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Globalized Means for Diagnostic and Preventative Management of HIV/AIDS

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

HIV/AIDS is one of the global health issues of great proportions. The virus has reached pandemic volumes affecting the lives of many people throughout the world. The objective of this paper is to address pertinent factors about HIV/AIDS including a history of the disease, management, and treatment modalities. Furthermore, this paper will discuss the impact this disease has made globally on public and community health throughout the years. According to the U.S Department of State (2010), the Centers for Disease Control and Prevention (CDC) published a Final Rule in the Federal Register to remove the Human Immunodeficiency Virus (HIV) infection from the list of communicable diseases of public health significance [1]. The virus has had an exponential impact on the cost of health care globally. According to the World Health Organization (2018), there were approximately 36.9 million people living with HIV at the end of 2017 with 1.8 million people becoming newly infected in 2017 globally. It is estimated that currently only 75% of people with HIV know their status. In 2017, 21.7 million people living with HIV were receiving antiretroviral therapy (ART) globally. Between 2000 and 2017, new HIV infections fell by 36%, and HIV-related deaths fell by 38% with 11.4 million lives saved due to ART in the same period [2]. This achievement was the result of great efforts by national HIV programs supported by civil society and a range of development partners.

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The goal is to educate the public about the signs and symptoms and risk factors associated with the disease. Long term survival is determinant on proper management and treatment modalities. However, at a global level treatment is too expensive for many. HIV/AIDS affects everyone regardless of sex, race, age, and income levels. There is a broader geographic distribution and it involves multiple transmission risk factors. Approximately 36.7 million people worldwide living with HIV/AIDS at the end of 2015. Of these, 1.8 million were children under 15 years old and roughly 2.1 million individuals worldwide became newly infected with HIV in 2015. In the United States alone, it is estimated than an average of 40,000 people are diagnosed with HIV each year. To reduce these numbers, technology has been playing a huge role in helping reduce the number of infected people, in addition to allowing for people to test themselves using your own smartphone. Additionally, adhering to proper health behaviors and preventive measures assists in decreasing the prevalence of the disease. Health assessment in health care centers, at-home diagnostic kits, and community health fairs promote awareness and early detection for those most susceptible to the virus.

Keywords: HIV/AIDS; infectious diseases; sexually transmitted infection; global health; pandemic; community health.

1. INTRODUCTION

HIV/AIDS is considered as one of the deadliest viruses to humankind. HIV/AIDS can be sometimes used together, as well as interchangeably. HIV is known as human immunodeficiency virus, whereas AIDS stands for acquired immune deficiency syndrome. The main difference between the two is that AIDS is a cluster of symptoms that can eventually result from HIV. Once a person has been infected with the HIV virus, if left untreated it will progress to AIDS. The HIV virus is unlike many other viruses that affect the human body. For the most part, viruses that typically highjack the host's cellular system are easily killed off by macrophages within our system. Conversely, the HIV virus attacks the immune system thus reproducing and cloning itself without the macrophages being able to kill and remove them.

It is believed that HIV came from chimpanzee in Central Africa in the late 1800's. Hunters hunted these animals for food and consumed their infected meat. Through the years, the virus quickly spread within Africa and slowly made its way to the United States in the late 1970's early 1980's. Many believed it to be another virus easy to eradicate, when in fact it would eventually become of pandemic proportions. The National Center for Biotechnology Information NCBI Journal (2011) stated that the human immunodeficiency virus HIV/AIDS epidemic has devastated many individuals, families, and communities. The epidemic has left millions of children orphaned, has disrupted community life, and increasingly contributes to the erosion of civil order and economic growth [3]. The virus attacks the CD4 helper cells in our bodies whose specific function is to fight off infections whenever we get sick. When this occurs, the immunological system becomes suppressed and subsequently predisposes the body to infections, certain cancers, and ailments. While there is no available cure yet, with proper medication treatment and lifestyle modifications those infected can live full normal lives. There are several modes of transmission for the HIV virus. The most common route is through sexual activity, even though it could be acquired through blood transfusions, dental procedures, sharing of needles in drug users, and mother to child post-delivery. According to the CDC (2015), the risk of getting HIV varies widely depending on the type of exposure or behavior (such as sharing needles or having sex without a condom). Some exposures to HIV carry a much higher risk of transmission than other exposures. For some exposures, while transmission is biologically possible, the risk is so low that it is not possible to put a precise number on it [4]. These risks are the sharing of sex toys, spitting, biting, and being bitten by an insect that had previously bitten someone infected.

In consequence, as the virus continues to expand, rates will continue to rise in communities throughout the nations where poverty, social inequalities, and poorer health infrastructures exist.

The virus is gender-blind; according to the International Charity Avert (2016), in 1981, a few cases of rare diseases were being reported among gay men in New York and California, such as Kaposi's Sarcoma (a rare cancer) and a

lung infection called PCP. No one knew why these cancers and opportunistic infections were spreading, but that there must be an infectious 'disease' causing them. In the mid-1982, it was realized the disease was also spreading among other populations such as hemophiliacs and heroin users. By September that year, the disease was finally named AIDS [5]. To date, HIV/AIDS has a stronger correlation to men because of the high-risk behaviors associated with sexual intercourse in men with men. But it is safe to say that women are still as vulnerable and susceptible to the virus as men are. In certain regions of the world, despite the progress of the global HIV response, women remain disproportionately affected by the virus. This is due to unequal cultural, social and economic status in society. According to the Oxford Journal (2011), "HIV/AIDS is currently a disease of greater demographic diversity, affecting all ages, sexes, and races, and involving multiple transmission risk behaviors" [6].

2. EPIDEMIOLOGY

The impact of HIV/AIDS on federal Medicare costs is colossal. Today the epidemiology of HIV since the early 1980's has changed drastically. Where HIV was mainly seen among young, white middle-class men in the 80's, today HIV/AIDS is a disease of far greater demographic diversity. It affects everyone regardless of sex, race, age, and income levels. There is a broader geographic distribution and it involves multiple transmission risk factors. According to AIDS.gov (2016), there were approximately 36.7 million people worldwide living with HIV/AIDS at the end of 2015. Of these, 1.8 million were children under 15 years old. An estimated 2.1 million individuals worldwide became newly infected with HIV in 2015 [7]. Within the United States alone, it is estimated than an average of 40,000 people are diagnosed with HIV each year. This doesn't account for all those people who are living with the disease but are unaware and have not been counted for. As of 2013, the prevalence of HIV positive individuals in the U.S was estimated at 1.2 million. Of these numbers, about 1 in 8 were unaware that they were infected. The Oxford Journal (2011) states that while blacks/African Americans account for only 12% of the United States population, they represented 46% of all people living with HIV in the United States in 2008, compared with whites (35%), Hispanic/Latino persons (18%), and others (2%). HIV prevalence among blacks was almost 8 times higher than among whites [6]. In addition, African American females were also severely and disproportionately affected. The HIV diagnosis rate for black females is 14 times greater risk than for white females. The cost for global HIV control has been exponential. In 2010 alone over 13.7 billion was spent HIV treatment and care.

3. QUALITY OF HEALTH CARE DELIVERY, PREVENTION, AND WELLNESS STRATEGIES

Since many new infections are caused by people being unaware of their HIV infection, new initiatives for prevention and wellness are being implemented globally. For starters, in both medical and non-medical settings, HIV testing and screening is being implemented as a routine part of care. For those who don't have access to healthcare or clinics, the CDC has created a new program model. Funding pilot projects in areas of high prevalence would ensure that everyone gain access to the at-home HIV rapid test kits. But most importantly, educating the public about risk factors and behaviors, transmission methods, safe-sex practices, and signs and symptoms all essential strategies to reduce the incidence of the disease. The Oxford Journal (2014) states that these advances, together with time-tested prevention modalities such as condoms and the provision of clean needles and syringes for injection drugs users, represent a comprehensive package of prevention tools that could dramatically reduce infections. Although progress has been made, further reductions in incidence have been impeded by programmatic barriers, including inadequate financial and human resources [8]. The most basic of prevention tools, condom use, remains underutilized.

4. INTERDISCIPLINARY APPROACH

Thirty plus years after the discovery of HIV/AIDS, there has been an exceptional progress towards prevention, treatment methods, life expectancy, and research. This has been greatly due to the success of interdisciplinary teams collaborating on HIV/AIDS research. These advances have been possible because of the efforts multidisciplinary research have tackled on all aspects of this disease. The collaborative work by the interdisciplinary team (from the scientists all the way to the physicians) is central to finding new discoveries to eradicate HIV and decrease mortality and morbidity across the globe. Collaborative work is the cornerstone of success in any successful innovation. Everyone in the

team, regardless of how involved they are in the process, contributes to the improvement of the care and quality of patients. This disease requires comprehensive care to provide optimal outcomes. Interdisciplinary models are cultivated to provide diverse teams of clinical providers to improve the quality of care. According to the American Psychological Association (2017), what makes integrated health care unique is the sharing of information among team members related to patient care and the establishment of a comprehensive treatment plan to address the biological, psychological, and social needs of the patient. The interdisciplinary health care team includes a diverse group of members (e.g., physicians, psychologists, social workers, and occupational and physical therapists), depending on the needs of the patient [9]. The benefits of this approach extend beyond the patient. Providers, caregivers, and the health care system overall favor from the use of integrated health care services.

5. THE ROLE OF TECHNOLOGY

In the more recent years, the menu of HIV prevention technologies has broadened remarkably. New vaccine trials are being tested with hopes that this can be eradicated from existence. In the meantime, technology has been playing a huge role in helping reduce the number of infected people, in addition to allowing for people to test themselves using your own smartphone. Researches at Columbia University developed a device that attaches to your smartphone and collects a drop of blood to determine whether there is an abnormal number of antibodies in the system. The device attaches to the audio jack and results are collected within 15 minutes. The NCBI Journal (2014) has stated that cellphones facilitate multiple forms of communication, such as phone calls, short message services (SMS)/texts, and multimedia messaging services (e.g. video and picture texts). In the U.S., Youth (ages 18 to 29) communicate with each other predominately through SMS, and recent HIV interventions targeting youth have utilized SMS to reduce substance use and increase HIV testing [10]. The surge in multimedia and social media can have a tremendous impact on HIV research and awareness. Technology can act as a platform to obtain information of at-risk individuals, in addition to monitoring their behaviors. For example, Young (2014) mentions that in the U.S., racial/ethnic (African Americans and Latinos) and minority individuals were found to be the most avid social media users. Moreover, many of them have also used online social networking apps to meet sexual partners. Taking into account information on patterns of social media use is important in learning how to craft HIV interventions and studies using social media among at-risk groups [10].

6. LEGAL AND ETHICAL ISSUES

From a global perspective, all medical information including HIV status is considered confidential by law. However, HIV/AIDS has presented some health challenges to several populations including ethical and moral issues regarding human life and dignity. The NCBI Journal (2015) declare that the ethical issues mainly revolve around the standard of care, informed consent across cultures, privacy and confidentiality, stigma and discrimination, protection of vulnerable groups, community consultation, ethical review mechanisms, international collaboration, epidemiological studies, clinical trials and sociobehavioural studies on HIV/AIDS [11]. Informed consent is also required for any patient requiring any treatment. The African Journal of Reproductive Health (2014) states the outcome of the laboratory investigations often defines the line of care provided by our healthcare providers. However, the decision to undertake laboratory investigations for a patient requires the patient to grant his/her informed consent [12]. Not doing so would warrant an ethical dilemma. Exceptions to the legal and ethical obligation to maintain the confidentiality of HIV-related information exist as is the case for other diseases such as SARS and Ebola. In the USA, healthcare providers have a duty to report HIV infections and AIDS cases to public health authorities, because of the benefits to the public health of this reporting being felt to outweigh the risk to individuals. The Centre for Disease Control and Prevention (CDC) has made specific recommendations for keeping reporting confidential, and this include anonymous testing to reduce the risk of discrimination [13].

7. CONCLUSION

Many populations throughout the world lack access to primary care centers. People in rural and underserved areas face poverty, unemployment, transportation, and lack of education. These barriers prevent them from receiving care for routine check-up's and screenings. Many are living with the HIV virus

without even being aware. There is a strong correlation between HIV and poverty as does many other communicable diseases. This correlation is central to an awareness of the impact this epidemic has on rural livelihoods. The key to turning this around is providing more access to care in rural communities, providing free health screenings and HIV testing, and stressing the importance of education. It is important to take steps to reduce the risks associated with HIV/AIDS. The most important step is awareness.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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