Assessment of Post Exposure Prophylaxis (PEP) in Omdurman Voluntary Counselling and Testing Center (OVCTC)

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ABSTRACT

PEP is taking human immunodeficiency virus medicine (HIV) within 72 hours after possible exposure to HIV to prevent the occurrence of the disease.

Significance: exposure to the needle, surgical equipment, and rape is a life-threatening condition for hepatitis B virus (HBV), hepatitis C virus (HCV), HIV, acquired immunodeficiency syndrome (AIDS) infection, tetanus, and syphilis.

The objective of this study was to assess the PEP.

Methods: It was a descriptive-analytical study in OVCTC in September 2008.

30 patients in study as the whole number. We included all patients attending the OVCTC and potential exposed either occupationally or through sexual intercourse and received antiretroviral therapy (ARV) agents as prophylaxis. All cases diagnosed as HIV/AIDS and all persons need counseling were excluded in this study. Secondary data were collected from the records of the patients in OVCTC. Ethical considerations and clearance were taken from OVCTC and patients. It was accepted by the director.

Results: In these study 30 cases fully described from the record and part of them were interviewed. Most cases (13) 43% in the age group 26-35 years and the minority (2) 6% in age group (5-15 years) and (2) 6% in age group (46-55 years). Male (17) 56.6% and Female (13) 43.4%. Single (14) 46.6%, married (14) 46.6%, widow (1) 3.3% and divorced (1) 3.3%. Most of them (21), 70% are the health care professional, (27) 90% are educated and (26) 86.3% lived in Khartoum. The equipment of exposure (28) 93.3% due to needle stick, (1) 3.3% due to rape and (1) 3.3% due to rosary. (16) 53.3% were expose in 2007, (12) 40% in 2008 and (2) 6.6% in 2006. All of them started needle stick protocol. The baseline of HIV testing is negative in all. All of them started Duovir according to world health organization guidelines and non-reported side effects or complications.

Conclusion: Although PEP is offered in OVCTC according to
world health organization (WHO) guidelines, pre and post-test counseling, ARV prophylaxis, and counseling including ARV side effects; the outcome is good, although the patients are not adherent to schedule follow-up in the center.

Keywords: Acquired Immune Deficiency Syndrome; Antiretrovirals; Human Immunodeficiency Virus Infection; Omdurman Voluntary Counselling and Testing Center; Post-Exposure Prophylaxis

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Introduction and literature review
HIV is the virus that caused AIDS. (1) AIDS is HIV seropositive with AIDS-defining illness. AIDS is HIV seropositive and a cluster of differentiation antigen numbers (CD4) T-cell < 200 cell/mm³ blood. (2-4)

PEP is short term antiretroviral treatment to reduce the likelihood of HIV infection after potential exposure, either occupationally or through sexual intercourse (3-5)

- **Background Rationale and Justification**

  HIV/AIDS is an important topic all over the world and particularly in African countries; it has many negative and harmful effects, which were (socially, economically, financially, healthy, psychologically and politically affect the people and countries.). Exposure to the needle, surgical equipment, and rape is a life-threatening condition for hepatitis B virus (HBV), hepatitis C virus. (HCV), HIV/AIDS, infection, tetanus and syphilis. They may become at risk for themselves and for the rest. Furthermore, PEP is an important component in the prevention of HIV/AIDS. PEP was not highlighted before as well as its importance and magnitude among who works in the medical field.

- **Objectives**

  The general objective is to perform a full description for all exposed, registered and received ARV prophylactic agents in OVCTC; in September 2008. The specific objectives are to determine if there any post-exposure complications (infection, tetanus or psychological effect, to determine the mode of exposure and timing & date, to determine when ARV started and if there any side effects.

- **The timelines of HIV/AIDS:**

  1981: the first AIDS cases recognized in young homosexual men presenting with Pneumocystis Jirovecii, Pneumocystis Carinii Pneumonia (PCP) and Kaposi’s sarcoma (KS). Initially classified as GRID (gay-related immune deficiency)

  1982: blood-borne infection (hemophiliacs, blood transfusion recipients), infection in women and children described

  1983: HIV isolated in cell culture (human T-lymphotropic virus (HTLV-III), lymphadenopathy/AIDS virus (LAV), ARV 2), defined as the cause of AIDS (Montagnier and Gallo) - AIDS recognized in Africa

  1984: the receptor recognized as CD4 molecule on T lymphocytes

  1985: the first serological test for HIV approved, description of HIV seroconversion illness, and transmission by breast milk.

  1986: Center for Disease Control (CDC) disease classification first health care worker transmission described

  1987: AZT (zidovudine) approved for treatment. HIV-2 isolated

  1988: HIV now worldwide, HIV genome diversity, incubation period determined and trimethoprim-sulfamethoxazole prophylaxis for PCP

  1989: AZT resistance determined

  1991: the importance of TB and HIV co-infection

  1993: HIV plasma load assays available

  1995: first protease inhibitor (saquinavir). Combination antiretroviral therapy

  2008: over 25 million deaths since AIDS recognized. Over 30 ARV was available. (2)

  HIV-1 and HIV-2 are both human retroviruses single-strand RNA that can have similar effects on the human body, they are genetically distinct. (2)

- **General Properties about HIV**

  The virus spreads by budding, excreted in all body fluids( semen, vaginal secretions, blood, cerebrospinal fluid (CSF), milk, saliva, urine, and tears), resists all adverse PH, viable for several days at warm dry temperature, perished at boiling point for 15 minutes, destroyed by 10% iodine, in
alcohol after 15 minutes, destroyed by Hypochlorite, and 70% alcohol 15 minutes.\(^{(2)}\)

- **The life cycle; entry of HIV and effective drugs**

HIV Is a single strand RNA retrovirus. After mucosal entrance and exposure, HIV is moved to the lymph hubs by means of dendritic, CD4 or Langerhans cell, where the disease becomes built up. The statement of different receptors by dendritic cells encourage catch and transport of HIV-1. The cell entered by infection is spread by means of the circulation system with seeding off sanctuary locales (central nervous system and latent CD4 cell supplies). At that point, the quality of the CD4 cell populace will lessen. This led to the impedance of cells intervened invulnerability and empower shrewd diseases. Each develops virion is spherical and has a lipid membrane lined by a grid protein that is studded with glycoprotein (gp)120 and gp41 spikes encompassing a cone-molded protein center. This center houses two duplicates of the single-stranded RNA genome and viral compounds. The infection contaminates the CD4 cell in a convoluted grouping of occasions starting with a commitment of the viral gp120 and CD4 cell receptor (stage 1), which brings about a conformational change in gp1 20. This license connection with (CXCR4 or CCR5 as coreceptors for HIV-1 entry into CD4\(^{+}\) cells.: stage2) which is trailed by layer combination and basement passage including gp41 (stage3). Different cells communicating the CD4 cell receptor and lenient to contamination are monocyte-macrophages, follicular dendritic cells and microglial cells in the central nervous system (CNS). In the wake of infiltrating the cell and uncoating, a deoxyribonucleic acid (DNA) duplicate is interpreted from the ribonucleic acid (RNA) genome by the turn around transcriptase (RT) protein (stage4) that is conveyed by the tainting virion. Invert translation is a blunder inclined procedure, and various changes emerge with continuous replication (consequently the quick age of protection from drugs). This DNA is shipped into the core and coordinated haphazardly inside the host cell genome by means of an integrase catalyst (stage5). Coordinated infection is known as proviral DNA. On have cell enactment, this DNA duplicate is utilized as a layout to decipher new RNA duplicates (stage6), which are prepared and is sent out from the core, viral messenger RNA (mRNA) at that point being converted into viral peptide chains (stage7) The forerunner polyproteins are then cut by protease chemical to frame new popular basic proteins and viral catalysts, for example, the turnaround transcriptase and protease. These then move to the cell surface and amassed utilizing the host cell mechanical assembly to deliver irresistible viral particles (stage8). These bud from the cell surface, joining the host cell film as their lipid bilayer code, and cell lysis happen (stage9). When development is finished the new irresistible infection (virion) is then accessible to contaminate uninfected cells.\(^{(1)}\)

Depending on the above stages, the common drugs are very useful such as; non-nucleoside reverse transcriptase inhibitor (NNRTIs) (inhibit stage 4) Nevirapine (Viramune) binding near the active site of the enzyme, causes conformational changes to inhibit DNA synthesis or reverse transcription. Nucleoside reverse transcriptase inhibitors (NRTIs) inhibit stage (reverse transcription). Protease inhibitors (PIs) inhibit stage 8. Inhibition of cleavage of precursor polypeptides and assembly: Saquinavir, Ritonavir, and Indinavir, all are Protease inhibitors for HIV. New drugs (fusion inhibitors) stage 3, prevent viral entry into the cell by targeting gp41 and preventing fusion (subcutaneously injected), Enfuvirtide(T-20). Other entry inhibitors target CCR5 and CXCR4. Other new PIs drugs show activity against resistant virus (Tiplanavir and Darunavir TMC-114), and NNRTIs as Etravirine TMC-125).\(^{(1)}\)

- **Mode of transmission**

Includes sexual, intravenous drug users (IDUs), vertical transmission (MTCT), during pregnancy, at delivery, and during breastfeeding); blood transfusion, and occupational transmission as in table (1)(2)(3)\(^{(1,5)}\)

The mosquito transmission???? how many bites in an endemic area? The explanations include; biologically no extrinsic cycle, mechanical by sucking, and epidemiological NO…??\(^{(2)}\)

**Table (1): Estimated HIV transmission rates**\(^{(2)}\)

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Single exposure percentage %</th>
<th>Global importance %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual intercourse</td>
<td>00.01-1.00</td>
<td>70-80</td>
</tr>
<tr>
<td>Injecting drug use</td>
<td>00.50-1.00</td>
<td>5-10</td>
</tr>
<tr>
<td>Vertical</td>
<td>12-50</td>
<td>5-10</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>&gt;90</td>
<td>3-5</td>
</tr>
<tr>
<td>Health workers</td>
<td>00.30</td>
<td>&gt;0.01</td>
</tr>
</tbody>
</table>
- **Co-factors that contribute to HIV transmission "predisposing factors"
  Include cultural practices that put the people in your community at the risk of contracting HIV and socio-economic factors that pre-dispose the people in your community to HIV infection. \(^{(2-5)}\)

- **Conditions that facilitate HIV transmission**
  Include the presence of HIV (infected person), carrier of HIV (medium) i.e. body fluid -genital fluid, breast milk, and point of entry. \(^{(2-5)}\)

- **Some of the factors influencing progression to AIDS**
  Include virus subtype, viral load, host genetics, host immunity, the lifestyle of host, availability of ART \(^{(3-5)}\)

- **What is not true (myths) about HIV transmission**
  Include staying in the same house with an HIV positive person, eating together with an infected, sleeping on the same bed, when one coughs, working together with people living with HIV/AIDS (PLWHAS) do/don't transmit, sitting in the same class/bench, bathing with a PLWHAS, playing together, using the same phone, shaking hands, and sharing clothes. \(^{(3-5)}\)

- **Sexual transmission**
  Having unprotected sex with an HIV infected person vaginal, anal and oral as in table (2). The probability of sexual transmission depends on Infectiousness of the index case mode of sexual contact, the susceptibility of the exposed person (host factors, sexual preferences, behavior, infectiousness, and susceptibility), environmental factors (social, cultural, and political environment), and biological HIV subtype and phenotype. \(^{(2-5)}\)

**Table (2): Estimated HIV transmission rates (sexual)**

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Single exposure</th>
<th>Global importance %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual intercourse</td>
<td>0.00-1.00</td>
<td>70-80</td>
</tr>
<tr>
<td>Receptive vaginal</td>
<td>0.01-0.32</td>
<td>60-70</td>
</tr>
<tr>
<td>Receptive oral</td>
<td>1.00</td>
<td>5-10</td>
</tr>
<tr>
<td>Insertive anal</td>
<td>0.06</td>
<td>not available</td>
</tr>
<tr>
<td>Insertive vaginal</td>
<td>0.01</td>
<td>not available</td>
</tr>
</tbody>
</table>

- **HIV in genital fluids**
  HIV present as free virus and/or HIV infected cells in 10-30% of patients. HIV load higher in the seminal and vaginal fluid than in cells correlates with plasma viral load and CD4 T cell count. The presence of other STIs and genital inflammation increases the viral load (and in the plasma) and mostly CCR5-tropic (macrophage) strains. \(^{(2-5)}\)

- **Factors affecting HIV-1 shedding in the genital tracts**
  In females include pregnancy, oral contraceptives, cervical ectopy, cervicitis, others-HIV disease stage, phase of the menstrual cycle, CD4+ T cell count, STIs, and trauma (rectal or vagina). In male’s HIV disease stage, CD4+ T cell count, gonorrhea and urethritis, viral load, viral phenotype, HIV subtype, circumcision status, vasectomy, and other STIs. \(^{(2-5)}\)

- **HIV-1 in vaginal fluid**
  HIV load lower than in semen. It elated to plasma viral load (may still be detectable even whilst on highly active antiretroviral therapy (HAART). Possibly higher with subtype C. Increased in the presence of inflammation and contains infected T cells, but rarely free virus. Possible separate compartments of viral replication. The source from cells in cervix, uterus and menstrual blood. \(^{(2-5)}\)

- **The seminal compartment of HIV**
  HIV shedding may be continuous, intermittent or absent usually correlates with plasma viral load, but sometimes higher correlates with CD4+ T cell count. Deterrent phenotype (mostly CCR5-tropic) may be present to what is in the blood. Different genotypes, including antiretroviral drug resistance patterns. Often have latently infected T cells present. T cells increased if STIs present. \(^{(2-5)}\)

- **HIV in other body fluids**
  Saliva contains low levels of HIV (free virus and HIV infected cells), and only in some patients (~10%). Increased in periodontal disease. Transmission by bite is very rare. Urine, sweat, bronchoalveolar lavage fluid, synovial fluid, amniotic fluid, and tears have very low levels of virus. CSF has very high levels of HIV, and there is a separate compartment of viral replication in the brain. \(^{(2-5)}\)

- **Mother to child transmission (MTCT)**
  This occurs in the intrapartum period in utero breastfeeding. Increased if maternal health is high...
viral load fast-replicating HIV strains low CD4+ T cell counts. Estimation during pregnancy (In the womb 15-20%) During delivery (60-70%) there is a lot of fluid blood and amniotic fluid which protect the baby inside the womb. During breastfeeding or after delivery (15-20%). The evidence for in utero transmission is detection of HIV DNA by PCR in the first 24-48 hours of life, identification of HIV in fetal tissue from 10 weeks gestation, placental membrane inflammation, HIV can be detected in amniotic fluid, HIV can infect cultures of uterine, placental and fetal tissue replication is at low level. The evidence for intrapartum infection is HIV not detected by PCR at birth then becomes positive, increased risk in the first born twin, HIV isolated in neonatal gastric aspirates, increased transmission rate if a prolonged rupture of membranes, decreased transmission if elective, caesarian section performed, and reduction in transmission with intrapartum ARV. HIV in breast milk; HIV load in breast milk affected by plasma HIV load and or mastitis. Colostrum and early breast milk contain CD4+ macrophages with CCR5-tropic HIV strains. CD4+ T-cells in breast milk produces more virus than CD4+ T cells. The highest viral levels are seen early in breastfeeding (58% detectable by PCR). Newborn has less gastric acid in the first few days, so it may not inactivate HIV. HAART will reduce free virus but not HIV-infected cells in breast milk. HIV in breast milk increased by longer duration, younger age, lower parity, and mastitis. Breast milk is the main mode of transmission of human T-lymphocytic virus HTLV-1. (3-5)

### Table (3): Estimated HIV transmission rates; blood and medical

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Single exposure</th>
<th>Global importance %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injecting drug use</td>
<td>0.50-1.00</td>
<td>5-10</td>
</tr>
<tr>
<td>Blood transfusions</td>
<td>&gt;90</td>
<td>3-5</td>
</tr>
<tr>
<td>Blood products</td>
<td>not available (n/a)</td>
<td>not available</td>
</tr>
<tr>
<td>Organ transplantation</td>
<td>not available</td>
<td>not available</td>
</tr>
<tr>
<td>Artificial insemination</td>
<td>not available</td>
<td>not available</td>
</tr>
<tr>
<td>Health care workers</td>
<td>&gt;00.01</td>
<td>00.10-1.00</td>
</tr>
</tbody>
</table>

- **Needlestick injuries**

It takes place by blades, scissors, and enema. The risk of approximately 1 in 300-400 5. The risks of deep injuries (visible blood on the device needle) have been in contact with a blood vessel high viral load in the source patient (or has AIDS). The risk from mucosal membrane or skin exposed to infected blood is approximately 1 in 1000 -association. IDUs association detected 1980 account for 10% among the world. 1/3 of the 30% HIV infection outside Africa. 3/13 million IUDs are HIV positive. (3-4)

- **Reducing transmission**

ARV reduces MTCT and viral load in 70-80% of patients, and low viral load is associated with less transmission. However, resistant HIV can be transmitted. The Treatment of opportunistic infections may reduce transmission e.g. herpes simplex, ulcerative genital tract disease, syphilis, and TB. Knowledge political and societal will reduce transmission. Cultural understanding, safe sex, minimizing IDU risk (needle exchange), highly active antiretroviral therapy (HAART), money and commitment are essential factors to reduce transmission. (2)

- **Laboratory diagnosis of HIV infection**

Describe all HIV tests available, and their principle, advantages, and disadvantages. Explain the rationale of screening and confirmatory tests. Interpret the results and give the diagnosis. Develop strategies for testing in Sudan. The types of HIV Tests include the following: Antibody tests include ELISA (enzyme-linked immunosorbent assay) is very sensitive, but not specific (false positives+++). The positive results need to be confirmed. Agglutination tests Serodia within 1 to 2 hours is a treponema pallidum particle agglutination (TP-PA) test is a treponemal test for the serologic detection of antibodies. Rapid tests as in determine, Unigold, Capillus, HIV spot, HIV check within 1 to 10 minutes. Western Blot test (WB) is a confirmatory test, very specific. DNA polymerase chain reaction (PCR) qualitative test, detect intracellular viruses can be used in indeterminate serological tests and neonatal diagnosis. Virus Load and CD4 count for follow up. Antigen Test. (2-5)

- **Diagnosis of HIV infection in children**

The diagnosis of HIV in children born to HIV positive mothers and their ages <18 months here antibody tests are NOT useful, but the detection of the virus by PCR, culture, Antigen test (p24 Ag) are good choices. Also, the child considered positive specimens. The issue is the maternal antibodies can
• **HIV/AIDS globally and types of epidemics**

There are 3 types of HIV epidemics include low level, concentrated and generalized. The low-level HIV infection may have existed for many years, but not at any significant level (HIV prevalence less than 5% in any subpopulation). The concentrated epidemic HIV spread rapidly in a defined subpopulation (prevalence >5%), but not well-established in the general population (<1% in pregnant women in urban areas). The generalized epidemic HIV epidemic firmly established in the general population. In 2007, people living with HIV 30.6 -36.1 million, the new HIV infections is 1.8 - 4.1 million and the deaths due to AIDS were 2.1 million as reported by (UNAIDS) the Joint United Nations Program on HIV and AIDS and WHO. (2-3)

• **The natural history of HIV infection**

Includes primary infection, asymptomatic infection, mildly symptomatic disease, and AIDS as mentioned below. In the primary infection, the features are asymptomatic in 70-80%, occurs 2-6 weeks after exposure, fever with rash, pharyngitis with cervical lymphadenopathy, myalgia, arthralgia, and mucous ulceration. The diagnosis by immunoblot assay, specific anti-HIV antibodies in serum (seroconversion) takes place later at 3-12 weeks and rarely happens after 3 months. The factors indicate faster progression like candidiasis and neurological involvement and increase the viral load. The differential diagnosis includes Epstein-Barr virus (EBV), Cytomegalovirus (CMV), streptococcal pharyngitis, toxoplasmosis, and secondary syphilis. In the asymptomatic infection, (CDC) category A, the infected individual remains well with no evidence of disease except for the possible presence of persistent generalized lymph node (PGL) ≥ extra inguinal sites, the bulk of the virus takes place within the lymphoid tissue CD4 count 50-150 cells/year. In mildly symptomatic disease: category B-(not AIDS); the disease corresponds to AIDS-related complex, the development of symptoms is around 7-10 years in progression. The clinical manifestations include oral hairy leucoplasia, recurrent oropharyngeal candidiasis, severe PID, Bacillary angiomatosis, cervical dysplasia, idiopathic thrombocytopenic purpura (ITP), weight loss, chronic diarrhea, herpes simplex (HS), low-grade fever and night sweats. In AIDS: category C is defined by the development of specified opportunistic infections.

• **The relations between CD4 count and HIV associated disease**

<500 cells/mm3: acute primary infection, PGL, recurrent vaginal candidiasis.
<200: PCP, muco-cutaneous HS, cryptococidum, microsporidium, esophageal candidiasis, miliary TB, extrapulmonary TB, HIV associated wasting and peripheral neuropathy (PN).
<100: cerebral toxoplasmosis, cryptococcal meningitis, primary CNS lymphoma, non-Hodgkin lymphoma, HIV associated dementia, progressive multifocal leukoencephalopathy.
<50: CMV, retinitis, gastrointestinal disease, disseminated Mycobacterium Avium intracellularly.

• **AIDS-defining diseases**

esophageal candidiasis streptococcal meningitis, chronic cryptosporidium diarrhea, CMV retinitis/otitis, chronic mucocutaneous HS, disseminated Mycobacterium Avium intracellularly. pulmonary or extrapulmonary TB, PCP, progressive multifocal leukoencephalopathy., recurrent non-Typhi Salmonella septicemia, cerebral toxoplasmosis, extra coccidiiodomycosis, invasive cervical cancer, extrapulmonary histoplasmosis, KS, non-Hodgkin lymphoma, primary cerebral lymphoma, HIV associated wasting and HIV associated dementia. (4)

• **WHO Clinical Stages in adults ≥ 15 years**

Stage1: Asymptomatic.
Stage2: PGL, moderate unexplained weight loss, HZ, angular cheilitis, and recurrent oral ulceration.
Stage3: Unexplained severe weight loss, unexplained chronic diarrhea for ≥ 1month, unexplained persistent fever intermittent or constant lasts for ≥ 1month, persistent oral ulceration, pulmonary tuberculosis, severe bacterial infection, acute necrotizing ulcerative stomatitis/gingivitis/ periodontitis, unexplained anemia/neutropenia/ and or chronic thrombocytopenia.
Stage4: HIV wasting syndrome, pneumocystis pneumonia, recurrent severe bacterial pneumonia, chronic herpes simplex infection, candida of
esophagus/trachea/bronchi or lung, extrapulmonary tuberculosis, Kaposi sarcoma, disseminated nontuberculous mycobacterial infection, progressive multifocal leukoencephalopathy, chronic cryptosporidiosis, chronic isosporiasis, disseminated mycosis, and recurrent non-typhoid salmonella. (3)

- Prevention in HIV/AIDS

The level of prevention includes primordial, primary, secondary and tertiary as shown below. Primordial prevention deals with preventing the underlying causes of HIV/AIDS as in general education, life and livelihood skills education sex and sexuality education. Legal rights and responsibility, economic empowerment, nutrition, reproductive health programs, range of gender issues, range of developmental issues, and open interactive media. Primary prevention plays very important role in PEP e.g., after rape or needle stick injury, seeks to prevent HIV infection in an individual using the classic ABC model (A--Abstinence, B--Be mutually faithful, C--condoms use male condom and female condom (in the future condom with microbicides) and/or behavior change. Letter B for Behavior change, using behavior change communication (BCC) and providing tools for empowerment. Primary prevention focuses on high-risk groups of youth, men, married women, transactional sex, serial monogamy, etc. It utilizes societal gatekeepers and peer role models for changing behavior, encompasses faithfulness, abstinence, condoms, low-risk sexual activity, screening of blood and blood products. Primary prevention includes prevention of MTCT using a short course of ART, single-use of sterile needles/razors/etc., treatment and prevention of STIs, treatment of opportunistic infections that cause high viral load, and circumcision. It requires both parties to know HIV status for effectiveness. Secondary prevention works with HIV positive persons to prevent the progression of HIV to AIDS and maintain the person, their family, and the community in good mental, physical and social health. It also contributes to preventing further transmission of the virus (positive prevention), VCT, psychosocial counseling, positive living interventions, opportunistic infection management, nutritional support, prevention of opportunistic infections, and ART. Tertiary prevention prevents the negative impacts of disease and death. It is increasingly becoming important as HIV epidemics are maturing resulting in large numbers of dying people and large numbers of orphans. It plays an important role in economic empowerment programs, human resource strategic planning, food security, inheritance planning e.g., legal support, memory books, family and community counseling, and orphans and vulnerable children (OVC) interventions e.g., free education. (3-5)

- The future of prevention strategies

Includes microbicides, vaccines-curative and preventive, immunomodulation stimulating the immune system to get rid of the HIV virus even though, these approaches are in the future, preparatory work needs to be carried out now e.g., awareness programs, research site preparation, advocacy work, use of diaphragms, and PEP+. (3-5)

- Needlestick Injuries

Are wounds caused by needles that accidentally puncture the skin, are a hazard for people who work with hypodermic syringes and other needle equipment. It can occur at any time when people use, disassemble, or dispose of needles. When not disposed of properly, needles can become concealed in linen garbage and injure other workers who encounter them unexpectedly. Needlestick injuries transmit infectious diseases, especially blood-borne viruses. In recent years, concern about AIDS, hepatitis B, and hepatitis C has prompted research to find out why these injuries occur and to develop measures to prevent them. Despite published guidelines and training programs, needlestick injuries remain an ongoing problem. The hazards of needlestick injuries include accidental punctures by contaminated needles that can inject hazardous fluids into the body through the skin. There is potential for the injection of hazardous drugs, but the injection of infectious fluids, especially blood, is by far the greatest concern. Even small amounts of infectious fluid can spread certain diseases effectively. Accidental injection of blood-borne viruses is the major hazard of needlestick injuries, especially the viruses that cause AIDS (the HIV virus), hepatitis B, and hepatitis C. The risk of infection after exposure to infected blood varies by a bloodborne pathogen. The risk of transmission after exposure to HIV-infected blood is about 0.3%, whereas it is estimated to be up to 100 67-times greater for hepatitis B virus (30%) and could be as high as 10% for hepatitis C virus. The risk of needlestick transmission of HIV, the virus that causes AIDS, is considerably less than for hepatitis B virus. Several hundred health care workers have been accidentally exposed, mostly through needlestick injuries, to blood from patients infected
with the HIV virus. As of June 1999, researchers report that needlestick injuries transmitted HIV to 49 of these health care workers in the United States. Researchers estimate that needlestick injuries involving blood-contaminated with HIV can spread the virus in 0.3 percent of cases. Stated another way, 99.7 percent of needlestick/cut exposures do not lead to infection. The risk factors for hepatitis C virus transmission in occupational settings is 1.8% (range 0% to 7%).

Needlestick injuries have transmitted many other diseases involving viruses, bacteria, fungi, and other microorganisms to health care workers, laboratory researchers, and veterinarian staff. The diseases include Blastomycosis, Mycoplasma Caviae, Brucellosis, Rocky Mountain spotted fever, Cryptococcosis, Sporotrichosis, Diphtheria, Staphylococcus aureus, Cutaneous gonorrhea, Streptococcus pyogenes, Herpes Syphilis, Malaria, Toxoplasmosis, and Tuberculosis Mycobacteria. Many of these diseases were transmitted in rare, isolated events. They still demonstrate, however, that needlestick injuries can have serious consequences. A needlestick injury is the result of an accident with a needle. The equipment design, nature of the procedure, work condition, staff experience, recapping, disposal system plays an important role in injuries.

Preventing needlestick injuries is the most effective way to protect workers from the infectious diseases that needlestick accidents transmit. A comprehensive needlestick injury prevention program would include needlestick protocol in the event of a needlestick, splash exposure, or other body fluids contact summarized in the following steps. Decontaminate the area of exposure with soap and water. Call your supervising resident to inform him/her of the event in order so that he/she can provide coverage of your patients. Call the chief resident on-call for all needlesticks. Go immediately to occupational health care during business hours or to the emergency unit during nights/weekends/holidays. A hospital incident report will need to be completed by an emergency room (ER) or occupational health services (OHS) for every needlestick. Appropriate baseline labs will be drawn, and you will discuss with health services or the ER attending the need for HIV prophylaxis depending on the exposure type. Follow-up tests will be scheduled through occupational health. If the initial evaluation happens in the emergency department, one should still follow-up at OHS.

- Needlestick studies in the world

Study in Zurich73 injuries in 1000 procedures (7.3%). Injuries to the surgeon occurred 35 times, to the assistant 18 times and to the scrub nurse 18 times. The injury rate according to different procedures. All the injuries occurred using sharp instruments or suture needles, and none mentioned the use of a hollow bore needle. In USA, this systematic review of randomized studies showed that interventions like the use of double gloves, safer needles, and other interventions were effective in reducing needlestick injuries in surgical settings. Results Eleven studies were found. Four examined the use of double gloves, three blunt suture needles, two evaluated safety devices, like needleless IV systems, and two surgical techniques. Randomized studies may well not be the only way to examine the effect of safety devices or techniques on needlestick injuries.

Another study among nurses in USA the sample for this study were nurses working in 22 hospitals across the USA, 20 of which had reputations for attracting and retaining clinical nurses. In 1998, 4,085 nurses were sent questionnaires asking about needlestick injuries, staffing, organization, and the use of protective equipment. There were 2,287 replies (56% response rate). Results Respondent nurses were frequently well educated, with 63% having some higher nursing qualification. Most (85%) reported always using gloves in situations where contact with body fluids as possible. Half the nurses (4%) had at least one needlestick injury in their career, 9% had a needlestick injury in the previous year and 1.2% in the previous month. There was a reported near-miss incidence of 23% in the prior month. Needlestick injuries in Saudi Arabia, this was retrospective record analysis carried out over the three years of 1995-1997. In 11 of 38 hospitals of the Eastern Province with a reporting system, there were 282 injuries and information were requested by a questionnaire from authorized personnel. Results Of the 282 cases, 73% were women, predominantly of non-Saudi origin. There was a significant relationship between the years of experience in the job and the proportion of injuries, so that half occurred in people with less than three years of experience. Most injuries 67% occurred in nurses, 14% doctors, 12% other workers and 6% in technicians. Needlesticks were common in a Ugandan medical school. The risk from a single needlestick injury for HIV infection was about 1 in 400 to 1 in 2,000, and for hepatitis B infection was 1 in 200 to 1 in 45. Study a voluntary, anonymous questionnaire was circulated to 280 healthcare
workers in a Ugandan teaching hospital in November 1999. It explored recall of needlestick injuries in the previous year, the circumstances, and the action taken. It also examined the local prevalence of HIV and HBV infection in patients and calculated the risk of infection from a single needlestick. Results showed the response rate was 64%. One hundred of 180 respondents (55%) reported at least one needlestick injury in the previous year, with 336 injuries in total, giving an average of two injuries per healthcare worker per year. Interns suffered most injuries, followed by nurses and medical students. Most injuries occurred when patients moved during procedures, or when re-sheathing needles. Most (61%) respondents took blood without wearing gloves. The most common action was to squeeze the puncture site and then wash it with bleach. Blood from 435 anonymous patients was tested, and the seroprevalence of HIV was 26% and HBV was 3%. In Italy analysis of 19,860 cases of occupational exposure Results Occupational exposures From January 1994 to June 1998 (5.5 years), there were 19,860 occupational exposures, 75% percutaneous and 25% mucocutaneous. Known infected sources were involved in 28% of all exposures: HCV 63%, HBV 13%, HIV 11%, and two or more of these together in 13%. Needlestick in rural north Indian; approximately 3 million health care workers experience percutaneous exposure to bloodborne viruses each year. This results in an estimated 16,000 hepatitis C, 66,000 hepatitis B, and 200 to 5000 HIV infections annually. More than 90% of these infections are occurring in low-income countries, and most are preventable.

- **PEP**

It is a short-term antiretroviral ARV treatment to reduce the likelihood of HIV infection after potential exposure, either occupationally or through sexual intercourse. It is a four weeks course of drugs against HIV, and measures against HBV, which may stop bloodborne pathogens infection becoming established after an exposure. Occupational risk exposures include percutaneous injury (needlestick, cut) or contact of mucous membrane or non-intact skin, blood, tissue, other body fluids that potentially infectious are (cerebrospinal, synovial, pleural, pericardial, peritoneal, or amniotic fluids; semen or vaginal secretions) as in table (4). The high risk includes splashes with blood/body fluids on non-intact skin or in eye or mouth provided that the source is symptomatic. The low risk is a firm needle (not hollow), an accident with no visible blood, superficial accident not through the skin, splash on intact skin provided that the source is asymptomatic. NOT considered Infectious for HIV unless visibly bloody such as feces, nasal secretions, saliva, sputum, tears, urine, sweat, and vomitus. Exposure to bloodborne pathogens via a needlestick or cut with a sharp instrument contaminated with HIV, HBV, HCV patient's blood or through contact of the eye, nose, mouth, or skin (chapped, abraded, with dermatitis) with blood or body fluids containing visible blood, semen or vaginal secretions.

**Table (4): Estimated Per-Act Risk for Acquisition of HIV, by Exposure Route.**

<table>
<thead>
<tr>
<th>Exposure route</th>
<th>Risk per 10,000 exposures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood transfusion</td>
<td>9,000</td>
</tr>
<tr>
<td>Needle-sharing injection drug use</td>
<td>67</td>
</tr>
<tr>
<td>Receptive anal intercourse</td>
<td>50</td>
</tr>
<tr>
<td>Percutaneous needle stick</td>
<td>30</td>
</tr>
<tr>
<td>Receptive penile-vaginal intercourse</td>
<td>10</td>
</tr>
<tr>
<td>Insertive anal intercourse</td>
<td>6.5</td>
</tr>
<tr>
<td>Insertive penile-vaginal intercourse</td>
<td>10</td>
</tr>
<tr>
<td>Receptive oral intercourse</td>
<td>1</td>
</tr>
<tr>
<td>Insertive oral intercourse</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**In case of exposure**

The following steps are essential that include wash thoroughly (water and soap). Flush splashes to the nose, mouth or skin with water, irrigate eyes with clean water, saline, or sterile irrigants. Determine risk. Report accident Start PEP if necessary/available. The average risk of HIV infection after a needlestick or sharp injury with HIV infected blood is 0.3%. For HBV unvaccinated person, the risk after the same kind of exposure is 23-37% if the source is HBeAg negative and 37-62% if the source is HBeAg positive. The risk for infection after a needlestick or cut exposure to HCV infected blood is approximately 1.8%. The risk of seroconversion to HIV after exposure of the eye, nose, or mouth to infected blood is estimated to be on average 0.1% (1 in 1000); it is potential for HBV and rare for HCV.

The tests do I have to ask for the blood of the source patient; if the source agrees to HBeAg, anti-HCV, anti-HIV antibody (rapid test if available). If the source is unknown or cannot be tested:
information's about where and under what circumstances the exposure occurred should be assessed epidemiologically for the likelihood transmission of HBV, HCV, and HIV. For sources whose infectious status remains unknown (e.g., the source person refuses to test), consider medical diagnoses, clinical symptoms, and history of risk behavior.

The HIV status of the patient if the source is HIV negative there is no risk, if the source is HIV positive there is a risk, and if the HIV patient status was unknown.

The selection of the number (2 or ≥ 3) of drugs is based on the assessment of risk for HIV infection and which agents to use is based largely on the potential toxicity of PEP drugs and on the likelihood of efficacy especially in the case of a resistant virus.

\[(3-5)\] AZT (Zidovudine) + 3TC(Lamivudine) (or Emtricitabine-FTC)

\[\text{OR}\]

d4T(Stavudine)+3TC (or FTC)

TDF (Tenofovir Disoproxil Fumarate) + 3TC (or FTC)

\[\text{OR}\]

(Didanosine) ddI + 3 TC (or FTC)

2 nucleosides + LPV/r (Lopinavir/Ritonavir) (Kaletra)

\[\text{OR}\]

2 nucleosides + ATV(Atazanavir) (±rit Rationimm unotherapy), or (Fosamprenavir) FOSAPV (± rit), or (Indinavir) IDV (± rit), or boosted (Saquinavir) SQV, or (Nelfinavir) NFV

\[\text{OR}\]

2 nucleosides + EFV (Efavirenz not in pregnancy)

(3-5) PEP recommendations in case of high risk:

AZT(Zidovudine) +3TC + EFV (not in pregnant or potentially pregnant women)

AZT + 3TC + Kaletra (LPV/r) or NFV or IDV (+/-rit)

DO NO USE fix dose combination d4T/3TC/NFV because of the high toxicity rate. (3-5)

Adverse Effects NRTIs, NNRTIs and PIs

NRTIs: lactic acidosis, hepatic steatosis and lipodystrophy.

ddI: gastrointestinal intolerance, peripheral neuropathy, possible increased risk of MI, pancreatitis and possible noncirrhotic portal hypertension.

d4T: peripheral neuropathy. Lipoatrophy and pancreatitis

TDF: renal impairment, decrease in bone mineral density, headache and gastrointestinal intolerance

AZT or ZDV: headache, gastrointestinal intolerance, lipoatrophy, bone marrow suppression

NNRTIs: low genetic barrier to resistance-single mutation, cross-resistance, rash, hepatotoxicity, potential drug interactions (CYP450)

EFV: neuropsychiatric, teratogenic in nonhuman primates + cases of neural tube defects in human infants after first-trimester exposure, dyslipidemia

PIs: metabolic complications, fat maldistribution, dyslipidemia, insulin resistance, gastrointestinal intolerance, Possibility of increased bleeding risk for hemophiliac potential for drug interactions (CYP450)

IDV: nephrolithiasis, gastrointestinal intolerance, diabetes/insulin resistance

LPV/r: gastrointestinal intolerance, diabetes/insulin resistance, possible increased risk of myocardial infarction, PR and QT prolongation

NFV: diarrhea

SQV: gastrointestinal intolerance, PR and QT prolongation

(4-5)

The PEP should be initiated as soon as possible, if possible, within 4 hours. Although animal studies suggest that PEP probably is substantially less effective when started more than 24-36 hours post-exposure, the interval after which no benefit is gained from PEP for humans is undefined. Therefore, if PEP is indicated, it should be started as soon as possible after the exposure. In general, it is not recommended to start PEP when the exposure was more than 72 hours ago. However, initiating therapy after a longer interval of 3-7 days might be considered for exposures that represent a higher risk for transmission. (3-5)

HBV and HCV If you have not been vaccinated, then hepatitis B vaccination is recommended for any exposure regardless of the source person's hepatitis B status. HB immunoglobins and/or hepatitis B vaccine may be recommended depending on the exposure immunity to hepatitis B and the source person's infection status. For HCV
the PEP, no immunoglobins or viral agents (interferon-ribavirin) are recommended.\(^{(3-5)}\)

**Special precautions during PEP:** safe sex or abstain until serology is negative at 6 months post-exposure; the highest risk occurs during the first 6-12 weeks. Discontinue breastfeeding. PEP drugs entail substantial toxicity, requiring close clinical and laboratory monitoring; therefore, the decision to start PEP should be taken by more than one person. Counseling supports the side effects of ARV drugs.\(^{(3-5)}\)

**Testing afterward** HIV serology should be performed at the time of injury, and repeated at 6 weeks, 3 months (together with HCV), and 6 months (together with HCV). It should be repeated at 12 months if the exposed acquired HCV with the injury since this would delay HIV seroconversion. Most healthcare workers who seroconverted had symptomatic acute HIV syndrome, usually 2 to 6 weeks after exposure.\(^{(3-5)}\)

**Follow-up**
Follow-up counseling, postexposure testing, and medical evaluation. HIV-antibody testing to monitor for seroconversion: at baseline, 6 weeks, 12 weeks, and 6 months after exposure. Health care professionals should be advised to use precautions (e.g., avoid blood donations, breastfeeding, pregnancy) to prevent secondary transmission, especially during the first 6-12 weeks postexposure. If signs and symptoms of acute HIV infection appear during therapy the patient should be tested for the viral protein (p24 antigen), HIV viral load assays while continuing PEP until expert advice.\(^{(3-5)}\)

**Women of childbearing age**
Offer a pregnancy test prior to starting PEP. If known or suspected pregnancy in the exposed person, the use of optimal PEP regimens not precluded, and PEP not denied solely based on pregnancy. Breastfeeding in the exposed person, the use of optimal PEP regimens did not preclude, and PEP not denied solely based on breastfeeding.\(^{(3-5)}\)

**Special situations**
Delayed (i.e., later than 24-36 hours) exposure report; interval after which lack of benefit from PEP undefined.
Unknown source (e.g., needle in a sharps disposal container or laundry); use of PEP to be decided on a case-by-case basis, consider the severity of exposure and the epidemiologic likelihood of HIV exposure and do not test needles or other sharp instruments for HIV. Resistance of the source virus to antiretroviral agents; influence of drug resistance on transmission risk unknown. If source person's virus is known or suspected to be resistant to one or more of the drugs considered for PEP, selection of drugs to which the source person's virus is unlikely to be resistant is recommended, resistance testing of the source person's virus at the time of the exposure not recommended, and initiation of PEP not to be delayed while awaiting any results of resistance testing.\(^{(3-5)}\)

**Toxicity of the initial PEP regimen**
Adverse symptoms (e.g., nausea and diarrhea) common with PEP. Symptoms often manageable without changing The PEP regimen by prescribing antiemetic or antimotility agents. Modifying the administration (i.e., taking drugs after meals, if possible) might help alleviate symptoms when they occur.\(^{(3-5)}\)

**Non-Occupational Exposure (nPEP)**
Evaluation of persons Seeking nPEP includes the HIV status of the person seeking nPEP and performing HIV baseline testing on persons seeking nPEP (use rapid test). The time and frequency of exposure are important as nPEP is less likely to be effective > 72 hours and should only be used infrequently.\(^{(3-5)}\)

**Evaluation of Persons Seeking nPEP: HIV Status of Source**
If the HIV status of source is +ve HIV, consider nPEP if within 72 hours and if possible, interview source to determine ARV use. If the HIV status of source is unknown, determine if the source is available for testing and If the source is from a group with a high prevalence of HIV infection the risk of transmission might be increased. Do not delay the initiation of nPEP for source testing.\(^{(3-5)}\)

**Transmission Risk from the Exposure**
We need to determine the specific sexual, injection drug use, or other behavior that led a person to seek nPEP and determine the relative risk for HIV exposure using the algorithm for evaluation and treatment and per-act risk for acquisition of HIV.\(^{(3-5)}\)

**Recommendations for The Use of Antiretrovirals for nPEP**
If the substantial exposure risk more 72 hours since exposure the n PEP not recommended.
If less than 72 hours since exposure, we have 2 options regarding the source and one option regarding the negligible. The source patient is known to be positive HIV the nPEP recommended. The source patient of unknown HIV status the case by case determination is preferable. The negligible risk for HIV exposure (exposure of mouth, eye, vagina, rectum, other mucous membranes, intact or nonintact skin, or percutaneous contact with saliva, sweat, urine, tears, nasal secretions if not visibly contaminated with blood and irrespectively of the source's HIV status known or suspected), the nPEP not recommended.\(^{(3-5)}\)

**Assessing Risk for HIV Exposure**

Substantial Risk for HIV Exposure of vagina, rectum, eye, mouth or other mucous membranes, nonintact skin, or percutaneous contact with blood, semen, vaginal secretions, rectal secretions, breast milk, or any body fluids that are visibly contaminated with blood when the source is known to be HIV-infected.

Negligible Risk for HIV Exposure of vagina, rectum, eye, mouth or other mucous membranes, intact or nonintact skin, or percutaneous contact with urine, nasal secretions, saliva, sweat, or tears if not visibly contaminated with blood regardless of the known or suspected HIV status of the source.\(^{(3-5)}\)

**Assault:**

- The risk increased in the following situations such as male on male rapists might be expected to have a higher prevalence of HIV infection, rape in a region or country with a high background prevalence of HIV increases the likelihood that an assailant will be HIV infected, multiple assailants presumably increase the risk, since any of the assailants might be infected with HIV, anal rape may be more likely to transmit HIV, and rape, where either the assailant or the victim has trauma, bleeding or genital lesions, may increase the likelihood of transmission.


- The laboratory testing includes any sites of contact (vagina, rectum, pharynx, mouth) that can be sampled for gonorrhea and chlamydia under the following steps a wet prep vaginal smear can be examined to look for bacterial vaginosis and trichomonas. Wet preps may also show motile sperm; jurisdictions vary as to whether the examiner or the forensic laboratory is to make that evaluation. Pregnancy testing and baseline serologic tests for syphilis and hepatitis B should be done. Baseline HIV test counseling should occur with options of confidential and anonymous testing offered and explained.

- Patient follow-up should occur at two weeks with psychosocial counseling, STIs testing for patients who did not take empirical therapy or who have symptoms, pregnancy testing, hepatitis B vaccine should be given at one and six months to complete the vaccine course -HIV and RPR testing should be repeated at 12 and 24 weeks

- Preferred Antiretroviral Regimens for nPEP NNRTIs; based Efavirenz + 3TC + zidovudine for 28 days. Do not administer efavirenz to pregnant women. PIs; based (LPV/r) Lopinavir/ritonavir (Kaletra) + 3TC + zidovudine for 28 days

- Treatment; ceftriaxone 125 mg IM in a single dose PLUS metronidazole 2 g orally in a single dose PLUS -Azithromycin 1 g orally in a single dose

- Emergency contraception

  - 2X2 method: ethinylestradiol 0.1 mg +levonorgestrel 0.5 mg in /2 hours after the sexual act and 12 hours later Neogynon or Stediril- day 2 capsule x 2

  - Levonorgestrel method: 0.75 mg of levonorgestrel in 72 hours after the sexual act and 12 hours later Norlevo 1 capsule x 2

  - The IUD can be an option after 72 hours. It must be put in place in 5 days after the sexual act.\(^{(4-5)}\)

**Material and methods**

It was a descriptive-analytical study in OVCTC in September 2008.

**Inclusion criteria**

All patients attending the OVCTC and potential exposed either occupationally or through sexual intercourse and received antiretroviral therapy (ARVs) agents as prophylaxis.

**Exclusion criteria**
All cases diagnosed as HIV/AIDS and all persons needing counseling

**Methods of data collection**

Secondary data were collected from the records of the patients in OVCTC.

**Ethical considerations and clearance** were taken from OVCTC’s director and patients.

**Results**

In this study 30 cases fully described from the record and part of them were interviewed. Most cases (13) 43.3% occur in the age group (26-35 years) and the minority cases (2) 6.6% occur in the age group (5-15 years) and 2 cases 6.6% occur in the age group (46-55 years). Male (17) 56.6 % and female (13) 43.4%. Single (14) 46.6%, married (14) 46.6%, widow (1)3.3% and divorced (1) 3.3%. Most of them( 21 cases),70% are related to the medical field table, two are students, basic school,6.6%, two are housewives, 6.6%, two are cleaners 6.6%, one free worker, 3.3 %, one in security system 3.3 %, one is not working 3.3%, Most of them (25 cases) 83.3% are educated. The majority are lived in Khartoum (26 cases) 86.3%. The risk or mode of exposure (28 case) 93.3% due to needle stick (one case) 3.3% due to rape and (one case) 3.3% due to rosary.(16 case) 53.3% were expose in 2007, (12 case) 40% in 2008 and (2 cases)6.6% in 2006. All of them started needle stick protocol. The result of HIV testing, all were negative and all of them used Duovir. There are no reported side effects or complications. The effectiveness of ARV agents is 100%. Three cases (10%) have repeated the testing on subsequent visits and follow-up and 27 cases (90%) did not perform follow-up in the V C TC.

**Discussion**

This descriptive-analytical study was done in OVCTC to assess the effectiveness of the ARV, to determine risk, counseling, follow-up date and if there any PEP side effects or complications. The effectiveness of the system; particularly the ARV agents are 100%, although most patients stop the follow-up due to social stigma. Some studies showed regular follow-up and counseling are essential in this system. There is no reported about tests of HBV and HCV and immunological state of patients regarding these viruses, certain studies showed tests for these viruses and vaccination accordingly is a part of PEP. There are no data, remarks or reports indicate that the patients started the emergency guide include airways, breathing, and circulation (ABC...) of the needle stick protocol, these steps are essential before starting ARV therapy. 

**Recommendations**

- Training of medical, paramedic, employee, workers in hospitals, clinics and health centers about the risk of injury, potential hazards, recommended precautions for the use and disposal of needles, procedures for reporting injuries and the importance of hepatitis B vaccination where the appropriate risk of injuries hazards.
- The availability of universal precautions and their usage for medical paramedics and workers or cleaners in the hospitals, health centers, and clinics is essential in the prevention of injury.
- Follow-up and adherence to international protocol and recommended guidelines after exposure (first aid, counseling testing, vaccine, prophylaxis, treatment, and regular follow-up and so for nPEP).
- Follow-up of updated effective disposal system.
- Improve and qualify equipment designee
- Performance of a surveillance program.

**Conclusions**

Although PEP is offered in O VCTC according to WHO guidelines (pre and post-test counseling, ARVs prophylaxis, counseling, and ARVs side effects), the outcome is good, although the patients are not adherent to schedule a follow-up in the center.

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**Conflict of interest and financial disclosure**

We have no personal or financial conflicts of interest. We agree with the submission of this manuscript and declare that we have approved it.

**Ethical Approval**

The study was approved by the OVCTC Director.
References

1. Davidson's (Principles & Practice of Medicine2008) Nicholas A. Boom Nicki R. Colledge Brian R. Walker
5. SNAP Supplemental Nutrition Assistance Program
6. Canadian Centre of Occupational Health and Safety
12. Am J Infect Control, 2005 Feb Kermode M. Jolley D. Langkham B, Thomas MS, Crofts N. School of Population Health, University of Melbourne, Melbourne, Victoria, Australia. mkermode@unimelb.edu.au