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HIV/AIDS Among Injecting Drug Users: A review on Epidemiology and Management of Occupational Exposure in Iranian Health Network Setting

Seyed Mohammad Alavi [1,*], Mohammad Hossein Sarmast Shushtari [2]

[1]Infectious and Tropical Diseases Research Center, Jundishapur University of Medical Sciences, Ahvaz, IR Iran
[2]Medical School, Jundishapur University of Medical Sciences, Ahvaz, IR Iran

*Corresponding author: Seyed Mohammad Alavi, Infectious and Tropical Diseases Research Center, Jundishapur University of Medical Sciences, Ahvaz, IR Iran. Tel: +986113387724, Fax: 06113335396, E-mail: alavi.seyedmohammad@yahoo.com.

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Context: Human Immunodeficiency Virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) concentrated in injecting drug users (IDUs) is a major public health in Iran as well as throughout the world. Health care workers (HCW) are occupationally at the risk of HIV infection. The aim of this article is to review the information about the IDUs, epidemiology, diagnosis, natural course of infection, immunopathogenesis, and occupational risks associated with managing HIV in the health care workplace.
Evidence Acquisition: Information obtained from previous investigation on HIV infection has yielded a better knowledge about HIV.
Results: Because HCWs are at the risk of HIV infection from IDUs attending the health care units, knowledge about preventive strategy and the efficacy of post exposure anti-viral therapy enables general physicians to manage these every moment events.
Conclusions: Based on existing data, HIV infection surveillance, performance of standard precaution, and post exposure prophylaxis with anti-retroviral drugs outlined in this review article represent reasonable interim approaches to this complex problem.

Keywords: HIV; Drug Abuse; Occupational exposure; Health Personnel

1. Context

A high percentage of HIV infected population throughout the world are injecting drug users (IDUs), the majority of them are living in undeveloped countries. More than two third of HIV/AIDS persons in Iran are attributed to IDUs (1). In addition to HIV infection these people are also infected with serious viruses including viral hepatic pathogens such as hepatitis B virus (HBV) and hepatitis C virus (HCV) due to sharing contaminated needles and syringes (2-6). Beside the mentioned health problems, IDUs are exposed to dangerous infections such as tuberculosis (TB) and multi-drug TB (MDR-TB) (7-12), sexually transmitted infection (STI) (13), and malaria (14) because of their antisocial behavior and imprisonment (8, 14-16). One particular cause of STI transmission among female sexworkers is unprotected sexual relationships with IDUs (17), who serve as reservoirs for HIV, HCV, or HBV (18), in addition to their high-risk sexual (17) and injecting (19) behaviors. The considerable prevalence of HIV and HCV with the rate of approximately 14% and 80%, respectively among Iranian IDUs at the end of 2009 (20) suggests the important role for this population in transmission of these infections to the general population. Therefore, IDUs are the most important source of dangerous infectious pathogens threating the public health (21). General physicians as well as other health care workers (HCWs) concerned with public health should not overlook the dangers of IDUs in health care settings. The aim of this article is to review the current information about epidemiology, diagnosis, and prevention of HIV/AIDS among IDU person attending health care workplace.

2. Evidence Acquisition

A systematic review of the literature on the epidemiology, diagnosis, and prevention of HIV from 1991 to 2012 using computerized bibliographic databases which include Pub Med, Current Content, Scopus, EMBASE, Google Scholar, and Iran Medex was carried out to increase understanding of HIV/AIDS in health care settings.

3. Results

3.1. Illicit Drug Use

Although addiction to opium has been present in Iran for centuries, now, because of emergence of intravenous drug use along with transmission of infectious diseases including HIV and HCV it has changed into a major pub-

Implication for health policy/practice/research/medical education:
This article is a useful guide for general physician involved in public health to manage infectious diseases.

lic health with significant social, psychological, familial, and economic importance (22, 23).

3.2. Profile of Drug Addicts in Iran

Data from various provinces of Iran and within different social groups show that more than 90 % of the drugs abusing population are male. Around two-thirds of the addict population are married, and about less than 10% of the addicts live alone. The majority of drug abusers are employed, where the unemployed comprise only a fifth of this population (22, 23).

3.3. Kind of Substances

Narcotics are the most common substance in Iran with the incidence rate of 73 % (some of them also abuse a preparation of opium called Shireh), heroin ranked second with 39 %, cannabis use with the rate of 13 %, and cocaine and stimulant with the negligible rate. On average, 62 % of them are uni-drug users (22).

3.4. Route of Substance Administration

Opium and Shireh are abused via smoking, ingestion, or rarely by injection, while heroin is sniffed, smoked, or injected. Approximately 20 - 25 % of total Iranian addicts abuse their substances via intravenous injection (1, 2, 22). Despite easy access to needles in Iran, high proportion of IDUs mostly in street and in prisons had a positive history of sharing syringes and needles with their friends. It appears that the sharing is related to a practice of injecting with a peer group. Two-thirds of IDUs claimed to have engaged in this practice, therefore it is estimated that about 66.6% of them share needles (23).

3.5. Health Care Network in Iran

Ministry of Health and Medical Education of Iran, through its network of universities of medical sciences including health centers in the country, is in charge of provision of healthcare services. An elaborate system of health network has been established which has ensured provision of primary health services to the vast majority of public (24, 25).

3.5.1. Primary Health Center

The Primary Health Center (PHC) is the fundamental unit of the public health system providing services throughout Iran, from remote mountain areas to inner urban areas in the country's capital (24). The Iranian Health Care Network provides health services through first line health services called in Iran" Khaneh-e-Behdasht", health centers, and tertiary hospitals (24, 25). Since 1984, the activities of the health system have resulted in a dramatic decrease in the burden of common and endemic infectious diseases (25).

3.6. Epidemiology of HIV/AIDS

HIV/AIDS is amongst the most serious health problems worldwide and has developed important challenges. The first cases were reported in 1981, and today HIV not only affects the health of populations, it impacts households, communities, sociocultural development, and economic growth of nations (20).

3.6.1. Global HIV/AIDS Status

Now, with the progress made in the HIV/AIDS control in the world, the trend of HIV/AIDS has decreased. Today, there are approximately 34 million people living with HIV and nearly 30 million people have died of AIDS-related causes since 1981. Although a lot of progress have been made in the recent years by HIV testing and awareness of HIV status leading to a better personal control on the infection, but still many people are unaware of their HIV status (20, 26).

3.6.2. HIV/AIDS Status in Asia

Due to the growing trend of Iranians traveling to Asian countries such as India, China, Malaysia, and Thailand, and the geographical Iranian neighborhood with Pakistan, Afghanistan, and Central Asian countries, it is important to know the HIV status in those regions (20). Approximately 5 million HIV infected people are living in South/South-East Asia and East Asia. While most national epidemics are supposed to be stabilized, HIV prevalence is increasing in Bangladesh, Pakistan, and the Philippines. The most populous nations in the world (China and India) with large numbers of HIV infected people are located in the region near to Iran (20).

3.6.3. Epidemiology of HIV Infection in the Middle East and North Africa

There is considerable evidence on HIV prevalence and risk behavior practices among IDUs, men having sex with men (MSM), and female sex workers (FSWs) in this region. IDU is a key HIV mode of transmission worldwide (27) and was found to be the dominant mode of transmission in several countries such as Iran (28). Overall, HIV prevalence among IDUs was in the low to intermediate range compared to global figures (29), with significant variation across and within these countries. Although the prevalence of HIV among this risk group was low in several countries, there was robust evidence for concentrated epidemics among IDUs in at least Iran and Pakistan (30). Concentrated epidemics are defined as HIV prevalence consistently exceeds 5% in a high-risk group, while remaining below 1% in pregnant women (31). HIV incidence was found to be at very high levels of 16.8% per person every year among IDUs in a detention center in Iran (32). MSM are the most hidden and stigmatized of all HIV-risk groups in the region. Although reliable estimates of the

number of MSM are scarce, available data indicate that the proportion of the male population engaging in anal sex with males in this region is comparable to global levels of roughly 2 - 3% (33, 34). The prevalence of HIV among FSWs in the region continues to be at low levels in most countries, although at levels much higher than those in the general population.

3.6.4. Epidemiology of HIV Infection in Iran

According to statistics collected from medical and health services to the date of June 2012, total of 24 290 persons with HIV/AIDS in the country have been identified, where 90.8% of them were men and 9.2% were women. 3455 persons have been identified to have AIDS and 4722 patients with AIDS have died, and 46.4% of patients with HIV infection are in the age group 25 - 34 years. The common way of transmission was 69.6% by IDU, 10.5% by sex, blood transfusion and blood products (1%), and from mother to child transmission (1%). Transmission in 17.9% of this group was unknown (35).

3.7. Route of Transmission

The most common way of transmission of HIV is through heterosexual contact. Other ways, such as homosexual contact in men, female sex working, sharing injection equipments among injecting drug users, and mother to child are also important (26). Persons at highest risk for development of HIV/AIDS related diseases are FSWs (36), MSM (34), IDUs, IDUs sex partner (27, 30), and HCWs who are at risk for needle-stick and other exposures (37). The risk of HIV transmission by a deep hollow needle injury from an HIV infected source is about 0.3%, but if the source is HIV negative with a high risk behavior then the risk is lower (38). Studies show that the risk of HIV transmission is lower than that of HCV and HBV with the rate of 3% and 30%, respectively (26, 38). Mother-to-child HIV transmission rate is 30 - 40%, but when the mother is HCV co-infected this rate is higher. This risk increases with higher maternal viral load. Breast feeding transmits HIV to infant (39). HIV transmission is under influence of mode of delivery, so HIV infection is a contraindication for pregnancy, therefore HIV testing should be considered as a routine screening test in pregnant women (26).

3.7.1. Transmission of HIV in the Health Care Units

3.7.1.1. Infection Acquired Through the Medical Interventions

Medically transmitted infection is said to infections that are caused by medical interventions such as blood/blood products transfusion or organ transplantation. Blood borne pathogens such as HIV can be transmitted by transfusion of contaminated blood or blood products and by seropositive organ transplant donors (26).

3.7.1.2. Occupational Exposure

3.7.1.2.1. Patient-to-HCW Transmission

HIV is a blood-borne viral infection that can be transmitted by transfusion or needle stick. By this reason, the HCWs are occupationally at the risk of HIV transmission from infected patients. Percutaneous exposure to blood is the primary mode of transmission for HIV from patients to health staff (26). Splashes of blood from infected patients to HCWs' mucous membranes are reported to be a route of transmission for HIV (40).

3.7.1.2.2. Patient-to-patient Transmission

Transmission of HIV in health care setting deserves special emphasis. Nosocomial transmission of HIV among patients and staff is described in the past reports from various countries. Hemodialysis settings, cardiovascular departments, endoscopic clinics, and orthopedic wards are hospital divisions where HIV transmission has been reported (26, 27). Spreading in these units has been suggested to be due to environmental contamination, contaminated dialysis machines, and inadequate infection control procedures in the dialysis unit (26). In addition, patient-to-patient transmission in health care settings, primarily related to faulty injection practices, appears to be a reasonably important mode of HIV transmission in developing countries (41).

3.7.1.2.3. HCW-to-Patient Transmission

To date, iatrogenic transmission of HIV from HIV-infected HCW to their patients in some countries has been reported. The first report of documented iatrogenic transmission in dental surgery was reported from USA (42).

3.8. Immunopathogenesis of HIV Infection

The main effect of HIV infection is progressive reduction in the number of T lymphocytes CD4+ which is resulted in progressive decline in the immunity system (43).

3.9. The Natural Course of HIV Infection

1. Acute infection or acute retroviral syndrome: This occurs 2 - 4 weeks after exposure to the virus. At this stage, patients experience symptoms such as fever, rash, joint pain, and enlarged lymph nodes. At this stage, which is self-limited, serological tests are negative and the diagnosis of acute infection is based on detection of viral RNA through the plasma (27, 43).

2. Asymptomatic acute infection: Since the start of the infection to onset of AIDS, about 10 years in adults and 2 years in children, the patients has no symptoms and appear healthy (43).

3. Persistent generalized lymphadenopathy (PGL): PGL is called to large lymph nodes in more than 2 site of body

except the groin area. Enlarged lymph nodes are non-symmetrical and non-painful (43).

4. Immunosuppression period: Along with the progress of HIV infection, patients are prone to serious infections such as tuberculosis, pneumonia, and repeated fungal and viral infections. Some patients present general symptoms such as fever and weight loss, which was called in the past as ARC. The others present diarrhea and weight loss, which was called Slime disease. Finally, patients lost their lives due to certain infections such as cryptococcal meningitis or kaposi sarcoma, in which stage infection is categorized as ull blown disease (10, 26, 44).

3.10. HIV Testing

Examination of HIV antibodies in the blood is used for routine HIV testing. It is recommended that two tests be performed to detect HIV infection. For diagnosis of infection, both HIV antibody tests should be positive. Western blot (WB) test should be performed to confirm the infection, but in limited resource area (lacking access to WB testing facilities) two positive Elisa-Anti-HIV tests for risk-assessed patients is also accepted for diagnosis of HIV infection (10, 39, 45). Due to the limitation of facilities and resources in health work places, other new antigen detection based tests are not discussed here.

3.11. Case Definition

According to WHO case definition for AIDS surveillance, in limited resource areas (lacking access to HIV testing facilities) AIDS patients are defined as bellow:

3.11.1. Adults

In adults case definition of AIDS is definite when at least two major and one minor symptom are present (44). Major symptoms include: 1) Weight loss of over 10% of body weight. 2) Diarrhea lasting more than 1 month. 3) Fever lasting more than 1 month. Minor symptoms include: 1) A cough that lasts more than 1 month (excluding tuberculosis). 2) Diffuse pruritic dermatitis. 3) A history of herpes zoster. 4) Oro-pharyngeal candidiasis. 5) Disseminated chronic herpes simplex. 6) Diffuse lymphadenopathy.

3.11.2. Children

In children case definition of AIDS is definite when at least two major and two minor symptoms are present (44):Major symptoms include: 1) Weight loss or abnormal growth. 2) Diarrhea lasting more than 1 month. 3) Fever lasting more than 1 month. Minor symptoms include: 1) A lasting cough. 2) Diffuse rash. 3) Repeated ear or pharyngeal infections. 4) Oro-pharyngeal candidiasis. 5) Diffuse lymphadenopathy.

Prevention of HIV infection in health care units:

3.12. Standard Precautions

In dealing with every patient as well as HIV infected patients, following precautions should be taken (26, 46):

1. Use gloves while contacting the patient and wash hands after that.
2. Use protective eyewear and mask..
3. Use sharp materials safely and cautiously.
4. Clean the blood stains and contaminated materials on surfaces with appropriate disinfectants.
5. Use standard disinfection and sterilization.
6. Treat any material soiled with blood or body substance as contaminated.
7. Vaccinate all the clinical and laboratory staff against hepatitis B.
8. Other measures include: wearing two pairs of gloves over each other, changing surgical methods to prevent exposure prone to infection, use safe systems without needles and other sharp tools.

3.13. HIV Treatment

HIV treatment includes the use of combination of antiretroviral therapy against the virus itself and medications to prevent and treat the many opportunistic infections that can occur when the immune system is compromised by HIV. Combination anti retroviral treatment (ART), first introduced in 1996, has led to dramatic reductions in morbidity and mortality, and access has increased in recent years, rising from less than half a million people on treatment in 2001 to 6.6 million people in 2010, with an increase of 1.35 million people since 2009 (26).

3.14. Preventive Measures

3.14.1. Pre-Exposure

Standard precaution, to avoid contact with potentially contaminated body substances such as blood, bloody secretions, or tissues of patients in health care units, should be performed.

3.14.2. Post Exposure

Approach to occupational exposure to potentially contaminated body substances should be avoided. In the case of occupational exposure including splashes, mucus membrane, or needle sticks preventive recommendations should be followed as below (26, 46):

1. Appropriately wash the exposed area.
2. Inform the event to in charge health official.
3. Test the source patient for HIV and hepatitis B and C.
4. If the source patient was infected, the contact person should be tested for above mentioned tests.
5. If the exposed person was unvaccinated to hepatitis B vaccine, hepatitis B immunoglobulin has to be injected and the primary HBV vaccination has to be given with a preferable booster dose.
6. If skin or intravenous contact with HIV is confirmed,

in the first few hours prophylaxis with anti-retroviral drug must be given and consultation with an infectious disease specialist should be done. Combination therapy with at least 3 anti-retroviral drugs for 4 weeks (according to national HIV program) is recommended (35).

7. Protect sexual partners through a 12-week follow-up period and prevent from pregnancy and blood donation and report every febrile illness.

8. Repeat anti-HIV tests in weeks 6 to 12.

9. Be sure of reporting the events, results of the tests, and the follow-up.

4. Conclusion

Based on existing data, HIV infection surveillance, performance of standard precaution, and post exposure prophylaxis with anti-retroviral drugs outlined in this review article represent reasonable interim approaches to this complex problem.

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Authors' Contribution

SM Alavi; design 80%, writing 90%, revision 100%, search 70%. MH Sarmast; design 20%, writing 10%, search 30%.

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