

Abstract to symposium Update in Addiction Medicine

Title: People who inject drugs and HIV transmission in Indonesia: a biopsychosocial approach

Shelly Iskandar¹, Reinout van Crevel³, Teddy Hidayat¹, Ike M. P. Siregar¹, Lucas Pinxten², Andre J.A.M. Van der Ven³, Cor A.J. De Jong⁴

¹ Department of Psychiatry, Faculty of Medicine, Padjadjaran University/ Hasan Sadikin Hospital, Bandung, Indonesia

² Health Research Unit, Faculty of Medicine, Padjadjaran University/ Dr. Hasan Sadikin Hospital, Bandung, Indonesia

³ Department of General Internal Medicine and Nijmegen Institute for Inflammation, Infection and Immunity, Radboud University Nijmegen Medical Centre, Nijmegen, the Netherlands

⁴ Nijmegen Institute for Scientist-Practitioners in Addiction (NISPA), Nijmegen, the Netherlands

Background:

People who inject drugs (PWID) have constituted to be a major component of the country's HIV epidemic. Despite implementation of several programs, HIV risk behavior is still high and coverage of harm reduction is still low. Therefore, the biopsychosocial factors in PWID should be better studied to formulate more suitable intervention.

Methods:

Literature studies and several researches among PWID have been studied to describe the socio-demographic characteristics, the risk behavior, the determinants of access to drug treatment, the co-occurring problems, and the quality of life of PWID and to explore family involvement in HIV care.

Results:

Addiction is a result of the combination of different biopsychosocial factors. In communities, there were former and current PWID. Those who never accessed treatment were younger compared to methadone patients (28 ± 4 vs. 30 ± 4 years), had a shorter history of injecting drug use, lower education, lower level of occupation and income. The most frequent co-occurring disorders in 112 methadone patients were hepatitis C (92%), HIV (77%), benzodiazepine abuse (56%), and anxiety disorders (32%). Severity of psychiatric and physical problems was associated with lower quality of life. The hope of family for the future of HIV patients is high although they perceive more worry about their sick relative.

Conclusion:

Comprehensive treatment is essential and related with better quality of life. Perceived worrying behavior in family of HIV patients with IDU history is high and should be addressed to increase the support from the family.

Correspondence Address :

Department of Psychiatry, Faculty of Medicine, Padjajaran University/ Hasan Sadikin Hospital, Jl. Eijkman no. 38 Bandung – Indonesia 40161

Phone : +62 22 2037823

Fax : +62 22 2030776

Mobile phone : +628562133201

Email address : shelly_bdg@yahoo.com

People who inject drugs and HIV transmission in Indonesia: a biopsychosocial approach

This review starts with a description of HIV problem in Indonesia and the role of people who inject drugs in HIV transmission. The intervention programs to handle HIV transmission driven by people who inject drugs are described; this is followed by the concept of biopsychosocial approach.

HIV epidemic in Indonesia

The first case of Acquired Immunodeficiency Syndrome (AIDS) in Indonesia was notified in 1987 (World Health Organization Regional Office for South-East Asia and Ministry of Health Republic of Indonesia, 2007) and it was not until 1995 that the first AIDS case among injecting drug users (IDU) was reported (Mesquita et al., 2007b). Since then, IDU have constituted to be a major component of the country's HIV epidemic and being the main route of transmission in large parts of Indonesia, especially in urban areas of Java, North Sumatra, and South Sulawesi, followed by heterosexual transmission, especially in Papua (Directorate General CDC & EH, 2008). Injecting drug users may constitute 50% of all HIV-infected individuals in Indonesia (see figure 1), compared with 0.6% for South Africa and 3% for Kenya (Mathers et al., 2008, UNAIDS et al., 2008).

In the Indonesian report on the follow up of the declaration of commitment on HIV/AIDS, it was shown that the estimated annual number of new HIV infections in South and South-East Asia decreased from 450,000 (150,000-800,000) in 2001 to 340,000 (180,000-740,000) in 2007. In spite of this improvement, in South-East Asia and particularly in Indonesia, the prevalence of HIV is growing. The increasing number of new HIV

infections in Indonesia makes the epidemic one of the fastest growing in Asia, even though the aggregate national prevalence is as low as 0.16% (NAC, 2006-2007).

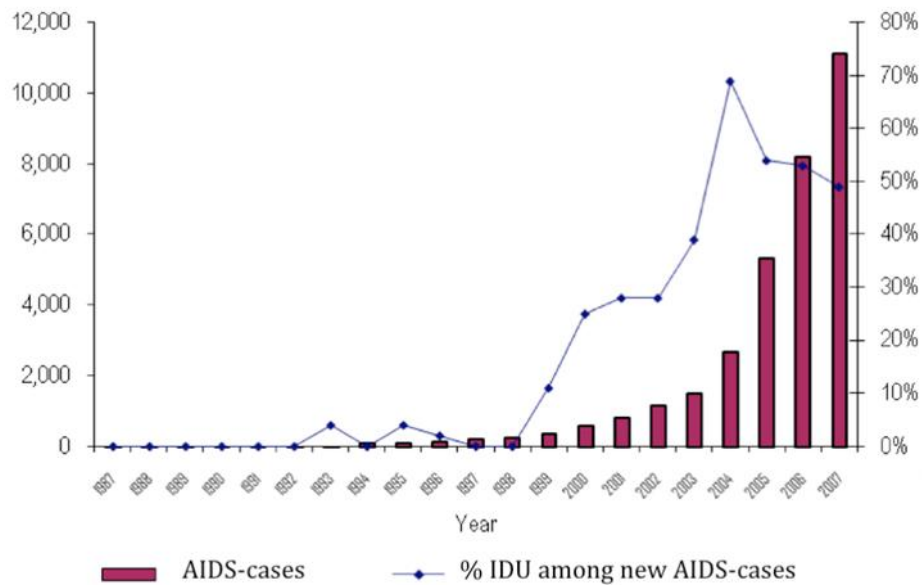


Figure 1.1 Trend of cumulative AIDS cases and IDU percentage among new AIDS cases (Direktur Pengendalian Penyakit Menular Langsung Depkes RI, 2008)

Injecting drug users in the context of HIV epidemic in Indonesia

Similar to various other countries, it was the HIV epidemic that drew the first attention to the increase of drug-taking practices in Indonesia. Until 1998, all data indicated that the HIV prevalence in Indonesia was low, even in the traditional high risk groups, such as men who have sex with men, female sex workers, and people who inject drugs.

A survey in the major drug treatment centre in the capital, Jakarta, found no indication for HIV infection among those tested from 1996 to 1998, however, because of limited numbers of IDU under treatment, only between 50 and 60 a year were tested,. In the next survey in 2000, 39 out of 247 (15%) from IDU were tested HIV-seropositive.. Two years later, HIV prevalence among injectors at this sentinel site was recorded at 48%—by far the

highest prevalence rate among any risk population in Indonesia (Pisani, 2006). The Indonesian Ministry of Health reported HIV seroprevalence among IDU to be 43 – 56% (Depkes RI and KPA, 2006), a very high rate compared to other Asian countries such as Pakistan (8-24%) (UNAIDS and WHO, 2007), China (18-50%) (UNAIDS and WHO, 2006), Vietnam (34%) (UNAIDS and WHO, 2007), Thailand (38%) (UNAIDS, 2006).

The estimation number of Indonesian people who inject drugs in 2003 was 145,000 to 170,000 (Pisani, 2006). IDU in Indonesia (Pisani et al., 2003, 2007, Heriawan et al., 2004-2005) are younger and had higher education (most of them graduate from senior high school or higher education) compared to IDU in Australia, Canada, China, Iran, Israel, Netherland, Poland, Thailand, and USA (Brands et al., 2008, Lawrinson et al., 2008, Peles et al., 2008, Cacciola et al., 2001, Carpentier et al., 2009). Several Indonesian studies reveal that almost all IDU reported risky injecting practices (Gordon et al., 2000, Setiawan et al., 1999, Pisani et al., 2003). Findings from the Indonesian Behavioural Surveillance Survey (BSS) in 2004-2005 indicated that IDU tend to gather in groups to ‘shoot up’ together in a particular circle with an average size of 7 – 14 people (Badan Pusat Statistik (BPS) and Departemen Kesehatan RI, 2005). Apart from transmission of blood-born infections among peers, IDU may also spread these infections to the general populations. A study conducted in 2002, showed that over two-thirds of IDU were sexually active with high sexual risk behaviour, consistent condom use was reported by 10%, and almost half of them also reported having multiple sexual partners, (Pisani et al., 2003).

Indonesian programs for the prevention of HIV transmission

A variety of prevention strategies have been adopted and implemented in Indonesia to reduce the emerging HIV epidemic. Many governmental organizations play a role in the control of the HIV/AIDS epidemic, primarily the KPA or the National AIDS Commission

(NAC), which has been a part of the Presidential Cabinet from July 2006. The Ministry of Health is responsible for implementing the response to the HIV/AIDS epidemic, comprised of four departments. The Pharmacy Department is responsible for all medications including anti-retroviral treatment (ART). The Centre for Diseases Control includes the National AIDS Program which is responsible for program development, building local human resources and for all matters related to epidemiology. The Department of Medical Services runs all the hospitals, the Drug Program (including methadone clinics), and all laboratories. Lastly, the Community Health Department is responsible for the Community Public Health Centres (Puskesmas) programs.

The National Narcotic Board (BNN), which is related to the National Police, is responsible for drugs demand and supply reduction. Demand reduction includes prevention (family based, school based, community based and workplace based), treatment and rehabilitation activities in public, non-government organizations (NGO), and private facilities, employing various modalities. Supply reduction strategies are implemented through more intensive eradication of cannabis cultivation, intensive investigations and raids of clandestine manufacturers and applying strict airport and seaport interdictions. Also related to this effort is the Ministry of Justice and Human Rights, which runs prisons in the country and is responsible for every intervention inside the prison system (Mesquita et al., 2007a). Supply and demand reduction approaches are complemented by a harm reduction (HR) approach.

The role of NGO in HR activities has been notably instrumental since late 1990s (Mesquita et al., 2007b), and it was not until early of January 2007 that the official national policy has been stipulated. The national HR policy aims to prevent HIV transmission among IDU and their partners, prevent HIV transmission from IDU and their partners to general population; and integrate HR approach into public health system through HIV/AIDS prevention, care, support and treatment (CST) services as well as drug addiction

rehabilitation service. It is implemented through 12 programs or services by involving multi-sectorial agencies and institutions and by 2010 the programs should provide corresponding services for at least 80% of the IDU population (19 Januari 2007).

Among the twelve HR programs, the methadone maintenance treatment (MMT) is stated as priority programs by the Ministry of Health (Direktur Pengendalian Penyakit Menular Langsung Depkes RI, 2008). The opioid substitution treatment has shown its effectiveness in reducing injecting drug use, unsafe injection practices, unsafe sexual practices, and seroconversion rates for HIV (Mattick et al., 2003, Mattick et al., 2008, Berkman and Wechsberg, 2007). By 2008, twenty-four MMT clinics are operational in seven provinces (Asril, 2008) and 110 service points of needle and syringe exchange programs (NSP) are operational in Indonesia (Minister of Health, 2008). The national Integrated Biological and Behavioural Surveillance Survey (IBBS) in 2007 revealed that most of those who received MMT were still injecting drugs (Ministry of Health et al., 2008) and despite receiving needles from needle exchange program (NEP), IDU still shared needles, ranging from 9% in Semarang to 63% in Jakarta (Ministry of Health et al., 2008), leading to question about its effectiveness.

Apart from continuing needle sharing, the coverage of HR programs is still low and the drop-out rate is high. WHO-SEAR and Indonesian ministry of health (2007) reported that there were a total of 1,546 MMT clients registered in 12 MMT clinics by the end of 2006, in which only 752 of them (49%) were still in treatment (World Health Organization Regional Office for South-East Asia and Ministry of Health Republic of Indonesia, 2007). Furthermore, in 2006, the total number of IDU residing in the cities in which the clinics operated was estimated to be not less than 42,000 (Depkes RI and KPA, 2006). It implies that only 4% of IDU ever used the service.

Many studies have shown that pharmacotherapy is an effective HR strategy. Methadone and buprenorphine are commonly used with positive effects as described above (Mattick et al., 2003, Mattick et al., 2008, Berkman and Wechsberg, 2007). However, the complex nature of addiction may ask for additional interventions, such as HIV-related or psychiatric medical care. For patients in need, the provision of these additional support services is indeed associated with improved drug treatment retention and lower relapse rates (Berkman and Wechsberg, 2007, Amato et al., 2004). Besides stabilization and reduction of the injecting risk behaviour, abstinence could be a legitimate goal of harm reduction (Smyth, 2006, Fetterman et al., 2004, Kellogg, 2003, Koutroulis, 2000) and preferable when feasible (Critchlow and Nadeem, 2006, O'Brien, 1996). Finally, it should be noticed that the different HR programs not only reduce the harmful consequences of drug use of individuals but are beneficial from a public health point of view as well.

Concept of biopsychosocial approach

There are several concepts of addiction, such as the moral model, pharmacological model, symptom model, disease model, and learning mode, and different treatment types that can be offered depending on the model (Brink van den, 2006). One of the latest introduced models was the biopsychosocial model. This model views addiction as a disease with continuum of severity with biological, psychological and social causes and consequences (2000, McLellan et al., 2000). Changes in one area could result in changes in other areas and the combination, interactions and the weightings of specific factors will be different for each individual (2000).

IDU in Indonesia are suffering from addiction as a chronic brain disease often in co-occurrence with HIV and other somatic, psychiatric and social problems. All of these co-occurring problems and their treatment interact in a complex way. Furthermore, like other Asian countries, Indonesia is a collectivist society. People are integrated from birth onward into strong, cohesive in-groups, often extended families (Hofstede and McCrae, 2004). Involvement and support from the family or non-related subjects are strongly associated with better physical and psychological adjustment, improving the well being of patients (Gordillo et al., 2009, Weaver et al., 2005). However, families with high stress may also transfer psychological distress to other family members (Brincks et al., 2010). Therefore, family members can be seen as a source of support from one side but may act as a source of stress from the other side (Owens, 2003).

Challenges in implementation of intervention program

Implementation of harm reduction program in Indonesia faces great challenges. Until recently, a common view of the general public and some health care providers in Indonesia was that drug addicts are weak or bad people, unwilling to control their behaviour and gratifications (Leshner, 1997, Hyman, 2007). On the other hand, health care providers and societies may also view drug dependence as a curable, acute condition and not as a chronic disease. These viewpoints may have an impact on the treatment strategies and outcome expectations (McLellan et al., 2000).

There is a considerable number of IDU who change from injection to non-injection drug administration. These subjects are called former injecting drug users when no drugs have been injected in the previous 6 months (Neaigus et al., 2001, Des Jarlais et al., 2007b). The high HIV, Hepatitis B and C prevalence in former IDU is important since these infections can be further transmitted to others through sexual risk behaviour, sharing of non-

injection drug-use implements such as straws and crack pipes, and other practices such as tattooing (Gyarmathy et al., 2002, Neaigus et al., 2007, Tortu et al., 2004, Des Jarlais et al., 2007a).

The HIV risk behaviour among former IDU in comparison with current IDU in Indonesia is comparable. There is an indication that the access to treatment and care is limited for IDU (Directorate General CDC & EH, 2008). Drug use is illegal and highly stigmatized; factors that influence treatment entry among drug users may differ from factors that influence treatment utilization for other types of health needs.

The retention and the coverage of the MMT programs in Indonesia remains very low (Mesquita et al., 2007a). Care for co-occurring problems will increase the effectiveness and higher utilization of services (Berkman and Wechsberg, 2007) and integrated services should be established based on the patients' characteristics and problems (Willenbring, 2005). The prevalence of psychiatric disorders in IDU is high (Yen et al., 2011, Erfan et al., 2010, Gu et al., 2010, Liao et al., 2011, Zahari et al., 2010, Maremmani et al., 2011, Carpentier et al., 2009, Jones et al., 2010, Schafer et al., 2010). The psychiatric problems are associated with HIV infection and its treatment (Kaul and Lipton, 2006, Judd et al., 2005, Basu, 2010) and drug use (Maremmani et al., 2011, Brands et al., 2008).

Involvement and support from the family or non-related intimates are strongly associated with better physical and psychological adjustment in HIV-infected patients (Gordillo et al., 2009, Weaver et al., 2005). However, data regarding factors that may influence the support of non-related intimates is still limited. The satisfaction of the family members in services received from health care providers, problems they are faced with in helping sick relatives, and their hope concerning the future of their sick relatives are important to be considered in increasing a support from significant others.

References

- Peraturan Menteri Koordinator Bidang Kesejahteraan Rakyat RI selaku Ketua Komisi Penanggulangan AIDS Nasional Nomor 02/PER/MENKO/KESRA/I/2007 tentang Kebijakan Nasional Penanggulangan HIV dan AIDS melalui Pengurangan Dampak Buruk Penggunaan Narkotika Psikotropika dan Zat Adiktif Suntik.
- Addictions Foundation of Manitoba: A biopsychosocial model of addiction. [Accessed August 20, 2008].
- HIV/STI Integrated Biological Behavioral Surveillance (IBBS) among Most-at-Risk Group (MARG) in Indonesia. Ministry of Health, National AIDS Committee, Family Health International.
- AMATO, L., MINOZZI, S., DAVOLI, M., VECCHI, S., FERRI, M. & MAYET, S. 2004. Psychosocial combined with agonist maintenance treatments versus agonist maintenance treatments alone for treatment of opioid dependence. *Cochrane Database Syst Rev*, CD004147.
- ASRIL, A. 2008. Kondisi PTRM di Indonesia. *Pertemuan Konsultasi Nasional PTRM (National Consultation Meeting of Methadone Maintenance Treatment)*. Bandung.
- BADAN PUSAT STATISTIK (BPS) & DEPARTEMEN KESEHATAN RI 2005. Behavioral surveillance survey (BSS) results in Indonesia 2004-2005. Jakarta: Badan Pusat Statistik (BPS)[Central Bureau of Statistics] and Departemen Kesehatan RI [Ministry of Health, Republic of Indonesia].
- BASU, D. 2010. Overview of substance abuse and hepatitis C virus infection and co-infections in India. *J Neuroimmune Pharmacol*, 5, 496-506.
- BERKMAN, N. D. & WECHSBERG, W. M. 2007. Access to treatment-related and support services in methadone treatment programs. *J Subst Abuse Treat*, 32, 97-104.
- BRANDS, B., BLAKE, J., MARSH, D. C., SPROULE, B., JEYAPALAN, R. & LI, S. 2008. The impact of benzodiazepine use on methadone maintenance treatment outcomes. *J Addict Dis*, 27, 37-48.
- BRINCKS, A. M., FEASTER, D. J. & MITRANI, V. B. 2010. A multilevel mediation model of stress and coping for women with HIV and their families. *Fam Process*, 49, 517-29.
- BRINK VAN DEN, W. 2006. Verslaving: een chronisch recidiverende hersenziekte [Dependence: a chronic relapse brain disease]. *Justitiële verkenningen*, 32, 59-75.
- CACCIOLA, J. S., ALTERMAN, A. I., RUTHERFORD, M. J., MCKAY, J. R. & MULVANEY, F. D. 2001. The relationship of psychiatric comorbidity to treatment outcomes in methadone maintained patients. *Drug Alcohol Depend*, 61, 271-80.
- CARPENTIER, P. J., KRABBE, P. F., VAN GOGH, M. T., KNAPEN, L. J., BUITELAAR, J. K. & DE JONG, C. A. 2009. Psychiatric comorbidity reduces quality of life in chronic methadone maintained patients. *Am J Addict*, 18, 470-80.
- CRITCHLOW, G. & NADEEM, H. 2006. Abstinence-oriented treatment for opiate addiction. *Br J Psychiatry*, 188, 292-293 author reply.
- DEPKES RI & KPA 2006. Laporan Nasional: Kegiatan estimasi populasi dewasa rawan terinfeksi HIV tahun 2006 [National Report on Estimating HIV Infected Adult Populations 2006]. Jakarta: Departemen Kesehatan RI (Ministry of Health, Republic of Indonesia/MOH) and Komisi Penanggulangan AIDS Nasional (National AIDS Commission/NAC).
- DES JARLAIS, D. C., ARASTEH, K., PERLIS, T., HAGAN, H., ABDUL-QUADER, A., HECKATHORN, D. D., MCKNIGHT, C., BRAMSON, H., NEMETH, C., TORIAN, L.

- V. & FRIEDMAN, S. R. 2007a. Convergence of HIV seroprevalence among injecting and non-injecting drug users in New York City. *AIDS*, 21, 231-5.
- DES JARLAIS, D. C., ARASTEH, K., PERLIS, T., HAGAN, H., HECKATHORN, D. D., MCKNIGHT, C., BRAMSON, H. & FRIEDMAN, S. R. 2007b. The transition from injection to non-injection drug use: long-term outcomes among heroin and cocaine users in New York City. *Addiction*, 102, 778-85.
- DIRECTORATE GENERAL CDC & EH, M. O. H., REPUBLIC OF INDONESIA 2008. Cases of HIV/AIDS in Indonesia.
- DIREKTUR PENGENDALIAN PENYAKIT MENULAR LANGSUNG DEPKES RI 2008. Strategi pengendalian epidemi HIV dan AIDS terkait napza suntik. *Pertemuan Konsultasi Nasional PTRM (National Consultation Meeting of Methadone Maintenance Treatment)*. Bandung.
- ERFAN, S., HASHIM, A. H., SHAHEEN, M. & SABRY, N. 2010. Effect of comorbid depression on substance use disorders. *Subst Abus*, 31, 162-9.
- FUTTERMAN, R., LORENTE, M. & SILVERMAN, S. 2004. Integrating harm reduction and abstinence-based substance abuse treatment in the public sector. *Subst Abus*, 25, 3-7.
- GORDILLO, V., FEKETE, E., PLATTEAU, T., ANTONI, M. H., SCHNEIDERMAN, N. & NOSTLINGER, C. 2009. Emotional support and gender in people living with HIV: effects on psychological well-being. *J Behav Med*, 32, 523-31.
- GORDON, J., GORDON, D., WIDODO, A. & DEAKIN, S. 2000. Rapid assessment on drug abuse and HIV/AIDS by drug addicts in recovery. Bogor: Yayasan Kita.
- GU, J., LAU, J. T., CHEN, H., CHEN, X., LIU, C. & LIU, J. 2010. Mental health and interpersonal factors associated with HIV-related risk behaviors among non-institutionalized female injection drug users who are also sex workers in China. *Women Health*, 50, 20-36.
- GYARMATHY, V. A., NEAIGUS, A., MILLER, M., FRIEDMAN, S. R. & DES JARLAIS, D. C. 2002. Risk correlates of prevalent HIV, hepatitis B virus, and hepatitis C virus infections among noninjecting heroin users. *J Acquir Immune Defic Syndr*, 30, 448-56.
- HERIAWAN, R., AHNAF, A., ANWAR, J., PRAMONO, D., MULIA, A., PURNAMA, H., IRMANINGRUM, Y., HILMIAH, FARID, M. N., SUGIHARTONO & BUDIMAN, D. 2004-2005. Behavioral Surveillance Survey (BSS) Result in Indonesia 2004-2005. In: KESEHATAN, B. P. S. W. D. (ed.). Jakarta.
- HOFSTEDE, G. & MCCRAE, R. R. 2004. Personality and Culture Revisited: Linking Traits and Dimensions of Culture. *Cross-Cultural Research*, 38, 52-88.
- HYMAN, S. E. 2007. The neurobiology of addiction: implications for voluntary control of behavior. *Am J Bioeth*, 7, 8-11.
- JONES, D. L., WALDROP-VALVERDE, D., GONZALEZ, P., MACK, A., KUMAR, A. M., OWNBY, R., WEISS, S. M. & KUMAR, M. 2010. Mental health in HIV seronegative and seropositive IDUs in South Florida. *AIDS Care*, 22, 152-8.
- JUDD, F., KOMITI, A., CHUA, P., MIJCH, A., HOY, J., GRECH, P., STREET, A., LLOYD, J. & WILLIAMS, B. 2005. Nature of depression in patients with HIV/AIDS. *Aust N Z J Psychiatry*, 39, 826-32.
- KAUL, M. & LIPTON, S. A. 2006. Mechanisms of neuroimmunity and neurodegeneration associated with HIV-1 infection and AIDS. *J Neuroimmune Pharmacol*, 1, 138-51.
- KELLOGG, S. H. 2003. On "Gradualism" and the building of the harm reduction-abstinence continuum. *J Subst Abuse Treat*, 25, 241-7.
- KOUTROULIS, G. 2000. "That original tension". Negotiating abstinence in clinicians' accounts of harm reduction in nonresidential treatment of heroin withdrawal. *J Subst Abuse Treat*, 19, 89-98.

- LAWRINSON, P., ALI, R., BUAVIRAT, A., CHIAMWONGPAET, S., DVORYAK, S., HABRAT, B., JIE, S., MARDIATI, R., MOKRI, A., MOSKALEWICZ, J., NEWCOMBE, D., POZNYAK, V., SUBATA, E., UCHTENHAGEN, A., UTAMI, D. S., VIAL, R. & ZHAO, C. 2008. Key findings from the WHO collaborative study on substitution therapy for opioid dependence and HIV/AIDS. *Addiction*, 103, 1484-92.
- LESHNER, A. I. 1997. Addiction is a brain disease, and it matters. *Science*, 278, 45-7.
- LIAO, Y., TANG, J., LIU, T., CHEN, X., LUO, T. & HAO, W. 2011. Sleeping problems among Chinese heroin-dependent individuals. *Am J Drug Alcohol Abuse*, 37, 179-83.
- MAREMMANI, A. G., DELL'OSSO, L., PACINI, M., POPOVIC, D., ROVAI, L., TORRENS, M., PERUGI, G. & MAREMMANI, I. 2011. Dual diagnosis and chronology of illness in treatment-seeking Italian patients dependent on heroin. *J Addict Dis*, 30, 123-35.
- MATHERS, B. M., DEGENHARDT, L., PHILLIPS, B., WIESSING, L., HICKMAN, M., STRATHDEE, S. A., WODAK, A., PANDA, S., TYNDALL, M., TOUFIK, A. & MATTICK, R. P. 2008. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *Lancet*, 372, 1733-45.
- MATTICK, R. P., KIMBER, J., BREEN, C. & DAVOLI, M. 2003. Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. *Cochrane Database Syst Rev*, CD002207.
- MATTICK, R. P., KIMBER, J., BREEN, C. & DAVOLI, M. 2008. Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. *Cochrane Database Syst Rev*, CD002207.
- MCLELLAN, A. T., LEWIS, D. C., O'BRIEN, C. P. & KLEBER, H. D. 2000. Drug dependence, a chronic medical illness: implications for treatment, insurance, and outcomes evaluation. *Jama*, 284, 1689-95.
- MESQUITA, F., WINARSO, I., ATMOSUKARTO, II, EKA, B., NEVENDORFF, L., RAHMAH, A., HANDOYO, P., ANASTASIA, P. & ANGELA, R. 2007a. Public health the leading force of the Indonesian response to the HIV/AIDS crisis among people who inject drugs. *Harm Reduct J*, 4, 9.
- MESQUITA, F., WINARSO, I., ATMOSUKARTO, I., EKA, B., NEVENDORFF, L., RAHMAH, A., HANDOYO, P., ANASTASIA, P. & ANGELA, R. 2007b. Public health the leading force of the Indonesian response to HIV/AIDS crises among people who inject drugs. *Harm Reduction Journal*, 4.
- MINISTER OF HEALTH 2008. Strategi nasional peningkatan cakupan pelayanan kesehatan bagi pengguna napza suntik. *Pertemuan Nasional Harm Reduction*. Makassar.
- MINISTRY OF HEALTH, STATISTICS INDONESIA & NATIONAL AIDS COMMISSION 2008. Integrated biological-behavioral surveillance among most-at-risk-groups (MARG) in Indonesia 2007. Surveillance highlights: injecting drug users. Jakarta.
- NAC 2006-2007. Country Report on The Follow Up to The Declaration of Commitment on HIV/AIDS: UNGASS Reporting Period 2006-2007. In: COMMITTEE, N. A. (ed.).
- NEAIGUS, A., GYARMATHY, V. A., ZHAO, M., MILLER, M., FRIEDMAN, S. R. & DES JARLAIS, D. C. 2007. Sexual and other noninjection risks for HBV and HCV seroconversions among noninjecting heroin users. *J Infect Dis*, 195, 1052-61.
- NEAIGUS, A., MILLER, M., FRIEDMAN, S. R., HAGEN, D. L., SIFANECK, S. J., ILDEFONSO, G. & DES JARLAIS, D. C. 2001. Potential risk factors for the transition to injecting among non-injecting heroin users: a comparison of former injectors and never injectors. *Addiction*, 96, 847-60.
- O'BRIEN, C. P. 1996. Recent developments in the pharmacotherapy of substance abuse. *J Consult Clin Psychol*, 64, 677-86.

- OWENS, S. 2003. African American women living with HIV/AIDS: families as sources of support and of stress. *Soc Work*, 48, 163-71.
- PELES, E., SCHREIBER, S. & ADELSON, M. 2008. Tricyclic antidepressants abuse, with or without benzodiazepines abuse, in former heroin addicts currently in methadone maintenance treatment (MMT). *Eur Neuropsychopharmacol*, 18, 188-93.
- PISANI, E. 2006. Estimating the number of drug injectors in Indonesia. *International Journal of Drug Policy*, 17, 35-40.
- PISANI, E., DADUN, SUCAHYA, P. K., KAMIL, O. & JAZAN, S. 2003. Sexual behavior among injection drug users in 3 Indonesian cities carries a high potential for HIV spread to noninjectors. *J Acquir Immune Defic Syndr*, 34, 403-6.
- SCHAFFER, I., EIROA-OROSA, F. J., VERTHEIN, U., DILG, C., HAASEN, C. & REIMER, J. 2010. Effects of psychiatric comorbidity on treatment outcome in patients undergoing diamorphine or methadone maintenance treatment. *Psychopathology*, 43, 88-95.
- SETIAWAN, I., PATTEN, J., TRIADI, A. & YULIANTO, S. 1999. Report on injecting drug use in Bali (Denpasar and Kuta): results of an interview survey. *International Journal of Drug Policy*, 109-116.
- SMYTH, B. P. 2006. Author's reply. *Br J Psychiatry*, 188, 292-293.
- TORTU, S., MCMAHON, J. M., POUGET, E. R. & HAMID, R. 2004. Sharing of noninjection drug-use implements as a risk factor for hepatitis C. *Subst Use Misuse*, 39, 211-24.
- UNAIDS 2006. 2006 Report on the global AIDS epidemic: a UNAIDS 10th anniversary special edition. Geneva: Joint United Nations Programme on HIV/AIDS (UNAIDS).
- UNAIDS & WHO 2006. AIDS epidemic update: December 2006. Geneva: Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO).
- UNAIDS & WHO 2007. AIDS epidemic update: December 2007. Geneva: Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO).
- UNAIDS, WHO & UNICEF 2008. Epidemiological Fact Sheet on HIV and AIDS, 2008 Update: Core data on epidemiology and response Indonesia.
- WEAVER, K. E., LLABRE, M. M., DURAN, R. E., ANTONI, M. H., IRONSON, G., PENEDO, F. J. & SCHNEIDERMAN, N. 2005. A stress and coping model of medication adherence and viral load in HIV-positive men and women on highly active antiretroviral therapy (HAART). *Health Psychol*, 24, 385-92.
- WILLENBRING, M. L. 2005. Integrating care for patients with infectious, psychiatric, and substance use disorders: concepts and approaches. *AIDS*, 19 Suppl 3, S227-37.
- WORLD HEALTH ORGANIZATION REGIONAL OFFICE FOR SOUTH-EAST ASIA & MINISTRY OF HEALTH REPUBLIC OF INDONESIA 2007. Review of the health sector response to HIV and AIDS in Indonesia 2007. New Delhi: WHO-SEARO and MOH-RI.
- YEN, C. N., WANG, C. S., WANG, T. Y., CHEN, H. F. & CHANG, H. C. 2011. Quality of life and its correlates among heroin users in Taiwan. *Kaohsiung J Med Sci*, 27, 177-83.
- ZAHARI, M. M., HWAN BAE, W., ZAINAL, N. Z., HABIL, H., KAMARULZAMAN, A. & ALTICE, F. L. 2010. Psychiatric and substance abuse comorbidity among HIV seropositive and HIV seronegative prisoners in Malaysia. *Am J Drug Alcohol Abuse*, 36, 31-8.