

## HIV from Blood Exposures in India

Nitin Shinde<sup>1</sup>

### ABSTRACT

By the end of 2017, there were an estimated 21.40 lakh people living with HIV (PLHIV) in India. There was an adult HIV prevalence of 0.22%. Slightly more than two fifths (42%) of the total estimated PLHIV were females. Around 87.58 thousand new HIV infections and 69.11 thousand AIDS-related deaths occurred in 2017. With 3.30 lakh PLHIV, Maharashtra had the highest number of PLHIV contributing 15% of total PLHIV in the country.<sup>1</sup>

HIV risk is two-way - Infections can come from sexual contacts and from blood exposures. Knowing the proportions of HIV coming from each direction as well as the specific blood exposures that are responsible - e.g., medical injections, dental care - is useful not only to advise people how to avoid HIV infection but also to develop more effective programs to slow epidemic growth.

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Despite advances in our scientific understanding of HIV and its prevention and treatment as well as years of significant effort by the global health community and leading government authorities, too many people living with HIV or at risk for HIV still do not have access to prevention, care, and treatment, and there is still no cure. However, effective treatment with antiretroviral drugs can control the virus so that people with HIV can enjoy healthy lives and reduce the risk of transmitting the virus to others.

The biomedical facts are that the virus transmits many hundreds times faster through blood than through semen, so why is the sexual route totally

dominating our work, and the blood route mostly neglected, especially in a country where unsterile health care is so common?

### What if we are wrong about the way HIV spreads through different routes; could that be possible?

Why it is useful to know more about HIV transmission through blood exposures. HIV risk is two-way - Infections can come from sexual contacts and from blood exposures. Knowing the proportions of HIV coming from each direction as well as the specific blood exposures that are responsible - e.g., medical injections, dental care - is useful not only to advise people how to avoid HIV infection but also to develop more effective programs to slow epidemic growth. The sexual route, places the full responsibility on the HIV-positive person, making it to a large extent a moral issue. Either the HIV-positive person has got the virus from acting irresponsible, or the partner has. That is very convenient for society.

Traditionally when the blood route is addressed, it is related to IV drug users, a totally marginal group. Unsterile practices are very common in both the public and private sectors in India. If the health services are not safe, then the virus will spread over time regardless of the promotion and effective use of condoms. Unsafe health practices are a risk, if we do not make serious attempts to change them. There is much available evidence from studies in India which shows an important proportion of HIV infections

<sup>1</sup>Consultant Infectious Diseases and Internal Medicine, Alexis Multispeciality Hospital, Nagpur

#### Address for Correspondence -

Dr. Nitin Shinde

E-mail : dr.nitinshinde@gmail.com

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from blood exposures, the theory of predominant infections occurring through sexual route is questionable.

### **Information on the contribution of blood exposures (except blood transfusions and injection drug use) to India's HIV epidemic.**

Unsterile medical injections are probably the most common blood exposure in India. Within the last 10 years, as the public has become more aware of risks with blood exposures, single use of disposable syringes has become more common. Even so, a national survey of medical injection practices by the All India Institute of Medical Science (AIIMS) in 2002-03 reports 5.8 injections per person per year, of which 32 percent were a potential risk to transmit blood borne viruses due to use of unsterile or unreliably sterile needles and/or syringes.<sup>2</sup>

Several studies of injection practices in north India in 2002-03 describe frequent reuse of syringes while changing only needles.

### **Pathogenesis of HIV transmission through needles and syringes**

Outside the body at room temperature, HIV in blood or plasma remains viable for weeks in a damp environment (e.g., in a used syringe) and for hours if dry. Similarly, most infection control professionals in India underestimate the transmission efficiency of HIV through unsterile injections and other blood exposures, supposing a risk of 0.3 percent to 0.5 percent only. These estimates of risk to transmit come from studies of European and US health care workers after percutaneous exposures to HIV. However, most percutaneous exposures are shallow scratches that carry little risk. In a case-control study, deep injuries accounted for 6.8 percent of percutaneous exposures and were 15 times more dangerous than other injuries. From this, the calculated average risk to seroconvert after a deep needle stick accident is 2.3 percent. Intravenous injections carry more risk than intramuscular or sub-cutaneous injections. Contaminated multi-dose vials may infect several subsequent patients. As for tattoos, repeat punctures carry more risk than single punctures, and ink may also be contaminated.<sup>3</sup>

Notably, changing needles while reusing syringes - a common practice in India<sup>4</sup> - allows pathogens to pass from patient to patient. Pathogens reach the syringe through multiple mechanisms, including suction when the socket of the needle is pulled away from the syringe and back pressure from the muscle.

### **Evidence for HIV transmission through blood exposures in India Model-based estimates :**

Hauri and colleagues estimated that medical injections accounted for 160,000 new HIV infections in India (and smaller regional countries) in 2000. Singhal et al estimated that injections infected 20,000-60,000 with HIV in 2001.<sup>5</sup> These model-based estimates depend heavily on assumptions, including especially the transmission efficiency of HIV through injections with unsterilized equipment. Hauri et al. assume a transmission efficiency of 1.2 percent, whereas Singhal assumes 0.3 percent. In addition, these estimates are limited to injections, ignoring other common blood exposures.

### **Evidence from studies of risk factors for HIV infection :**

At least 5 studies are available of risks for prevalent or incident HIV in India that report information on blood exposures (other than injection drug use and transfusions) in STD patients, outpatients, blood donors, injection drug users, and the general population<sup>6</sup>. In these studies, persons reporting more blood exposures - injections, tattoos, or blood donations - consistently were more likely to be or to become HIV positive than were persons not reporting these risks.

### **Reported nosocomial and unexplained HIV infections :**

Many published studies as well as unpublished information describe nosocomial and unexplained HIV infections in India. Singhal summarized eight studies of HIV in children during 1997-2002. In an aggregate total of 618 HIV infected children, 68 (11 percent) infections were attributed to transfusions of blood and blood products and 17 (2.8 percent) to unknown non-vertical routes of infection. In a summary of 26 studies of HIV infection among

adults during 1987-2001, Singhal finds a total of 353 (10 percent) infections attributed to blood transfusion, 34 (1.0 percent) to injections and other medical exposures, and 47 (1.3 percent) for which the route of infection is considered to be unknown.<sup>6</sup>

Although determining the source of HIV infections during AIDS case reporting is difficult in India. In India where only a minority of AIDS cases are IDUs or MSMs - it is not easy to determine the source of HIV infection for most AIDS cases. Most HIV-positive persons in India - including FSWs and clients - have had blood as well as sexual exposures

#### **Practices that present risks for HIV transmission**

- Curative injections - irrational use of injections in the fear of losing the patient is common. If syringes and needles are reused, they become a significant source of infection.
- Injections for immunization - ignorance of injection safety while giving vaccines to children is common in rural areas.
- Multidose vials - multidose vials of local anesthetic and heparin are classic example of contamination and proven source of infection.
- Intravenous (IV) saline - same iv set if used for multiple patients, can become a source of transmission of infection of blood borne viruses.
- Health camps - tubal ligation camps, cataract camps are classic examples of opportunity for reuse of equipments without doing adequate sterilization.
- Blood banks - In spite of regulation of blood banks, there are still many instances where HIV has been transmitted through blood transfusion. This is due to increasing no of professional donors who can be still within window period of infection.
- Blood tests - when a single lancet needle / syringe reused to draw blood can pose risk transmission of infection.
- Dental care - until recently there were no guidelines about sterilization in dental care. The quality control and effectiveness of steam sterilization in dental practice remains elusive.

While overall perception of HIV transmission is linked to unsafe sex practices, There are still many healthcare workers who do not follow standard precautions. There is still a tendency to follow standard precautions for some patients but not for all, based on preconceived notions about who may or may not be HIV-positive. Unfortunately, assumptions about the overwhelming importance of sexual transmission have discouraged attention to blood exposures, not only in prevention but also research awareness of HIV transmission through blood exposures

However, problems remain. Reuse of unsterile and unreliably sterile syringes and/or needles continues on a massive scale; major and urgent initiatives are required to address this well-known but continuing risk. Despite substantial improvements in testing of transfused blood, continuing reports of people infected through transfusions suggest lapses in testing or record-keeping; and professional blood donors continue to operate.

The final solution to this problem is universal awareness and implementation of principles of injection safety.

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