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HIV/AIDS in children: A review

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Abstract

Human immunodeficiency virus (HIV), the virus that causes acquired immunodeficiency syndrome (AIDS), The largest group of early AIDS cases comprised gay and bisexual men HIV is transmitted by mother to child during pregnancy, delivery, or breastfeeding (known as vertical transmission) Children involved in the epidemic face a set of psychological and social issues that must be addressed, not overlooked. This review study will discuss how children and adolescents are affected by some of the important aspects of the HIV/AIDS epidemic, including stigma, disclosure, and death, and how health care professionals can support them in dealing with these challenges In many parts of the world, HIV/AIDS is still seen as a death sentence, a disease from which there is no recovery. Tests used for the diagnosis of HIV infection in a particular person require a high degree of both sensitivity and specificity. If antibodies are detected by an initial test based on the ELISA method, then a second test using the Western blot procedure determines the size of the antigens in the test kit binding to the antibodies. Nurses provide life-saving and life-enriching care throughout the world. Often they are the first provider or even the primary provider for patients with HIV. Governments have a duty to ensure that medication is available within their countries HIV infected children.

Keyword: Human immunodeficiency virus, acquired immunodeficiency syndrome, ELISA, Western blot

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1. Introduction

The first cases of acquired immunodeficiency syndrome (AIDS) were reported in the United States in the spring of 1981. By 1983 the human immunodeficiency virus (HIV), the virus that causes AIDS, had been isolated. Early in the U.S. HIV/AIDS pandemic, the role of substance abuse in the spread of AIDS was clearly established. Injection drug use (IDU) was identified as a direct route of HIV infection and transmission among injection drug users. The largest group of early AIDS cases comprised gay and bisexual. Early cases of HIV infection that were sexually transmitted often were related to the use of alcohol and other substances, and the majority of these cases occurred in urban, educated, white MSMs. Currently, injection drug users represent the largest HIV-infected substance-abusing population in the United States. HIV/AIDS prevalence rates among injection drug users vary by geographic region, with the highest rates in surveyed substance abuse treatment centers in the Northeast, the South, and Puerto Rico. The virus is transmitted primarily through the exchange of blood using needles, syringes, or other IDU equipment (e.g., cookers, rinse water, cotton) that were previously used by an HIV-infected person. Lack of knowledge about safer needle use techniques and the lack of alternatives to needle sharing (e.g., available supplies of clean, new needles) contribute to the rise of HIV/AIDS. Another route of HIV transmission among injection drug users is through sexual contacts within relatively closed sexual networks, which are characterized by multiple sex partners, unprotected sexual intercourse, and exchange of sex for money [1]. The inclusion of alcohol and other non injection substances to this lethal mixture only increases the HIV/AIDS caseload [2, 3]. A major risk factor for HIV/AIDS among injection drug users is crack use; one study found that crack abusers reported more sexual partners in the last 12 months, more sexually transmitted diseases (STDs) in their lifetimes, and greater frequency of paying for sex, exchanging sex for drugs, and having sex with injection drug users [4]. Of the many theories and myths about the origin of HIV, the most likely explanation is that HIV was introduced to humans from monkeys. A recent study [5] identified a subspecies of chimpanzees native to west equatorial Africa as the

original source of HIV-1, the virus responsible for the global AIDS pandemic. The researchers believe that the virus crossed over from monkeys to humans when hunters became exposed to infected blood. Monkeys can carry a virus similar to HIV, known as SIV (simian immunodeficiency virus), and there is strong evidence that HIV and SIV are closely related [6, 7]. AIDS is caused by HIV infection and is characterized by a severe reduction in CD4+ T cells, which means an infected person develops a very weak immune system and becomes vulnerable to contracting life-threatening infections (such as Pneumocystis carinii pneumonia). Many States are counting HIV cases now that positive results are to be gained by treating the infection in the early stages and because counting only AIDS cases is no longer sufficient for projecting trends of the pandemic. However, because HIV infected people generally are asymptomatic for years, they might not be tested or included in the count. The CDC estimates that between 650,000 and 900,000 people in the United States currently are living with HIV (CDC, 1997c). In 1996, the number of new AIDS cases (not HIV cases) and deaths from AIDS began to decline in the United States for the first time since 1981. Deaths from AIDS have decreased since 1996 in all racial and ethnic groups and among both men and women (CDC, 1999a). However, the most recent CDC data show that the decline is slowing (CDC, 1999b). The decline can be attributed to advances in treating HIV with multiple medications, known as combination therapy; treatments to prevent secondary opportunistic infections; and a reduction in the HIV infection rate in the mid- 1980s prior to the introduction of combination therapy. The latter can be attributed to improved services for people with HIV and access to health care. In general, those with the best access to good, ongoing HIV/AIDS care increase their chances of living longer. HIV/AIDS is still largely a disease of MSMs and male injection drug users, but it is spreading most rapidly among women and adolescents, particularly in African American and Hispanic communities. HIV is a virus that thrives in certain ecological conditions. The following will lead to higher infection rates: a more potent virus, high viral load, high prevalence of STDs, substance abuse, high HIV seroprevalence within the community, high rate of unprotected sexual contact with multiple partners, and low access to health care. These ecological conditions exist to a large degree among urban, poor, and marginalized communities of injection drug users. Thus, MSMs and American and Hispanic women, their children, and adolescents within these communities are at greatest risk. African HIV cannot survive outside of a human cell. HIV must be transmitted directly from one person to another through human body fluids that contain HIV infected cells, such as blood, semen, vaginal secretions, or breast milk. The most effective means of transmitting HIV is by direct contact between the infected blood of one person and the blood supply of another. Structure of the virus is shown in Fig 1.

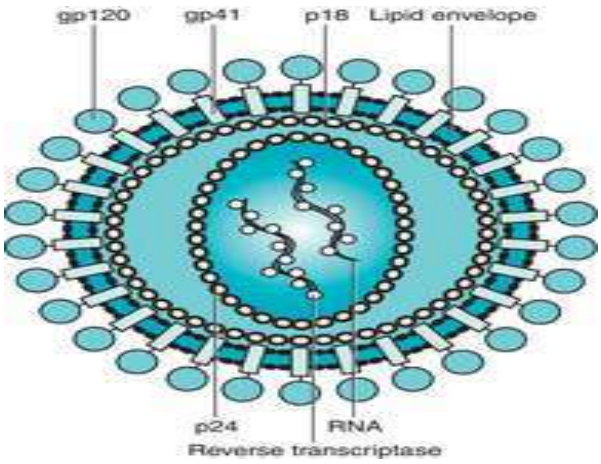


Fig 1: Structure of Virus

This can occur in childbirth as well as through blood transfusions or organ transplants prior to testing of the blood supply and, the chance of this has greatly decreased. Using injection equipment that an infected person used is another direct way to transmit HIV. Sexual contact is also an effective transmission route for HIV because the tissues of the anus, rectum, and vagina are mucosal surfaces that can contain infected human body fluids and because these surfaces can be easily injured, allowing the virus to enter the body. A person is about five times more likely to contract HIV through anal intercourse than through vaginal intercourse because the tissues of the anal region are more prone to breaks and bleeding during sexual activity [8].

Meaning of HIV/AIDS

Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) is a spectrum of conditions caused by infection with the human immunodeficiency virus (HIV) [9].

Causes of HIV Aids in children

HIV is transmitted by mother to child during pregnancy, delivery, or breastfeeding (known as vertical transmission) [10]. HIV can be transmitted from mother to child during pregnancy, during delivery, or through breast milk resulting in infection in the baby [11]. This is the third most common way in which HIV is transmitted globally. In the absence of treatment, the risk of transmission before or during birth is around 20% and in those who also breastfeed 35%. As of 2008, vertical transmission accounted for about 90% of cases of HIV in children. With appropriate treatment the risk of mother-to-child infection can be reduced to about 1%. Preventive

treatment involves the mother taking antiretrovirals during pregnancy and delivery, an elective caesarean section, avoiding breastfeeding, and administering antiretroviral drugs to the newborn. Antiretrovirals when taken by either the mother or the infant decrease the risk of transmission in those who do breastfeed [12]. Many of these measures are however not available in the developing world. If blood contaminates food during pre-chewing it may pose a risk of transmission. Programs to prevent the vertical transmission of HIV (from mothers to children) can reduce rates of transmission by 92–99% [13]. This primarily involves the use of a combination of antiviral medications during pregnancy and after birth in the infant and potentially includes bottle feeding rather than breastfeeding [14]. If replacement feeding is acceptable, feasible, affordable, sustainable, and safe, mothers should avoid breastfeeding their infants; however exclusive breastfeeding is recommended during the first months of life if this is not the case. If exclusive breastfeeding is carried out, the provision of extended antiretroviral prophylaxis to the infant decreases the risk of transmission. In 2015, Cuba became the first country in the world to eradicate mother-to-child transmission of HIV [15].

Epidemiology of HIV Aids in children, statistics

Epidemiology

Until recently, little attention was paid to numbers of orphaned children, either globally or nationally [16]. Orphan studies are likely to assume greater prominence when the number of children affected by HIV/AIDS is accurately and consistently quantified. The English word "orphan" is derived from Greek and Latin roots meaning "a child bereaved by the death of one or both parents" [17]. Whilst some orphan estimates are specific to children orphaned by HIV/AIDS, others include orphans from all causes. The wider definition is more useful for programming purposes since it is inappropriate at community level to determine eligibility for assistance based on specific cause of parental death. Most estimates and models define an orphan as a child whose mother has died. Maternal demographic data is more easily obtained and in surveys, biological mothers are more easily related to their children than fathers. Though some censuses count paternal orphans, until recently, no national estimates of paternal orphans were available. Impact on orphans depends upon whether children have lost a father or a mother [18]. Only in modern times has the death of a mother, as primary nurturer, been given so much significance. Throughout much of western history, the loss of a father led to reduced prospects for orphans with inheritance implications. In developing countries, loss of a father may have greater socio-economic impact than loss of a mother [19]. In addition to parental status, the other factor affecting orphan estimates is the age range chosen. Most orphan estimates are for children under 15 years old. Data from child health surveys is normally based on children less than 15 years. Data on children 15-17 years is usually presented together with adult data in the 15-49 year category. From a "rights" perspective a child is defined as a person less than 18 years. From a practitioner perspective, community programmes target children in difficult circumstances which includes maternal and paternal orphans less than 18 years. There are still no estimates for orphans under 18 years, or for paternal orphans in most countries with substantial HIV/AIDS epidemics. Yet numbers are important, after the adage "If you can't count it, it doesn't matter". Definitions which exclude paternal orphans underestimate total orphan numbers by 45-70%; definitions which exclude 15-17 year old children underestimate this figure by 25-35%. Broader definitions of orphans draw attention to the scale of the impact of HIV/AIDS on children yet still underestimate the problem. Children are directly affected by HIV/AIDS when they are orphaned. In addition, many more children are affected indirectly when their close or extended family, their community and, more broadly, the structures and services which exist for their benefit are strained by the consequences of the HIV/AIDS pandemic [20].

Psychosocial problems seen in children with HIV Aids

The psychological toll of the epidemic is just as significant. The psychological and social effects of HIV/AIDS are magnified in young people. Children and adolescents are an ever-growing part of the HIV/AIDS epidemic. 2.2 million Children under the age of 15 were living with HIV [21]. Children involved in the epidemic face a set of psychological and social issues that must be addressed, not overlooked. This study discuss how children and adolescents are affected by some of the important aspects of the HIV/AIDS epidemic, including stigma, disclosure, and death, and how health care professionals can support them in dealing with these challenges In many parts of the world, HIV/AIDS is still seen as a death sentence, a disease from which there is no recovery. But with the ever-improving availability of antiretroviral therapy, HIV is increasingly recognized as a chronic rather than terminal illness. This transition requires psychological adjustments, especially in the pediatric and adolescent populations. A chronic illness can be defined as "a disorder with a protracted course which can be progressive and fatal or associated with a relatively normal life span despite impaired mental and/or physical functioning [22]. This broad definition encompasses multiple types of conditions, ranging

from fatal to lifelong. It includes HIV/AIDS, which can but need not be fatal. Unlike acute conditions, which normally develop and resolve themselves quickly, chronic conditions are life-long and usually have no cure. Psychological problems among the children affected by HIV/AIDS shown in Fig 2.

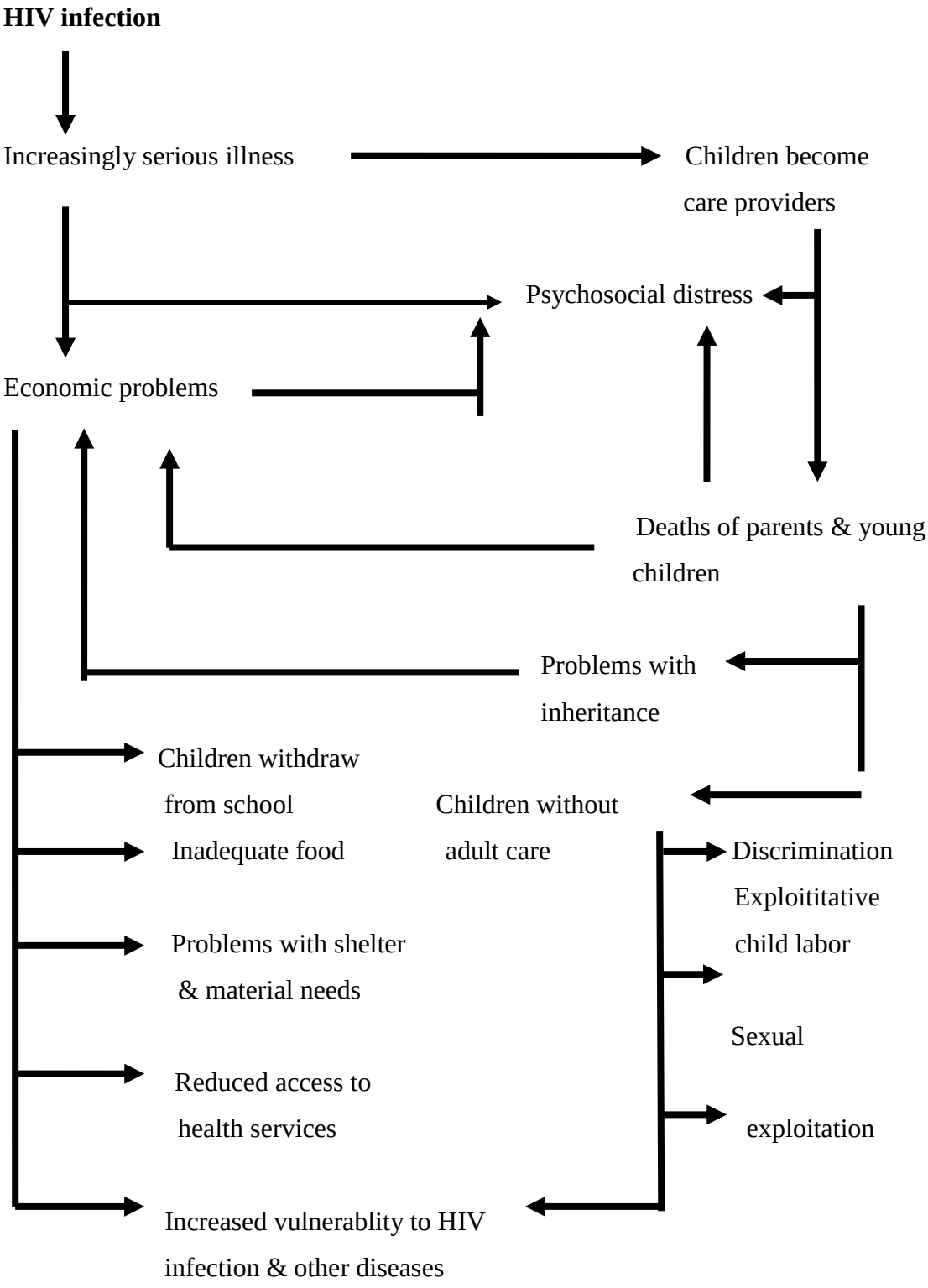


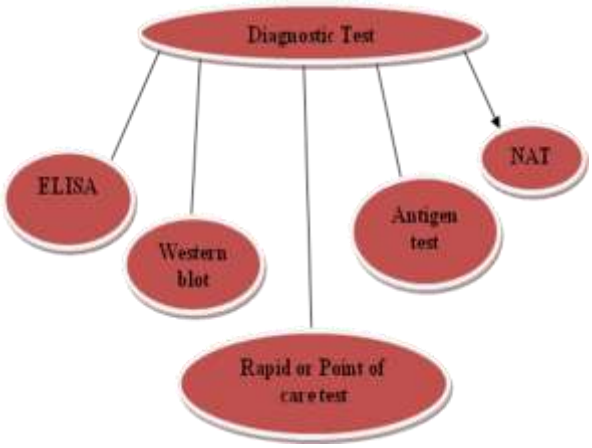
Fig 2: Psychological problems among the children affected by HIV/AIDS

The stressors of a chronic illness are more challenging when the ill patient is a child. This increases the necessity for primary caregivers and other family members to assist with medical care and with activities

of daily living. Chronic illness creates a series of challenges for those involved in the child's care. These challenges fall into three general areas: emotional, cognitive, and behavioral. Emotionally, the family must come to terms with the child's diagnosis. This includes grief over the loss of the "idea" of their once healthy child, as well as guilt, sadness, and anger. If the child was infected with HIV through mother-to child transmission, the mother may feel enormous guilt and may even be blamed within the family for the child's diagnosis. The cognitive challenge is to educate the child's family about HIV/AIDS, including transmission, disease progression, and treatment. Family members must understand how the child's life will be affected on a daily basis.

Diagnostic tests

Tests used for the diagnosis of HIV infection in a particular person require a high degree of both sensitivity and specificity. In the United States, this is achieved using an algorithm combining two tests for HIV antibodies. If antibodies are detected by an initial test based on the ELISA method, then a second test using the Western blot procedure determines the size of the antigens in the test kit binding to the antibodies. The combination of these two methods is highly accurate



ELISA

The enzyme-linked immunosorbent assay (ELISA), or enzyme immunoassay (EIA), was the first screening test commonly employed for HIV. It has a high sensitivity. In an ELISA test, a person's serum is diluted 400-fold and applied to a plate to which HIV antigens have been attached. If antibodies to HIV are present in the serum, they may bind to these HIV antigens. The plate is then washed to remove all other components of the serum. A specially prepared "secondary antibody" an antibody that binds to human antibodies is then applied to the plate, followed by another wash. This secondary antibody is chemically linked in advance to an enzyme. Thus the plate will contain enzyme in proportion to the amount of secondary antibody bound to the plate. A substrate for the enzyme is applied, and catalysis by the enzyme leads to a change in color or fluorescence. ELISA results are reported as a number; the most controversial aspect of this test is determining the "cut-off" point between a positive and negative result.

Western blot

Like the ELISA procedure, the western blot is an antibody detection test. However, unlike the ELISA method, the viral proteins are separated first and immobilized. In subsequent steps, the binding of serum antibodies to specific HIV proteins is visualized. Specifically, cells that may be HIV-infected are opened and the proteins within are placed into a slab of gel, to which an electric current is applied. Different proteins will move with different speeds in this field, depending on their size, while their electrical charge is leveled by a surfactant called sodium lauryl sulfate. Some commercially prepared Western blot test kits contain the HIV proteins already on a cellulose acetate strip. Once the proteins are well-separated, they are transferred to a membrane and the procedure continues similar to an ELISA: the person's diluted serum is applied to the membrane and antibodies in the serum may attach to some of the HIV proteins. Antibodies that do not attach are washed away, and enzyme-linked antibodies with the capability to attach to the person's antibodies determine to which HIV proteins the person has antibodies. There are no universal criteria for interpreting the western blot test: The number of viral bands that must be present may vary. If no viral bands are detected, the result is negative. If at least one viral band for each of the GAG, POL, and ENV gene-product group is present, the result is positive. The three-gene-product approach to western blot interpretation has not been adopted for public health or clinical practice. Tests in which less than the required number of viral bands is detected are reported as indeterminate: a person who has an indeterminate result should be retested, as later tests may be more conclusive. Almost all HIV-infected persons with indeterminate western blot results will develop a positive result when tested in one month; persistently indeterminate results over a period of six months suggest the results are not due to HIV infection. In a generally healthy low-risk population, indeterminate results on western blot occur on the order of 1 in 5,000 patients. However, for those individuals that have had high-risk exposures to individuals where HIV-2 is most prevalent, Western Africa, an inconclusive western blot test may prove infection with HIV-2 [23]. The HIV proteins used in western blotting can be produced by recombinant DNA in a technique called recombinant immunoblot assay (RIBA) [24].

Rapid or point-of-care tests

Rapid antibody tests are qualitative immunoassays intended for use in point-of-care testing to aid in the diagnosis of HIV infection. These tests should be used in conjunction with the clinical status, history, and risk factors of the person being tested. The positive predictive value of Rapid Antibody Tests in low-risk populations has not been evaluated. These tests should be used in appropriate multi-test algorithms designed for statistical validation of rapid HIV test results. If no antibodies to HIV are detected, this does not mean the person has not been infected with HIV. It may take several months after HIV infection for the antibody response to reach detectable levels, during which time rapid testing for antibodies to HIV will not be indicative of true infection status. For most people, HIV antibodies reach a detectable level after two to six weeks. Although these tests have high specificity, false positives do occur. Any positive test result should be confirmed by a lab using the western blot

Antigen tests

The p24 antigen test detects the presence of the p24 protein of HIV (also known as CA), the capsid protein of the virus. Monoclonal antibodies specific to the p24 protein are mixed with the person's blood. Any p24 protein in the person's blood will stick to the monoclonal antibody and an enzyme-linked antibody to the monoclonal antibodies to p24 causes a color change if p24 was present in the sample. This test is no longer used routinely in the US [25] or the EU [26] to screen blood donations since the objective was to reduce the risk of false negatives in the window period. Nucleic acid testing (NAT) is more effective for this purpose, and p24 antigen testing is no longer indicated if a NAT test is performed. The p24 antigen test is not useful for general diagnostics, as it has very low sensitivity and only works during a certain time period after infection before the body produces antibodies to the p24 protein.

Nucleic acid-based tests (NAT)

Nucleic-acid-based tests amplify and detect one or more of several target sequences located in specific HIV genes, such as HIV-I GAG, HIV-II GAG, HIV-env, or the HIV-pol [27, 28]. Since these tests are relatively expensive, the blood is screened by first pooling some 8-24 samples and testing these together; if the pool tests positive, each sample is retested individually. Although this results in a dramatic decrease in cost, the dilution of the virus in the pooled samples decreases the effective sensitivity of the test, lengthening the window period by 4 days (assuming a dose of nevirapine (an NNRTI) at the time of birth to prevent transmission. If this fails it can lead to NNRTI resistance [34]. Also, a large study in Africa and India found that a PI based regimen was superior to an NNRTI based regimen in children less than 3 years who had never been exposed to NNRTIs in the past [35]. Thus the WHO recommends PI based regimens for children less than 3. The WHO recommends for children following drugs shown in Table no 1 [32].

Table 1: WHO recommends children drugs in HIV?

Sr. No.	Drug combination	Year
1	abacavir (or zidovudine) + lamivudine + lopinivir + ritonavir	less than 3 years
2	abacavir + lamivudine + efavirenz	3 years to less than 10 years and adolescents

A systematic review assessed the effects and safety of abacavir-containing regimens as first-line therapy for children between 1 month and 18 years of age when compared to regimens with other NRTIs [36]. This review included two trials and two observational studies with almost eleven thousand HIV infected children and adolescents. They measured virologic suppression, death and adverse events. The authors found that there is no meaningful difference between abacavir-containing regimens and other NRTI-containing regimens. The evidence if of low to moderate quality and therefore it is likely that future research may change these findings.

Nursing management of children

Nurses provide life-saving and life-enriching care throughout the world. Often they are the first provider—or even the primary provider—for patients with HIV. While medically focused trainings provide a valuable service to the doctors in HIV care, nurses need training that is geared to their competencies and roles. To equip nurses in resource limited areas with this specialized training, Family Health International has developed Nursing Care of Patients with HIV/AIDS. This curriculum is intended for nurses working in facilities ranging from the primary-level health center to the tertiary-level hospital who work in a variety of roles to provide care to those with HIV. The goals of nursing care related to HIV/AIDS include reducing morbidity and mortality and increasing the quality of life of people at risk for HIV and those affected by the disease. These goals are achieved through a focus on assessment and implementation of interventions, including education on both prevention and care [37].

Resources available in the hospital and community

Community childcare committees or forums are an option that has been used very successfully in different countries. A group of adults work together to take responsibility for organizing support for vulnerable children in an area. Childcare forums can be set up by social workers, the community can elect volunteers or they can be appointed by various organizations. It is important that they have community support and some official status so that they can be effective. The volunteers usually come from different organizations and religious groups. They can be volunteers and/or be selected by a community meeting. They find children in need and try to ensure that they are either linked to welfare services or that member of their family look after their needs. The community childcare forums can also take responsibility for helping all children in need to get access to social workers and to child support or foster grants. They should also take responsibility that all births and deaths are registered so that children can get IDs and therefore access to social grants when they need them. Community childcare forums can also help to screen foster parents and to monitor them to make sure that they treat children properly. Children in need are very vulnerable to exploitation and abuse. Some people take in foster children just to get the foster grants.

Community childcare forums should be linked to social workers from the government Welfare Department (Social Development) or the Child Welfare Society. They should get some training and report regularly to professional supervisors to ensure that they are doing their work properly.

It is important for the community childcare forum to work closely with public and private organizations in the area. These include offices of government departments, businesses, churches, NGOs, health services and schools. There are many ways in which the forum can work with such organizations. In a school, for example, the committee could work with the principal to set up a system of peer support. Involving children in community events related to HIV and AIDS is an excellent way for children to learn and to feel less isolated. Community childcare forums should look at ways to facilitate involvement in events by children as appropriate.

Children living with HIV and AIDS will have special needs that are different from those of adults. They are not able to get access to services and help themselves in the same way. Usually they depend on their mother or another caregiver. If they are very young, they will not understand the disease and the steps they have to take to stay healthy and to protect other people.

Most children with HIV and AIDS were infected as a result of mother – child transmission and their parents often become ill or die when the children are still very young. While all young orphans from poor families need a lot of different kinds of support, home-based care and childcare volunteers should make especially sure that the medical needs of children with HIV and AIDS are properly addressed. It is best for children to be looked after by those they know and make them feel safe. If possible, children with HIV and AIDS should be left in the care of their families and relatives. These relatives should be targeted for support. In some areas, there are hospices or homes for children who are ill or dying. Social workers should work with clinics, home–based care and childcare volunteers to identify children who would be better off in hospices.

Children with HIV and AIDS are just as subject to discrimination as adults but are much less able to fend for themselves. It is important that every effort be made, by caregivers, teachers, health care providers, child care committees and community leaders, to educate community members. People must fully understand, for example, that an HIV-positive child cannot spread HIV through sitting next to each other in class or playing together. The survival benefit associate with combination antiretroviral therapy (cART) among children in developed countries has been substantial and well described [38, 39]. In resource-constrained countries in Asia, mono- and dual therapy were the only treatment options prior to 2002 at which time cART became available, although widespread scale up was inconsistent in the region [40].

Nurses role/ Government Role

Shortly after reporting the first AIDS case in 1986, the Government of India established a National AIDS Control Program (NACP) which has now become the Department of AIDS under Ministry of Health and Family Welfare. In 1991, the scope of NACP was expanded to focus on blood safety, prevention among high-risk populations, raising awareness in the general population, and improving surveillance [41]. A semi-autonomous body, the National AIDS Control Organization (NACO), was established under the Ministry of Health and Family Welfare to implement this program. This “first phase” of the National AIDS Control Program lasted from 1992 -1999. It focused on initiating a national commitment, increasing awareness and addressing blood safety. It achieved some of its objectives, notably increased awareness. Professional blood donations were banned by law. Screening of donated blood became almost universal by the end of this phase. However, performance across states remained variable. By 1999, the program had also established a decentralized mechanism to facilitate effective state-level responses, although substantial variation continued to exist in the level of commitment and capacity among states. Whereas states such as

Tamil Nadu, Andhra Pradesh, and Manipur demonstrated a strong response and high level of political commitment, many other states, such as Bihar and Uttar Pradesh, have yet to reach these levels are numerous NGOs and CBOs working on HIV/AIDS issues in India at the local, state, and national levels. Projects include targeted interventions with key populations; direct care of people living with HIV; general awareness campaigns; and care for children orphaned by AIDS. Funding for non-government and community-based groups comes from a variety of sources: the federal or state governments of India, international donors, and local contributions. Several CBOs have also piloted innovative approaches to tackling the stigma and discrimination that hinders access to effective HIV prevention, treatment and care services among populations most at risk. Governments have a duty to ensure that existing medication is available within their borders; such obligations are clearly stated in international human rights law. This implies that a state is obliged to establish a national medicine supply system that includes programs specifically tailored to reach the vulnerable and disadvantaged, such as children living with HIV. Moreover, governments have a responsibility to take all necessary measures to ensure that much-needed new medicines are developed, become available and are accessible. Indeed, one of the Millennium Development Goal targets is to provide, in cooperation with pharmaceutical companies, access to affordable essential drugs in developing countries. So, while governments have the primary responsibility for implementing the right to health, it is pharmaceutical companies that can make this happen. However, pharmaceutical companies set the price of pediatric diagnostic equipment and medicines too high. They also under-invest in research and development of medications to treat HIV in children. These things, along with lobbying for legal standards that limit access to HIV medicines, prevent the state from fulfilling their responsibility to provide adequate healthcare for its people.

Summary

HIV the virus that causes AIDS, The largest group of early AIDS cases comprised gay and bisexual men HIV is transmitted by mother to child during pregnancy, delivery, or breastfeeding (known as vertical transmission) Children involved in the epidemic face a set of psychological and social issues that must be addressed, not overlooked. This review study discuss how children and adolescents are affected by some of the important aspects of the HIV/AIDS epidemic, including stigma, disclosure, and death, and how health care professionals can support them in dealing with these challenges In many parts of the world, HIV/AIDS is still seen as a death sentence, a disease from which there is no recovery. Governments have a duty to ensure that medication is available within their countries HIV infected children.

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