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World AIDS Day: A Call to Action

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December 1st is World AIDS Day (WAD); a time to raise awareness about the Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) and reflect on the lives of those living with and affected by the pandemic. In 2015, over 30 years after the first cases of HIV/AIDS were diagnosed, it is important to continue to bring recognition to the pandemic through WAD and other strategic initiatives. We are still facing a pandemic and we must remain vigilant. This paper addresses the history of WAD and examples of how governments and organizations around the globe unite people and raise awareness.

HIV/AIDS PANDEMIC

The United Nations estimates that globally approximately 37 million people are living with HIV and that around half of all people are living with HIV (PLWH) do not know their status, thus preventing them from accessing care and treatment. In 2014, over two million individuals became newly infected with HIV and 1.2 million people died from AIDS-related illnesses. Despite high rates of HIV/AIDS, especially in developing countries, we have made significant progress in prevention, care, and treatment. For example, 15 million PLWH are taking combination antiretroviral therapy. Globally, new rates of HIV infection have decreased by 35% since 2000 and there has been a 42% reduction in AIDS-related deaths since 2004. In order to curb the pandemic, the Joint United Nations Programme on HIV/AIDS (UNAIDS) has a three-prong goal to achieve by 2020: 90% of all PLWH will know their HIV status, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy, and 90% of all people receiving antiretroviral therapy will have viral suppression.1

HISTORY OF WORLD AIDS DAY

The WAD initiative was established by the World Health Organization (WHO) in 1988 to facilitate the exchange of information among governments, community-based organizations, PLWH, and the general public. The idea to start WAD was developed in 1987 by two WHO public information officers named James Bunn and Thomas Netter who were assigned to the Global Programme on AIDS. In January 1988 after a meeting of international health ministers in London, an event attended by health leaders from all around the world, it was decided that a large-scale event was necessary to bring greater awareness to the HIV/AIDS pandemic facing our global society.2

Bunn, an ex-American journalist from San Francisco, made the December 1st recommendation for a number of strategic reasons. First, 1988 was a presidential election year in the United States. Coming off the heels of a major election, Bunn thought news journalists would take advantage and bring to light the first global event in the fight against HIV/AIDS. Secondly, it was right before the holidays, typically a “dead spot” in journalism as people are gearing up for holiday and other end-of-year celebrations. These two occurrences made it an optimal time for the inception of the first WAD.3

WHO organized WAD events, developing the annual themes and activities, until 1996, when these responsibilities were assumed by UNAIDS. In 1997 UNAIDS created the World AIDS Campaign to increase HIV/AIDS awareness and to integrate HIV/AIDS information on a global level.4 In 2004, the Campaign became an independent body, functioning as a global
advocacy movement outside of the United Nations and outside of Geneva.5

WORLD AIDS DAY EXAMPLES

WAD has become a universal call to action, recognizing our collective potential to create change while acknowledging the tremendous progress that has been made. During 2011-2015, the WAD theme has been “getting to zero”: zero new HIV infections, zero discrimination, and zero AIDS-related deaths.5 Below are some examples of how governments and other organizations implement WAD initiatives:

United States

In June 2014, New York Governor Andrew Cuomo established a blueprint containing three major steps to ending the HIV epidemic in New York State: (1) identifying persons living with HIV, (2) linking and retaining those diagnosed individuals into health care, and (3) providing access to Pre-Exposure Prophylaxis (PrEP) for high risk persons to help them stay negative.7 At Hofstra University in Long Island, New York, we are partnering with a community-based organization (Pride for Youth, a program of the Long Island Crisis Center) to hold a research dissemination symposium where we will share results from an academic-community research partnership where we conducted an HIV and sexual health survey of young men who have sex with men (YMSM) to raise awareness on knowledge, attitudes, and perceptions of YMSM.

Canada

In Canada, in addition to WAD, December 1st is also the start of Aboriginal AIDS Awareness Week; a time of reflection on the impact of HIV/AIDS on their native people. Various events will take place to inspire hope, remember those who have passed, and acknowledge the groundbreaking science that has informed HIV prevention and treatment. These events include, but are not limited to: concerts, fundraisers, sex kit creations, HIV and social determinants workshops for women, and candlelight vigils.8,9

Ghana

The 2015 WAD commemoration in Ghana will begin on November 3rd, to commence a month long period of awareness, advocacy and testing events. Noting the remarkable successes of decreasing HIV infection among children and preventing mother-to-child transmission of HIV, the Ghana AIDS Commission announced Ghana’s 2015 WAD theme, Fast Track: Meeting the Health Needs of Children towards an HIV-Free Generation. These successes come at the end of the five year Strategic Plan for HIV/AIDS. As Ghana transitions into the National Strategic Plan 2016-2020, it is cognizant of the advantages of partnerships to help to complement the services provided.10,11

Slovenia

Recognizing that more than half of HIV infections in Slovenia were detected late, the National Institute of Public Health, the WHO in Slovenia, and the Ministry of Health held a conference last year to confront the accessibility and availability of HIV testing. The conference also focused on how to eliminate stigma and discrimination that may significantly contribute to late HIV detection. Additionally, a group of medical students developed an initiative called Project Virus where they informally discussed safe sex at the popular Prešeren Square in Ljubljana.12

South Africa

Last year, South Africa reminded us that stigma and discrimination still serve as major deterrents for testing and treatment seeking. Despite the improvements made with regards to HIV treatment, stigma counters the fight against the HIV epidemic by hindering individuals from seeking testing and other prevention, care, and treatment services. Often times, HIV stigma and discrimination leads to homelessness and family abandonment, unemployment, emotional distress, and other driving factors that can be burdensome. This year’s WAD events titled Zero Stigma and Discrimination are taking place against the backdrop of South Africa hosting the 21st International AIDS Conference in July 2016.13

Switzerland

Due to the vast amount of people unaware of their HIV status, the International Labour Organization Headquarters in Geneva, Switzerland, building on their “Getting to Zero at Work” initiative, has aimed to have five million workers tested by 2015. This
initiative also protects the labor rights of those living with or affected with HIV. This initiative is a global public-private partnership involving governments, employers and workers to ensure access to testing, counselling and treatment for workers, their families and communities.\textsuperscript{14,15}

\textbf{A CALL TO ACTION}

As a global community fighting HIV/AIDS, there are many things we can do to contribute to WAD. First, make sure all of your community partners and stakeholders learn about HIV/AIDS. The AIDS.gov website is a comprehensive, user-friendly web tool with information about prevention, care, and treatment. Second, show your support for PLWH. This can be done by wearing a red ribbon, the global symbol for HIV/AIDS, on December 1\textsuperscript{st} and other times throughout the year. Finally, attend a local WAD event. Better yet, volunteer and/or donate for a WAD event to support a local HIV/AIDS service organization. Put your knowledge and skills into action!

\textbf{CONFLICTS OF INTEREST}

The authors declare that they have no conflicts of interest.

\textbf{ACKNOWLEDGEMENT}

The authors thank Corinne Kyriacou, PhD, MPH for her editorial suggestions and feedback.

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"J'accuse": A Matter of Genocide Plea for Access to Cure Hepatitis C

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To start this reflection I recall what François Emile Zola stated in his “J’accuse”. With this undiplomatic way of getting into the topic, Emile Zola shows his outrage in a letter to the President of France at that time, Félix Faure. With a title which calls the attention, he says what the rest of the people do not dare say and he does not care about being accused of “criminal defamation”. He wants to say what he thinks and he does so in an accusatory and challenging tone.

In a different time and with different people, I am not a famous writer, not even a writer, but only a medical specialist in infectious diseases, who reported that there is a treatment which heals people with Hepatitis C or Hepatitis C Virus (HCV) and Human Immunodeficiency Virus (HIV). New treatments recently approved or soon to be authorized will offer a range of advantages compared with their predecessors: multigenotypic activity, fewer side effects, and higher cure rates, including for those in advanced stages of infection.

However, for those who do not know about it, these medications that cure hepatitis C are not for everyone. Although millions of people have been dreaming of the new treatments, with their better cure rates and lesser side effects, the therapy based on Pegylated interferon (PEG-IFN) and Resource-Based View (RBV) is still saving lives and is the only option available in many countries. Although these new molecules will improve the quality of life of people with HCV and increase the number of people cured, their price will be out of reach of most of the people who need it.

We are witnessing a revolution in the treatment of HCV with powerful molecules capable of curing the infection. There is no question that these treatments that can save millions of lives must be made universally available at an affordable price.

What is the minimum cost per person to cure HCV? Whom do they benefit? Will they really benefit anyone? Access to medicines is dependent on their rational selection and use, the availability of financial resources, the strength of the health infrastructure and their affordability. As the high cost of medicines is a major factor limiting access to new drugs in developing countries. Pharmaceutical companies purposely maintain a confusion between the cost and price of medicines, suggesting there is an underlying cost rationale to justify the very high prices.

In developing countries, the power and influence of the pharmaceutical lobby, and the power of the pharmaceutical industry in the domestic economy, prevents any kind of transparent process on price negotiations or any kind of public debate. In addition, a limitation of the accelerating access initiative has been the tendency to work mainly with ministries of health in developing countries.

It is worth recalling that the “infantile paralysis” or polio was one of the most dangerous and contagious diseases in the first half of the twentieth century. Jonas Salk, an American MD and Virologist Researcher, was a pioneer in the development of a preventive strategy against polio. For this reason, his work, which enabled effective immunization against the
virus, was a fundamental base to eradicate this disease.

Despite being a milestone in medicine, Salk rejected registering a patent of the polio vaccine. Albert Sabin, another American virologist, whose work was also very important for childhood immunization by oral dose, also rejected to do it. Why wasn’t there a patent? If Salk had registered the polio vaccine, he would have had millions of dollars in profits, about seven billion. Both vaccines were used since the fifties, achieving the eradication of the disease in most of the world. Salk was asked about why he refused to register the patent of the polio vaccine: “There is no patent. Can we register de sun?”

Jonas Salk thought of a way to make science different, aimed at a universal benefit. It is important to emphasize the principles of the scientific contribution of Sabin and Salk’s work, and to pay attention to the fact that they refused to be the owners of the invention and they wanted to make it accessible to everyone, even though they could have had multimillionaire profits. I do not want to be part of a conspiracy of silence. I am particularly interested in showing the truth of the entities involved in the plot against public health: nations, private corporations, health systems, etc. As a human being and as a physician, I know that it is not right to remain silent while sacrificing people with hepatitis C, and I definitely take the side of patients.

It is estimated that each year more than 350,000 people die because of hepatitis C. Most of these lethal infections could be prevented with antiviral drugs of 3rd generation, which are accepted, approved and clinically effective for this purpose. The cost of these drugs is not an obstacle. If you share my moral outrage as regards your colleagues on this senseless slaughter of those who will not have access to treatment, I urge you to do the right thing.

For those who might have witnessed the consequences that silence have had on the murder of tens of thousands of other citizens, who were perpetrated by governments which did not assign any value to their fragile lives, doing the right thing may involve more direct action.

Learning what is right often involves the cumulative experience of realizing how many times we have done the wrong thing (usually because it was the safe thing to do) or we have not done anything. Sometimes we forget that we are responsible of the consequences of our actions as well as of our lack of action when we have a responsibility to act. All the countries have the responsibility to protect the health of patients infected by the deadly virus of hepatitis C, which is located in their body, facilitating the use of antiviral drugs.

The consequence of this lack of action and of indifference is that there are hundreds of thousands of patients who have their lives marked by unnecessary pain and suffering. The word that defines the consequences of this lack of medicine supply is “genocide”.

We all avoid facing painful truths about ourselves and others, in part because our knowledge of the truth entails the responsibility for action. We can never exorcise our personal or social evils unless we face them and call them by their names. We can never overcome our personal addictions unless we first recognize that we are an addict. We have to face the others and admit that we are alcoholics as a first step in our recovery. That is why the words have great power, and they can change the course of our lives and even the fate of nations.

Exorcists say they cannot force an evil spirit to leave the body of the possessed person until the name of that spirit is revealed. We will never put an end to the policy of blocking the use of antiviral drugs against hepatitis C until we call this policy by its name: genocide. For some of us, the right thing will be to use the word “genocide” whenever we refer to the policy of denying medicines to patients infected with hepatitis C.

The word genocide has an archetypal power. It implies a more primitive sense of justice. The ancient gods ruled with greater moral certainty than our modern deities. Often modern justice is based on infinite degrees of guilt. But the gods of antiquity genocide, whatever the medium, demanded quick justice and severe punishment. A murder has always been a murder. There was no difference between being killed by a deadly gas, a bayonet or if someone intentionally avoid providing available drugs to save lives.

It is ironic that many leaders of third world countries have ratified the Rome Statute to support the International Criminal Court (ICC). In doing so, these governments signed a consent which states that individuals who have committed or instigated flagrant violations of international law, whether war crimes, genocide and “crimes against humanity”, which include kidnapping and torture, will not be allowed to avoid processing. The element that defines the term “crimes against humanity” is the deliberate devaluation of human life. The devaluation of the lives of people with hepatitis C by the authorities of most governments would fit this definition.

On 15th May, 2016, the metaphor of war against hepatitis C may have been repeated again and again, sometimes by those who never fought or survived a war. But this is a war we have lost, not due to lack of effective weapons or brilliant strategists, but because many of us were conscientious objectors. We do not listen to our conscience, which tells us our obligations as regards the patient in danger of hepatitis C. Thousands of patients will continue to be murdered because of our silence, the silence that has promoted these crimes against humanity.
HIV/AIDS Res Treat Open J

Volume 2 : Issue 4
Article Ref. #: 1000HARTOJ2116

ABSTRACT

We studied in vitro Human Immunodeficiency Virus type 1 (HIV-1) infection within human thymic cell cultures as a model to explain the consequences of HIV-1 on the thymic microenvironment. Although HIV-1 infection may exert direct thymic cytopathicity, the majority of thymocytes remain uninfected. One hypothesis to explain this effect is that infection of stromal cells, including tissue macrophages, within the thymic microenvironment alters the normal cross-talk between stromal cells and thymocytes thereby disrupting thymocyte maturation. Accordingly, to establish a role for the thymic pathogenicity of HIV-1 we investigated the in vitro susceptibility of thymocytes and Thymic Macrophages (TM) to infection with a series of lab adapted HIV-1 that display well defined patterns of tropism: Ba-L(R5), HXB2(X4), and 89.6(R5/X4). We found that thymocytes were most productive in supporting the replication of the R5/X4-tropic virus 89.6 early in culture and displayed more significant replication of the X4-tropic virus HXB2 only after 7-14 days of culture. Replication of the R5 topic virus Ba-L was not detected. In contrast, although HIV-1 replication was delayed overall in cultures of thymic stromal cells enriched for TM, by day 7-21 these cultures supported the replication of both the R5/X4 tropic virus 89.6 and the R5-tropic virus Ba-L, but only transiently HXB2. Thus, while both thymic stromal cells and thymocytes are capable of supporting HIV-1 replication, they display markedly different patterns of susceptibility linked to HIV-1 tropism. Given the exquisite sensitivity of thymocyte development and selection on stromal cell function these results point to new mechanisms for HIV-1 infection in disrupting the maturation of thymocytes.

KEYWORDS: Thymocytes; Thymic macrophages; HIV-1 infection.


INTRODUCTION

The thymus functions as the primary site for T-lymphocyte development and selection of histocompatibility recognition linked to antigen presentation. Although the dependence on thymic function for maintenance of mature T cells decreases with age, viable thymic tissue persists in adults and may be functionally reactivated following the depletion of peripheral T cells. The development and selection of T cells is tightly regulated by the interaction of thymocytes with the non-lymphoid thymic stroma, which is composed of epithelial cells, dendritic cells, endothelial cells and fibroblasts. Thymocyte maturation and selection is a sensitive, multifaceted process that can be disrupted by several infectious agents including HIV-1. Although direct infection of thymocytes by HIV-1 may trigger cytopathology, this mechanism alone does not account for the profound loss of thymocytes seen during infection. The capacity of HIV-1...
to infect non-lymphoid cells, including thymic stromal cells, has been previously reported. However, the magnitude of this infection and consequences on thymic pathology are not clear. As is well known, monocytes and macrophages represent one of the most important peripheral targets of HIV-1, yet the infection of TM remains poorly defined. In our previous work we investigated HIV-1 infection of TM as a model for the indirect inhibitory effects of HIV-1 on the human immune system and showed that infection of TM triggers alterations in cytokine production. In the present report, we focus attention on the differential susceptibility of thymocytes and thymic stromal TM cells to HIV-1 infection.

MATERIAL AND METHODS

Thymic Cell Isolation and Tissue Culture

Fresh neonatal human thymic tissue was obtained from elective thoracic surgeries of HIV-1 negative individuals aged 1 day-6 months. Tissue was dissected into 3-10 mm fragments, and incubated with 0.1% collagenase (Sigma, St. Louis, MO, USA) and Deoxyribonuclease (DNAase) 10 IU/ml (Sigma) solution in Dulbecco’s Phosphate-Buffered Saline (PBS) without calcium chloride and magnesium chloride (GibcoBRL, Gaithersburg, MD, USA) for 2 hours at 37 °C. The fragments were subsequently passed through a 100 µm nylon cell strainer (Becton Dickinson, Franklin Lakes, NJ, USA), and washed with ice cold PBS. Mononuclear cells were isolated from whole blood by Ficoll-Paque (Amersham Pharmacia, Uppsala, Sweden), and plated onto 10 cm Biocoat tissue culture plates with collagen cover (BD, Bedford, MA, USA) or directly into Biocoat (collagen cover) 6-well plates. Non-adherent cells (thymocytes) were placed in separate dishes (Falcon 24 well plate) for further culture. After 12 hours incubation in Roswell Park Memorial Institute (RPMI) medium (GibcoBRL) adherent cells were supplemented with 10-20% Fetal Bovine Serum (FBS), 2 mM glutamine, 100 IU/ml of penicillin, 100 µg/ml of streptomycin and 0.25 µg/ml of amphotericin B. Cells were removed for analysis with either Trypsin-EDTA (GibcoBRL) or by use of disposable cell scrapers, and utilized for experimental analysis. Adherent cells were stained with fluorescent-tagged antibodies to determine cell-type: cells were 95% positive for the epitopes CD14 (Dako, Carpinteria, CA, USA) and CD68 (Dako, Carpenteria, CA, USA), which are indicative of TM.

Fluorescent Antibody Analysis of Thymic Cells

Thymic stromal cells, isolated as described above, were plated onto Lab-Tec chamber slides (Nunc, Rochester, NY, USA), and maintained in culture 7 days. At the conclusion of incubation cells were washed with PBS supplemented with 4% Bovine Serum Albumin (BSA). When necessary to visualize intracellular antigens, cells were first permeabilized by treatment with -20 °C methanol for 5-10 minutes, and then rinsed with PBS. All other incubations were conducted at 4 °C in PBS with 0.1% NaN₃. Following fixation, cells were incubated for 30 minutes with 20% goat serum in PBS at 4 °C to block non-specific binding. Subsequently, cells were washed in PBS-BSA and incubated with primary antibody for 1 hour at 4 °C. After washing with buffer to remove unbound primary antibody, cells were incubated for one hour with secondary antibody conjugated with FITC at 4 °C. Cell epitope specific staining was evaluated with anti-CD68 Ab (Dako, Carpenteria, CA, USA) at a concentration of 1:100, and anti-CD14 Ab (Sigma) at 5 µg/ml. HIV-1 staining was evaluated with HIV-1 gp41 monoclonal antibody (2F5) at 5 µg/ml, obtained from the National Institutes of Health (NIH) Acquired Immune Deficiency Syndrome (AIDS) Research and Reference Reagent Program. HIV-1 co-receptor staining was evaluated with the anti-CCR5 monoclonal 2D7 (Pharmingen, San Diego, CA, USA) at 5 µg/ml. Secondary goat anti-mouse IgG conjugated with Fluorescein Isothiocyanate (FITC) (Roche, BMB, Indianapolis, IN, USA), or goat anti-mouse IgG conjugated with Texas Red (Jackson Lab. Inc, West Grove, PA, USA) were both used at a concentration of 1:200. At the conclusion of antibody binding cells were washed, mounted with Gel/Mount medium (Biomedca, Foster City, CA, USA) and examined under a fluorescence microscope Nikon Optiphot (Tokyo, Japan).

HIV Infection and Assay

Thymocytes and stromal cultures enriched for TM were isolated as described above and then plated onto either Falcon 24, 48 or 96 well plates as required for subsequent assay. Cells were maintained for one week in RPMI medium supplemented with 10% FBS and subsequently incubated with one of the following HIV viral stocks at a concentration of 10 ng/ml: Ba-L (R5-tropic), HXB2 (X4-tropic), and 89.6 (R5/X4-tropic). After a 12-hour incubation, cells were washed 5 times in PBS solution and zero time samples were collected. Cells were then re-cultured in the presence of RPMI medium supplemented with 10% FBS for the times indicated in Results. After collection of all required time points, p24 ELISA was used to determine infection status. Enzyme Linked Immune Sorbant Assay (ELISA) reactions were performed using the Alliance HIV-1 p-24 ELISA kit (PerkinElmer, Boston, MA, USA). Briefly, serial dilutions of cell culture supernatant, or in some instances cell suspensions, were placed in a 96-well ELISA plate 5% TritonX-100 and incubated for two hours at 37 °C. Following washing, detector antibody was added, and the plate was re-incubated for one hour at 37 °C. After additional washing samples were incubated with Streptavidin-Horseradish Peroxidase (HRP) for 30 minutes at room temperature, treated with Ortho-Phenylenediamine (OPD) substrate solution, and analyzed at 492 nm in a MRX Revelation Plate Reader (Dynex, Chantilly, VA, USA).

Statistical Analysis

Arithmetic means, standard deviations and p24 ELISA calculations were performed, using Microsoft Excel 2011. Data was analyzed using the Student t-test for paired and unpaired samples. Statistical significance was defined as p<0.05.
RESULTS

Receptor Expression on Thymic Stromal Cells

Naïve, uninfected thymic stromal cells were first examined for expression of the classical monocyte surface markers CD14 and CD68 which are characteristic for macrophages and dendritic cells. As shown in Figure 1, these cells stained positively with both CD68 (Panel A) and CD14 (Panel B) antibodies relative to control (Panel D). Staining for the CCR5 chemokine receptor (HIV-1 co-receptor) was shown in parallel (Panel C).

Cultures of thymic stromal cells enriched for TM were then incubated with the R5/X4-tropic virus 89.6, and after 7 days cells were stained with gp41-Texas Red to confirm the presence of HIV-1 infection (Figure 2).

HIV-1 Infection of Thymocyte and Thymic Stromal Cell Cultures

To examine potential differences in susceptibility of subpopulations of thymic cells to various HIV-1 strains, we first incubated thymocytes with each of three laboratory derived HIV-1 strains: X4-tropic HXB2, R5-tropic Ba-L and R5/X4-tropic 89.6 at a concentration of 10 ng/ml (m.o.i. 0.02) as described above. We then utilized p24 ELISA to follow the kinetics of virus replication in these cultures over time from 1-14 days. As shown in the left side of Figure 3, thymocytes in short-term culture (day 1-5) supported the replication of both X4-tropic and R5/X4-tropic HIV-1 to relatively equal levels, but not the R5-tropic Ba-L virus. On longer-term incubation, shown on the right of the figure, virus replication at day 14 of culture was greatly enhanced for HXB2 relative to 89.6 virus.

Thymic stromal cells enriched for TM were similarly inoculated with the three different HIV-1 strains (Ba-L, HXB2 and 89.6). Both the kinetics and tropism of virus replication was different in TM cultures as compared to thymocytes. As shown in Figure 4, virus replication in TM cultures was slower overall then seen with thymocyte cultures, with virus not readily detected until day 7. With regard to tropism, cultures enriched for TM showed evidence of early replication of 89.6 virus, which peaked at day 7-14, whereas replication of the R5-tropic virus Ba-L continued to rise throughout culture from days 7-21 of culture. In contrast to thymocyte cultures, replication of the X4-tropic virus HXB2 was detected only transiently on day 7.
DISCUSSION

Thymic macrophages represent an important subset of cells within the thymic stroma. Although, TM comprise only a small percent of the total thymic cell population they play a central role in thymocyte development and selection. In view of this, disruption of TM function by infection with viruses such as HIV-1 might have a profound negative effect on thymocyte maturation.

Thymic macrophages are difficult to maintain in cell culture for study. Therefore, we focused the first steps of our analysis on establishing an appropriate TM isolation procedure, and subsequently on the maintenance of cultures enriched for TM for up to 21 days in vitro with greater than 90% viability. We then compared thymocytes to stromal TM cultures with regard to their susceptibility to HIV-1 infection. Here we detected significant differences in the strain-dependent tropism of infection and replication as measured by p24 ELISA analysis. Thymocytes supported the replication of R5/X4-tropic (early) and X4-tropic (early-late) HIV-1 strains, but not the R5-tropic virus Ba-L at any time point. In contrast, stromal cells enriched for TM supported the replication of R5/X4-tropic (mid) and R5-tropic (late) HIV-1 strains, but only transiently the X4-tropic virus HXB2.

It was reported previously that thymic macrophages are more mature and differentiated in vivo than monocytes and Monocyte Derived Macrophages (MDM). However, similar to monocyte and MDM cultures, the production of endogenous chemokines decreased with TM maturation. The differentiation of tissue macrophages was also correlated with an increase in C-C chemokine receptor type four (CXCR4) expression or function. This may explain the data we obtained, as in our study cultures enriched for TM were preferentially susceptible to viruses that utilize CXCR4 as a co-receptor, and replication of the R5 virus Ba-L rose continually throughout 21 days in culture.

It was also reported previously that monocytes and MDM are generally resistant to infection with X4-tropic strains of HIV-1 and that this phenomenon is not dependent on C-X-C chemokine receptor type four (CXCR4) expression or function. Nonetheless we observed here, in replicate assays, transient replication of the X4-tropic virus HXB2 in TM cultures. The validity of this observation is reinforced by work from a central role in thymocye development and selection. In view of this, disruption of TM function by infection with viruses such as HIV-1 might have a profound negative effect on thymocyte maturation. In summary, HIV-1 infection of the thymus can have profound consequences on thymocyte maturation. These effects may result from direct infection of thymocytes but may also occur via infection of TM stromal cells, thereby disrupting the cell cross talk that is so crucial to thymocyte maturation. This hypothesis is consistent with previous reports that changes in cytokine production of HIV-1 infected bone marrow cells induced the disregulation of normal myelopoietic development.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

ACKNOWLEDGEMENTS

This work was supported by National Institutes of Health grant R01 AI-4083 (G.N. Gaulton).

CONSENT

Regarding the consent statement, please be advised that the conduct of this research, including the acquisition of human subject materials was reviewed and approved by the University of Pennsylvania Institutional Review Board (IRB). As the research utilized only tissue samples that were provided to authors in an anonymized manner, direct patient consent was not required. Thus, this is also not a publication that reports on a patient based study and consent is not required for the publication of the manuscript.

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HIV/AIDS-Related Knowledge and Sources of Information among Secondary School Students in Enugu Nigeria

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ABSTRACT

The present study aimed to evaluate AIDS-related knowledge, and sources of information, among secondary school students in Enugu, Nigeria. Anonymous structured interviews were conducted with 1009 multi-stage sampled students aged 10-20 years. Ninety percent of the students had heard about AIDS but only 725 knew that HIV causes AIDS. Fifty percent (50%) could identify transmission modalities but only 36-50% could correctly identify actions to avoid contracting Human Immunodeficiency Virus (HIV) infection. Students learned about HIV/AIDS from the society (22.3%) and TV-20%; Radio-19%; Newspapers-13%, than schools (11.0%) and from home (16%), while 33% believed AIDS was not real. Seventy-nine percent (79%) and 46% of the respondents were afraid and have aversion for People living with AIDS respectively. Upto 27% of the respondents had had premarital sex while only 50% agreed they could change their sexual practice on account of HIV/AIDS. The respondents, those who had begun sexual activity started early and engaged in risky sexual practices. Results from this study indicate that HIV/AIDs knowledge among the respondents is inadequate, and that they want to learn more. Appropriate and factual HIV/AIDS and sexuality information should be provided in formal conducive setting in-schools to counteract wrong information, misconceptions and sexual myths gained from uninformed general public and on occasions the media.

KEYWORDS: Adolescents; Nigerian; HIV/AIDS; Knowledge; Sources of information; Secondary school students.


INTRODUCTION

Since the first description of HIV and AIDS, there has been a relentless spread of the disease to most countries of the world. The World Health Organization (WHO) in April 1997 estimated that over 24 million people were infected with HIV. Nine million are women and 1.5 are children.

Eight-five percent (85%) of infected women and children reside in sub Saharan Africa. In Africa it is estimated that 1 in 40 persons are infected and the figure is rising. The route of infection is heterosexual intercourse with a gender ratio of 1.2:1, indicating that women outnumber men.

The first AIDS case in Nigeria was in a 13 year old girl, officially reported in 1986. From 2 AIDS cases in 1986, 10,803 cases have been reported in 1997. The cumulative (1986-1995) prevalence of AIDS among 15-19 year age group is 6.75% and 48.68% among 20-29 year age group. The number of infected people in Nigeria is projected to reach 7.2 million by the year 2001.

The Epidemiological fact sheet on HIV/AIDS and STDs for Nigeria in 1998 estimates number of children 0-15 years to be 99000, number of AIDS case since the pandemic (adults and children) 590000, number of deaths cumulative (adults and children) 530000.0 and in 1997 for children is 150000.0, and number of orphans cumulative (<15 years)
of the transmission questions correctly ranged from 37-95%.

In Enugu State, there has been a steady increase in the prevalence of HIV infection among pregnant women, a sexually active group from 1.4% in 1992 to 5.9 in 1996. This trend has been documented among high risk groups like commercial sex workers, patients attending Sexually Transmitted Disease (STD) clinics and patients with tuberculosis. In 1993/1994 a structured survey in Enugu State showed the highest prevalence to be among the age bracket 20-29 years followed closely by the 15-19 year group 1995/1996. This shows the vulnerability of the adolescent/youth in Enugu to HIV infection. Knowledge, Attitude and Practice studies regarding HIV/AIDS were conducted in the USA and most developed countries in the 1980’s. They were relevant to their environment and what was known about HIV/AIDS then, for example homosexuality, Schedule 4 (IV) drug use and recipients of blood and blood products. There was limited enquiry about the nature of HIV, prevention and transmission modalities. More recent studies have incorporated enquiries about group behaviour, sexual negotiation skills, condom use and effect of culture. Questionnaires were the most frequently used tools. Knowledge were often inadequate, while perceptions and misconceptions were prevalent as were prejudices and popular myths in the societies concerned about people with AIDS especially among young people. The exceptions are in situations where Sex/AIDS education are entrenched in the school curriculum. In 1981, the Nigerian Educational Research and Development Council (NERDC) developed and incorporated a school based population education programme at the secondary school level. By 1989/1990 the family education component of the programme was expanded to include some information on AIDS. With the ever increasing threat and danger of HIV/AIDS, there was need for research to give insight into what teachers and students already know about HIV/AIDS. In a recent study with 6862 respondents knowledge score ranged from 20-59% with prevention measures scoring as low as 15%; 21% of respondents could not state any method of prevention.

Improtantly, 94.9% of the teachers agreed that students should be taught AIDS education and the NERDC concluded that AIDS and sex education be made available to students and teachers. The NERDC in conjunction with the National AIDS and STDs control programme conducted another study in 1996. The respondents consisted of 1445 youth aged 10-15 years from upper primary 5 to senior secondary school classes. The major findings was that the students did not consider STDs, HIV/AIDS a major health problem, STDs and AIDS awareness was very low in primary schools particularly among girls and that misconceptions abound. The recommendation of the NERDC was that there was an urgent need for implementation of an in-school HIV/AIDS and sex education programme and that parents be involved in STDs/AIDS education in order to reinforce behaviours advocated for their children. A Zambian study found worse knowledge scores ranging 10-20% and poor attitudes and behaviours. Studies in developed countries in the 1980’s when compared to studies in Nigeria in the 1990’s revealed similar scores. Helgerson SD found the proportion of students who answered each of the transmission questions correctly ranged from 37-95%.

About half of the students recognised risk groups correctly as well as having learned about AIDS from television (57%). Few had learned from parents (6.0%) and teachers (4.0%). About 24-29% of the students wanted AIDS education from a talk or lecture. Baldo M found similar results while Rawitscher LA found that adolescents preferred physicians to give them information and ask personal questions about HIV and HIV-related risk behaviours and that physicians initiate the discussion. Early Aids intervention strategies in teenagers were based upon studies that showed that general health education could improve knowledge, attitudes and behaviour. When compared, surveys of adolescents knowledge in the 80’s and 90’s about HIV/AIDS in both developed and developing countries revealed that their knowledge have improved. Despite increased knowledge, adolescents continue to have misconceptions about casual transmission of HIV and their information about prevention remains insufficient. Increase in knowledge is meaningless if they do not lead to behaviour change, and behaviour change is meaningless if the change is not adequate to ensure protection that is sustained and maintained over time. It is particularly crucial to change adolescent sexual behaviour because patterns of behaviour and risk taking at set during the teenage years. Adolescents feel invulnerable, engage in concrete rather than abstract thinking, deny the risk of their actions and frequently need peer approval. Because of the sensitivity of issues associated with sexual behaviour, public health official and educators confront problems in the prevention and control of HIV/AIDS/STDs. The problem increases when measures are aimed specifically at young people between the ages of 10-24. Nevertheless, this age bracket constitute an important target group and a potential resource for the prevention of HIV/AIDS/STDs. Many young people attend school or are in contact with those who do. Information, values and skills conveyed in school can have considerable impact in their lives. To be effective, education about HIV/AIDS/STDs must be presented within a school health education programme that provides a broad understanding of communicable diseases, community health, human relationships, sexuality, drug use and other relevant issues within the context of local cultural values. Given the early age at which young people become sexually active, 26% in Nigeria, 44% in Cameroon, 6% in Niger, 37% in Namibia and 18% in Burkina-Faso among 15-19 year olds and infected, there should therefore be special emphasis on early information and education of pre-adolescents and adolescent boys and girls both in-school and out-of-school. As they mature and become sexually active, adolescents face serious health risks with regard to STDs. Most face these risks with too many sexuality myths, too little factual information, guidance about sexual responsibility and access to health care. Childhood and youth are both periods of accelerated learning and a time during which young people can acquire the necessary knowledge, attitudes, values and skills that can help them to maintain healthy behaviour and avoid behaviours that put them or others at risk. United Nations Educational, Scientific and Cultural Organization (UNESCO) Regional Seminar on HIV/AIDS and education within the school system for English speaking countries in Eastern and Southern Africa 20-
24th Feb. 34 They are also at a vantage stage of development in which they are receptive to information and intervention. 15, 30, 35 UNESCO Regional Seminar on HIV/AIDS and education within the school system for English speaking countries in Eastern and Southern Africa 20-24th Feb. 34 School represent strategic institutions where STDs/HIV/AIDS prevention and health promotion education should begin. With these in mind the current study was embarked on to assess knowledge and sources of information regarding HIV/AIDS and propose ways to improve knowledge among the students. It is hoped that findings from the study will provide useful data that can help in the fight against HIV infection and AIDS.

RESULTS

Nine schools participated in the study and 1009 completed questionnaires was analysed. Table 1 show the demographic characteristics of the schools and students who responded to the questionnaire. Eighty six percent -98% of the students responded to every one of the survey questions. Table 2 show knowledge about the nature of HIV. Thirty-one (31%) of students did not respond to this question. That the no of true responses for HIV being bacteria and don’t know were similar could mean either that the respondents did not understand the question or they were guessing. When this response was stratified by age it was found that the older the respondents the more correct their responses for HIV being a virus or the AIDS virus Table 3. Gender did not influence knowledge about the nature of HIV. Misconceptions were prevalent as 120(11.9%) thought that AIDS is caused by poisoning while 115(11.4%) thought it was a form of cancer. One hundred and forty-eight (14.7%) did not know that a blood test could detect a person’s HIV status, while 205(20.3%) responded that AIDS was curable. One hundred and eighty-five (18.3%) of the respondents thought that AIDS was a “white man’s disease”. The respondents stratified by type of school show that they responded correctly that HIV infected persons may remain well for up to 10 years (p<0.001). Seven hundred and sixty-five (75.9%) of the respondents have heard of STDs while 227(22.7%) have not. However more girls than boys identified the causative organisms of STDs. The value for gonorrhoea (p<0.01) and syphilis (p<0.02) were statistically significant. Knowledge scores were not statistically different in the case of HIV/AIDS (p=0.3) and (p=0.6) respectively. Students of boys’ school have had STDs more than students of mixed schools and girls’ school (p<0.001). Knowledge scores about STDs stratified by class of the respondents are shown in Table 4. Knowledge about condom use was fair as 535(53.0) had...
seen a condom while only 91(9.0%) have used one. More girls 305(30.2%) than boys 291(28.8%) responded that they know what a condom is (p<0.4) though fewer of them (girls) have used it (p>0.02). Fifty four (24.4%) of the sexually active group (221 students) did not know where to get a condom while 74(33.4%) did not know what a condom is (p=0.4) though fewer of them (girls) have used it (p>0.02). Knowledge about the nature of HIV stratified by age of the respondents.

Table 2: Knowledge about the nature of HIV.

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Bacteria No (%)</th>
<th>Virus No (%)</th>
<th>AIDS Virus No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-11</td>
<td>21(91.3)(1.3)/(4.3)</td>
<td>87(54.8)/(60.9)/(4.3)</td>
<td>1(43.8)/(60.9)/(0.0)</td>
</tr>
<tr>
<td>12-13</td>
<td>19(78.6)/(4.8)/(14.8)</td>
<td>82/(33.7)/(146)/(60.1)/(15)/(6.2)</td>
<td>10/(50)/(61.7)/(85)/(35.0)/(8.3)</td>
</tr>
<tr>
<td>14-15</td>
<td>24/(70.7)/(8)/(67)/(18.9)/(37)/(10.4)</td>
<td>159/(44.8)/(166)/(46.8)/(38)/(8.5)</td>
<td>23/(165.1)/(108)/(30.4)/(16)/(4.5)</td>
</tr>
<tr>
<td>16-17</td>
<td>21/(73.2)/(41)/(4.3)/(36)/(12.5)</td>
<td>172/(59.9)/(87)/(30.3)/(28)/(9.8)</td>
<td>189/(65.9)/(74)/(25.8)/(24)/(8.4)</td>
</tr>
<tr>
<td>&gt;18</td>
<td>57/(62.0)/(16)/(17.4)/(19)/(20.7)</td>
<td>36/(39.1)/(39)/(24.2)/(17)/(18.5)</td>
<td>67/(72.8)/(16)/(17.4)/(9)/(7.8)</td>
</tr>
</tbody>
</table>

Table 3: Knowledge of STDs stratified by class of the respondents.

<table>
<thead>
<tr>
<th>Responses &amp; class</th>
<th>Gonorrhoea</th>
<th>Syphilis</th>
<th>Herpes</th>
<th>HIV</th>
<th>AIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>True False Nil</td>
<td>102/(47.7)</td>
<td>10/(47)</td>
<td>18/(8.4)</td>
<td>124/(57.9)</td>
<td>173/(80.8)</td>
</tr>
<tr>
<td>JS2 False</td>
<td>102/(47.7)</td>
<td>10/(47)</td>
<td>18/(8.4)</td>
<td>124/(57.9)</td>
<td>173/(80.8)</td>
</tr>
<tr>
<td>Nil</td>
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</tr>
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HIV transmission are shown in table 5 while table 6 show responses on desirable actions to avoid contracting HIV infection. Increasing age and female gender correlated with more correct responses in the knowledge questions (p<0.001 and p<0.02 respectively). The older students however did not perform better than the younger ones when asked if condom prevented transmission of HIV/AIDS (p>0.1). Poor knowledge and misconception were greater among girls than boys with regard to routes of transmission (p<0.01). Knowledge about AIDS varied between the schools with the girls’ schools consistently performing better than the other types of schools. However, students of girls schools were less able to identify breast milk and casual sex as modalities of HIV transmission (p<0.001). The students of girls schools identified risk behaviour for HIV/AIDS more often than the other types of schools. However, students of girls schools were less able to identify breast milk and casual sex as modalities of HIV transmission (p<0.001).
Affirmative responses to formal and informal sources of information about HIV/AIDS. When the respondents were asked to compare in ranking order where and whom they would seek information on HIV/AIDS from, 746(73.9%) would like to consult a doctor, while 639(63.3%) would rather consult the Enugu State AIDS office, school teacher 298(29.5%) and peers 144(14.3%). The differences were statistically significant $p<0.001$. The difference in scores between the schools as regards sources of information were also statistically significant ($p<0.001$). Sources of information varied significantly with age ($p<0.001$). Senior (SSS) students learned more from all listed sources than junior students ($p<0.001$). Gender least affected the source of infor-
mation. The difference between the boys and girls was not statistically significant for print, electronic or discussions within the community about HIV/AIDS (p value ranging 0.08 to 0.13). However, the difference for what they learned from school and home was significant (p<0.001 and 0.001) respectively. More girls than boys would like to find out about HIV/AIDS from school teachers (p<0.001). Six hundred and forty-five (63.9%) of the respondents want sex education to be taught in schools as more girls than boys (p<0.001). Age of the respondents did not influence opinion as to whether sex education should be taught in schools (p>0.09).

**DISCUSSION**

Data from this study show that adolescent Nigerian secondary school students have misconceptions, inadequate and incomplete knowledge about HIV/AIDS, the routes of transmission and the precautions necessary to prevent infection. This is in agreement with what had been found in other studies. It may also suggest that secondary school teenagers were in the range of 17-95%. Ninety five of their student population were able to recognize that having sex with an HIV infected person was a high risk behaviour. Otherwise, the other scores in the same study were similar to those of the current study. Knowledge of STDs was very poor. This may suggest that over a decade into the AIDS pandemic, there has been no significant improvement in knowledge in the current study population when compared to their American counterparts, as was also found by Lawrence, et al. 30 The differences between the two populations may be explained by the AIDS intervention programmes and sexuality education made available to US adolescents. AIDS education commenced nearly a decade ago in the USA. It may also suggest that secondary school biology syllables and lessons are deficient in basic health topics as indicators of applied biology. Although the Guidelines for Sexuality Education in Nigeria was only recently published in 1996, there has been neither implementation nor a statutory provision for same as yet. In another study Aplasca, et al. 31 reported similar findings but in addition demonstrated increased knowledge among the intervention group as against the controls emphasizing the immense value of intervention activities. Poor knowledge and attitudes to HIV/AIDS is not limited to secondary school students in Nigeria. A knowledge, practice and attitude survey among health workers in a Nigerian teaching hospital, noted important gaps in knowledge and showed avoidance attitude towards people living with HIV/AIDS among Doctors, nurses and other health workers. This agrees with findings the world over and probably underscores the point that although education is effective in increasing knowledge it has had less effect on AIDS-related attitude and behaviour. Social and cultural acceptance of a disease condition and scientific information regarding it, reinforced by intense AIDS-related education are often required to enhance positive AIDS-related attitudes. Misconception about HIV transmission was identified in this study, as there were also prejudiced and exclusionary beliefs made similar observation among students of the University of Ibadan which showed that many students thought that HIV could be spread by kissing, shaking hands, and sharing utensils. Knowledge deficiency scores for similar questions in this study ranged between 33-44.6% but were a significant improvement on the 72.6% which they found among University students in 1994(66-34). Up to 238(23.6%) and 537(53.2%) of students thought that blood transfusion and casual sex respectively were not risk modalities for HIV transmission. This lack of knowledge, as found in this study and others about routes and risk factors of transmission of HIV/AIDS stresses the importance of educating students properly, while explaining the biology of HIV infection. Knowledge of the risk of unprotected sex and the possible advantages of condom use was very poor (9%). Despite the relatively early sexual activities, about 53.0% and 9.0% of the students had neither seen a condom, nor used one for sexual intercourse respectively. To reduce the risk of contracting HIV infection as a consequence of early unprotected sexual activities by the adolescents in this study, condom use is better presented as a method to prevent contracting STDs than as a contraceptive, since the latter may be misconstrued to connote promiscuity. This may reduce apprehension and misconception about condom use and promote acceptability as well as emphasizing safety and sex-friendliness. Nearly half of the respondents did not understand the existence of a carrier state for HIV while more than 20% erroneously believed that there was a cure for HIV/AIDS. This may be part of the reason responsible for HIV prevalence in males catching up and overtaking those of females by the 20’s to 30’s. Informal sources constituted the respondents source of information and knowledge about HIV/AIDS. This would partly explain their poor responses and misconceptions. St. Lawrence, et al. 36 had made similar observations. The other reason could be appreciations of the questions by the respondents due to exposure to Non Governmental Organizations (NGO’s) activities regarding HIV/AIDS in their schools. Better staffing of schools may have also contributed to better scores. In addition, since girls tend to begin sexual maturation earlier than boys, the consistently better knowledge scores of girls maybe due in part to the fact that girls receive somewhat earlier sex education than boys of same age from their parents.

**CONCLUSION**

Informal sources contribute significantly to the respondents sources of information and knowledge about HIV/AIDS. Adolescents in this study population have incomplete and inadequate knowledge about HIV/AIDS. Interventions efforts by Government, Non-Governmental Organizations (NGOs), communities, Parents and Individuals have not targeted students in this study population adequately if at all.
LIMITATIONS OF THE STUDY

1. The participants were mainly in-school students and the findings may not be generalised to out-of-school peers although most of the students were day students and have a lot of interactions with out-of-school peers.

2. The study participants were students of urban schools, and the findings may not be generalised to students of rural schools. Most of NGO's activities regarding HIV/AIDS are concentrated in urban areas.

RECOMMENDATIONS

There is an urgent need to design and implement a school HIV/AIDS/Sexuality education programme. An effective and acceptable programme should involve the entire community to reduce parental and religious body's apprehension and encourage cooperation and acceptability amongst students, parents and the entire community.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

CONSENT

Consent was obtained from the Head Principal for the study to be carried out in schools under the Post Primary Schools Management Board (PPSMB), Enugu. The principals of the individual schools also gave consent for their students to participate in the study. The students were given individual letters for consent to their parents and guardians.

REFERENCES


HIV/AIDS Epidemic and Global Health

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AIDS has emerged as a global epidemic in an unprecedented universal involvement compelling the transformation of the general outlook towards disease and the emergence of the concept of global health. First cases of AIDS were reported in 19811 and the causative agent (HIV) was recognized in 1983 by Luc Montagnier.2 Different names were given to the disease initially such as lymphadenopathy, Kaposi’s sarcoma and opportunistic infections, Gay-related immune deficiency and the 4H disease, but ultimately the name AIDS was coined in July 1982. The HIV attacks the body’s immune system decreasing the helper T-lymphocyte counts and leaving individuals susceptible to opportunistic infections and tumors.

More than 34 million people have died of AIDS since 1981 which includes 1.2 million only in 2014.3 An estimated 36.9 million people are living with HIV in 2015 (including 2.6 million children), up from 29.8 million in 2001.4 Of 36.9 million infected individuals, 19 million are unaware of their HIV-positive status unfortunately.3 Around 5,600 people contract HIV every day, which makes 4 people being infected every minute and 230 people per hour.5 In the year 2013, 1.5 million people died due to AIDS out of which 220,000 were children under 15 years.6 (Table 1)

Ninety percent of the HIV positive children are based in Sub Saharan Africa8 and globally, most of children (90%) get the infection through vertical transmission from their mothers during pre and postpartum.9 Awareness to prevent the vertical transmission from mother to child is important for better quality of life in children of HIV mothers.
The ARV’s have various (PMTCT) services. Mothers are given ARV’s during pregnancy check through the Prevention of mother-to-child transmission of disease from mother to child is also kept in Apart from treating adults and children, the vertical challenge in fighting the AIDS epidemic is loss to follow up due difficulties, mobilizing resources and emphasizing sustainability by political commitment and smart investments have established a favorable course over the past decade with decrease in new HIV infections. Recent statistics show a reduction in new HIV infections by 35% in general population along with a decline in infections among children by 58% since 2000 whereas AIDS-related deaths have also been reduced by 42% since the peak in 2004.

The HIV management needs a holistic approach of prevention, treatment and follow-up of the HIV-infected individuals. The prevention includes male circumcision, post and pre exposure of prophylaxis, injection safety, safe blood transfusion and safe sexual practices. The treatment modality is Antiretroviral Therapy (ARV) or combination of drugs Highly Active Antiretroviral Therapy (HAART). These therapies result in the reduction of the HIV viral load in the blood and other bodily fluids to an undetectable level, thus minimizing the risk of HIV transmission from one individual to the other. There are more than 25 HIV medicines which are approved to treat HIV infections alone or in combination. These drugs are further grouped into six categories according to their mode of action such as Non-nucleoside reverse transcriptase inhibitors (NNRTIs) and Nucleoside reverse transcriptase inhibitors (NRTIs) that inhibit the conversion of HIV RNA into DNA thus blocking the replication cycle of HIV. Vitamins especially Vitamin A and mineral supplementation such as Selenium have also been used as an adjuvant to the standard treatment with variable results in quality of life and virtually no effect on the prognosis. The greatest challenge in fighting the AIDS epidemic is loss to follow up due to non-compliance to therapy.

Apart from treating adults and children, the vertical transmission of disease from mother to child is also kept in check through the Prevention of mother-to-child transmission (PMTCT) services. Mothers are given ARV’s during pregnancy to eliminate the risk of transmission. The ARV’s have various classes of drugs which target diverse stages in the life cycle of HIV virus thus keeping the viral replication in check and preventing disease progression. Without the ARV treatment, the transmission rate of HIV from mothers to their babies during pregnancy and delivery is around15-30%. A further 5-20% become infected through breastfeeding. The PMTCT services have scaled up and the proportion of women visiting PMTCT has increased from 33% to 68%. Women who are HIV positive should be encouraged to give birth at a clinic. The services should further be scaled up so that all pregnant women across the developing world must be tested for HIV. Under the WHO guidelines on PMTCT, all HIV positive mothers identified during pregnancy, should receive a course of antiretroviral drugs to prevent mother to child transmission. The successful implementation of PMTCT programme relies on public support and mobilization that can be achieved by investing energies for awareness and petitioning with potential benefactors, services providers, policy makers and general public.

It is very important that HIV infected individuals are tested at the earliest to initiate the treatment regime. The testing for HIV antibodies has been performed since 1985 and is useful in rapid field testing, the reason being their feasibility in terms of ease to perform and economically affordable infrastructure that obviates the need to process and store specimens and transport them from the field. Unprecedented numbers of kits are available for testing HIV antibodies. The antibody test has significantly lesser yield in children who are then tested with PCR since the antibody tests yield insignificant results in the first 18 months of life.

Initial rampage by HIV was cut short by the collective front against the AIDS by establishing fight against the disease. In 1993, the World Development Report devised a 3 pronged approach to develop government policies and endorsed the increase in prevention activities for HIV/AIDS activities by a factor of 10-15. By the late 1990’s, access to antiretroviral therapy in the high income countries turned the tables on AIDS mortality, this was closely followed by introduction of ART in developing and low income countries. Around 41% of the total individuals affected by HIV are now covered under ART that includes an estimated 200,000 children. Approximately, 12.9 million patients had access to antiretroviral therapy in 2013.
The progress made in the Fight against AIDS is enormous; however, for achieving the goal of eradication of HIV as an epidemic by the year 2030, the efforts will have to be scaled up. The prevention of HIV infection in communities is possible through greater access to the drugs that can treat the individuals and prevent child transmission with appropriate testing and support for the families. Drug availability along with development of the current infrastructure with extensive capacity building and improved management is required to eliminate the epidemic of AIDS.

UN members in 2015 have endorsed a bold agenda in development debate constructed around 17 Sustainable Development Goals (SDGs) with a dynamic shift to public oriented approaches. Moreover, the next five years have been marked as crucial in scaling up the AIDS response. This up scaling will not only pave ways to eradicate a public health problem by the year 2030, but would also generate benefits of US$1157 billion.

The scaling up of AIDS response includes stress on HIV prevention, and expanding access to treatment, increasing transparency and policy development based on better data with robust accountability, upholding human rights especially women, and finding new ways to address the criminalization, stigma, and discrimination against AIDS affected individuals. Increased efforts for research and development in fighting AIDS, global access to HIV treatment and safeguarding the right to health are key elements in the prevention of HIV epidemic.

CONFLICTS OF INTEREST: None.

REFERENCES


