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Original Article

Evaluation of The Effectiveness of HIV Prevention Strategies on HIV Prevalence Among Men and Women in Zoba-Ma'akel/Eritrea

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HIV, Health and Development Problems, HIV Education, Stigma.

ABSTRACT

Human Immunodeficiency Virus (HIV) emerged in the late 1970s and is transmitted through unprotected sex, mother-to-child transmission, drug use and contaminated medical tools. HIV has continued yet, as a health and development problem throughout the world. This study assesses the effectiveness of HIV prevention strategies in Zoba-Ma'akel/ Eritrea, focusing on gender disparities in HIV prevalence. Using Convergent-Parallel-Mixed-Method of Research Design, the study gathered quantitative data from 150 people living with HIV, and qualitative data from experts and community leaders. The quantitative data were processed using SPSS, while qualitative data were analyzed in thematic and content-based methods. The study found a significant decline in HIV prevalence in Zoba-Ma'akel over the past decade, but noted persistent new infections and high prevalence among women. Key findings highlighted the importance of HIV education, the impact of gender-based violence, stigma, unemployment and the effectiveness of Antiretroviral Therapy. Innovative strategies, such as the establishment of Association for People Living with HIV, couple testing, and integrated HIV-TB prevention, were identified as crucial. The study recommended targeted interventions for high-risk groups and emphasized the need for women's empowerment programs. Despite challenges, the study provided valuable insights for policymakers and future research.

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INTRODUCTION

HIV is a communicable infection that emerged in the late 1970s (Horowitz,1999). It is transmitted through unprotected sex, mother-to-child transmission, drug use and contaminated medical tools. So far, it has infected 84.4 million and killed 40.1 million people globally (WHO, 2023). HIV prevalence varies significantly by gender, geography, and socioeconomic factors (Ogunrinde, 2015). Women account for 48% of infections, and men for 40% (United Nation Programs on HIV/AIDS (UNAIDS), 2022). Western Europe and North America together have 5.9% of global HIV infections. Africa has the highest HIV epidemic. In 2021, Africa accounted for 66% of global prevalence, 53% of new infections, and 65% of HIV-related-deaths. In 2021; twenty-one million people were livening with HIV in Sub-Saharan Africa (UNAIDS, 2022). South Africa, particularly among the black-communities, constitute the highest number of cases (Girum, 2018). In 2019, seven million people were living with HIV in the country. The number of women with HIV cases are greater than that of men (Klaas, 2018). For example, in 2019, 60% of women in KwaZulu-Natal province were HIV positive (Gilbert, 2002). In 2019, Uganda's HIV prevalence rate was 15%, and this rate decreased to 5.2% (6.6% among women and 3.8% among men) in 2021 (UNAIDS, 2022). Kenya's HIV prevalence rate was 10% in the 1990s, and it decreased to 4.9% in 2018 (Kenya Ministry of Health, 2018). In Eritrea, HIV emerged in 1988, and expanded rapidly. The prevalence rate among female sex workers reached 6% in 1989 in Zoba-Ma'akel. By 2002, the National HIV prevalence among the general population was 2.4% (UNAIDS, 2018). It dropped to 0.93% nationally by 2010 and further declined to 0.3% by 2020, (National AIDS Control Program (NACP), 2021).

PURPOSE AND SIGNIFICANT OF THE STUDY

The study assessed the effectiveness of HIV prevention strategies on HIV prevalence rates to solve the HIV prevalence disparity among men and women in Zoba-Maekel/Eritrea. The specific objectives of the study were to establish HIV prevalence rate, to identify main HIV prevention strategies and to evaluate the importance of innovative HIV prevention strategies. The findings of the study may benefit the communities of the region and policymakers, and it may be replicated in similar contexts. The study faced time limits related to difficulty in meeting organizational representatives as well as challenges related to openness of the respondents during data collection phase due to the sensitivity of the topic. Despite this limitation, the study managed to collect all the required data.

LITERATURE REVIEW

The study discusses empirical review, research gap, Theoretical-farmwork and Conceptual-Framework in this subtopic.

Empirical Review

Disparity of HIV Prevalence Rate Among Men and Women

Since its emergence, in 1970, HIV/AIDS has infected 84.4 million, and killed 40.1 million people worldwide (Horowitz, 1999). It attacks human-beings indiscriminately, although various studies demonstrate HIV prevalence disparities among geographical locations and genders. Gender disparity in relation to HIV infection is caused by 3 reasons: physiological differences in reproductive organs, gender construction, sexual and economic inequalities between women and men that come from the societal division of labor (Klaas, 2018). According to United Nation's Programs on HIV/AIDS (UNAIDS) (2016), women constitute 51% of the total world HIV prevalence rate. In 2021, globally, 38.4 million people were living with HIV; 1.5 million of this number was newly infected, and, 650,000 People

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Living with HIV (PLHIV) died in this year. Women cover 48% of the new infection, and 40% of the death rates (UNAIDS, 2022).

Africa covers the highest HIV epidemic with 3.2 million annual new HIV infection in the Sub-Saharan Africa, and this accounts for 65% of the global annual new HIV infection rate (UNAIDS, 2022). Similarly, high women HIV prevalence rate is apparent in Sub-Saharan Africa. According to UNAIDS (2016), in Sub-Saharan Africa, 58% of the HIV positive people are women, and 13% this is 15 years old girls, and 79% is young women 15-24 years old; 5-7 Sub-Saharan African's women acquire HIV earlier than their men counterparts. As per this document, in low and middle-income countries women in sex trade are 13.5 times more susceptible to HIV than the total women who reached reproductive age (UNAIDS, 2016). According to Girum (2018), HIV prevalence rate among female population in Ethiopia is 1.6% greater than that of their male counterparts. As per this Author, 718,500 people were living with HIV in Ethiopia in 2016, and 433,763 of them were women (Girum, 2018). According to Kenya HIV estimate report (2018), in 2017 the adult HIV prevalence estimate was 5.2 % among Kenyan women and 4.5% among Kenyan men (Ministry of Health (MoH), 2018).

According to National AIDS Control Program (NACP) (2021), in Eritrea, HIV was detected among female sex workers in 1988, and it rapidly increased to 3% in the succeeding years. Later, with the expansion of health facilities, it started to decrease; but in a different ratio with gender. In 2010, the national HIV infection among the general population of the country decreased to 2.02%. In 2020, it again declined to 0.3%, with 0.9% and 0.2% among men and women respectively (NACP, 2021). In Zoba-Maekel, it decreased from 2.9%, in 2010, to 0.7% in 2016, with 0.5% and 0.9% among men and women respectively. It further decreased to 0.3 % with 0.2% among men and 0.4% among women) in 2020 (NACP, 2021).

Gender and HIV Prevention Strategies

Different behavioral structural and biochemical programs are employed under comprehensive anti-HIV response. According to Qiang (2014), early age-based HIV education is an effective method that reduces HIV risk behaviors. According to the same source, HIV education before the age of puberty is likely to delay first sexual intercourse and reduce number of sex partners. Besides, youths with HIV awareness are less likely to inject drugs and consume alcohol, and they are more likely to use condoms and ready to have HIV tests (Qiang, 2014). According to Ssempijja (2014), accessibility to HIV counseling and testing centers are entry- point to HIV prevention, and it is essential for both HIV positive or negative people. It helps the former to receive HIV care and ART services, and it assists the latter to avoid HIV risk behavior, and thereby play vital roles in HIV prevention. HIV awareness reduces 60% of risky of HIV infection, and encourages HIV positive people to adhere to Antiretroviral therapies that reduces 96% transmission among HIV discordant couples (Ssempijja, 2014).

However, gender-based power differences disturb HIV testing process by perpetuating stigmatization of people, and affects care services. According to Mbotu (2010), men and women equally suffer from HIV infection, but the negative attitudes that come from the society affects the parties differently. HIV positive women experience more isolation than HIV positive men do. Nigerian women are in disadvantageous position with regard to access to HIV care providing institutions, and this hindrance is attributed to the social status that Nigerian women have in the society (Mbotu, 2010). According to Terefe (2024), only 3/4 of the East African women, of reproductive age, attend Antenatal Care services, and this is attributed to low-level education, poverty, inaccessibility to healthy facilities and unequal marital status (Terefe, 2024). Kenya has set 80% target of HIV status knowledge among adult population. According to Kenyan Ministry of Health Report (2018), only 36% Kenyans were tested in 2017. The barriers were limited access to testing sites.

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According to the same source, 80% of 1.4 million HIV positive Kenyans, who were newly infected in that year, were unaware of their HIV status (Ministry Health of Kenya, 2018) According to United Nation Office for the Coordination of Humanitarian Affairs (OCHA) (2019), in 2019, the number HIV counseling and testing center in Eritrea were 135, and 93% of these facilities offer ANC and PMCT services, and 50% of them were located in Zoba-Ma'akel Region. (OCHA, 2019).

Globally, condom is used as a major HIV prevention tool, and it is effective if appropriate application is exercised. According to kyohangirwe (2012), it is 95% effective in the prevention HIV/STD. However, it is often influenced by gender inequality (kyohangirwe, 2012). In Eritrea, condom use started in 1988 for family Planning and Sexual Transmission Infection prevention. Condom use in Eritrea differs among different social groups. Female sex workers use more condoms than other social segments. According to condom assessment report, 90% of Female Sex workers in the country reported that they use condom frequently. It is estimated that 5.5 million condoms are annually distributed throughout the country, and 90% of this figure is distributed in Zoba-Ma'akel-Region (NACP, 2021).

Gander Inequality and HIV Prevalence Rate

In the early stage of the HIV pandemic, the primary victims of the pandemic were males, but with time it reversed. Currently, the number of HIV positive women is five times greater than that of their male counterparts (Global HIV/AIDS Epidemic, 2023). According to Moodley (1993), the cause of gender disparity in HIV infection could be divided in to 3 categories. It may be caused by physiological differences, gender construction and economic inequality (Moodley, 2019), According to the same other, various studies claim that women are more susceptible to HIV infection during heterosexual intercourse than men. The quantities of HIV in semen are much greater than that of HIV in vaginal mucus. Vaginal membrane is more delicate in contrast to the penis skin, and it easily permeates HIV to the bloodstream of the female body than the penis tissue does. Besides, the HIV-contaminated semen remains long time in the woman's body than the vaginal mucus stays in the surface of man's penis (Moodley, 2019).

According to traditional society, heterosexual intercourse is necessary primarily to child production and next to physical and mental health of the parties, but it is allowed in respect to the gender-based socially constructed rules and regulations. In most part of the African continent, childbearing is considered sacred and praiseworthy. The communities expect couples to produce more children. Besides they expect men's sexual aggressiveness, and anticipate women's sexual submissiveness. In addition, child production is expected to remain under father control. Men are explicitly encouraged to force their wives to have more children or seek multiple spouses or exercise polygamy, but women are denied their sexual and fertility rights (Moodley, 2019). To assert social expectations, masculinity traits, men execute extramarital and multiple sexes as well as domestic rapes. On the other hand, to maintain women-hood, wives tolerate their husband sexual infidelity (NACP, 2021).

According to the American Psychosocial Association (APA) (2024), gender inequality regarding resources is the cause of poverty that forces poor people (women) to barter sex for subsistence. As per the statement of the same author, low socioeconomic status, lack of income, low level of education and financial insecurity multiply risks of HIV infection (APA, 2024). According to Maruthappu (2017), HIV prevalence rate is high in places with scarce of job opportunities, and women are primary victims of unemployment. Thus, they are compelled to be involved in sex trade for subsistence (Maruthappu, 2017).

Research Gap

The study reviewed empirical literature on HIV epidemic among men and women, focusing on gender-specific HIV prevention strategies, gender inequality, and HIV prevalence rates in several

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Sub-Saharan African countries, including Nigeria, Uganda, Kenya, Ethiopia, Eritrea, and specifically in Zoba-Ma'akel region in Eritrea. It observed HIV prevalence rate is high among women compared to men in Zoba-Ma'akel. Then, it established the impact of gendered sociocultural and socioeconomic factors on HIV prevention strategies as research gap in Zoba-Ma'akel/Eritrea. Therefore, the study believes that by studying this research gap, the HIV prevalence that exists among men and women in Zoba Ma'akel /Eritrea would be resolved.

Theoretical-Framework

The study was guided by two Theories: Robert Connell's theory of gender and power (TGP) 1995 (King,1999) and AIDS Risk Reduction Model (ARRM) 1990 (Lanier, 1996). Connell's 1995 is social structural theory (King,1999). AIDS Risk Reduction Model (ARRM) 1990 deal with a framework that explains change efforts associated to HIV transmission and prevention strategies. (Lanier, 1996)

Connell's 1995 deals with sexual inequality and power imbalance, and it has 3 parts: *Gender-Based Division of Labor*, *Gender and Power* and *Structure of Cathexis*. According to the Gender-Based Division of Labor, traditional societies

assign domestic and reproductive work to women, and allocate productive and monetary value works to men. This practice causes women's economic dependency and unemployment that exposes women and girls to sex work which increases risk of HIV infection (King,1999). According to Seraphine (2019), women with financial problems could be exposed to an HIV risk environment, like the exchange of sex for financial favors (Seraphine, 2019). According to Gender and Power, women are mentally socialized to be sexually submissive to men, and men are shaped to have sexual supremacy over women. This nation encourages men to own multiple sex partners which increase risky of HIV infection (King,1999). According to (Seraphine, 2019) social norms, such as acceptance of male dominance in sexual issues, in Sub-Saharan Africa, has a negative impact on HIV prevention strategies (Seraphine, 2019).

The structure of cathexis is about women's attitude in regard to stable sex partners. Wives' long-standing sexual intimacies with husbands restrict their right to negation concerning sex and health (King,1999)

Similarly, Risk Reduction Model (ARRM) 1990 has 3 stage including *Knowledge-Attitudes*, *Commitment and Action*, and all stages deal with frameworks that explain change efforts associated to HIV transmission and HIV prevention strategies. The knowledge and attitude stage deal with HIV education which is about recognition and labeling oneself as being at risk of HIV infection (Lanier, 1996). The commitment stage deals with the reduction of high-risk sexual of behavior and promotion of less risk sexual practices. Action stage deal with the actual work on HIV reduction process or personal involvement in HIV prevention strategies (King, 1999).

According to Seraphine (2019), adequate knowledge of HIV infection is powerful way of developing positive attitudes that encourage individuals to participate in the actual HIV prevention programs (Seraphine 2019).

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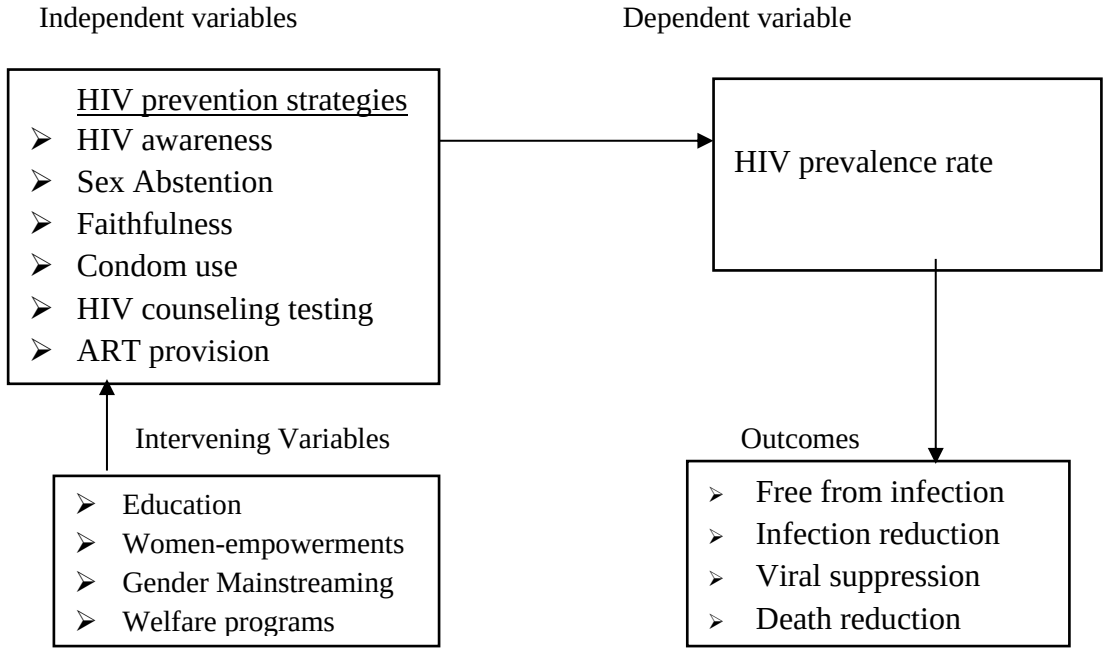
Conceptual Framework

Figure 4.1



The study's conceptual framework is anchored on the gender-based HIV prevalence disparity in Zoba-Ma'akel which is attributed to the ineffectiveness of the implementation of the HIV prevention strategies. The study identified 'HIV infection' as the dependent variable, 'Prevention Strategies' as independent variables, and policies like 'Education, Women Empowerment, and Gender Mainstreaming' as intervening variables. The study highlights the positive influence of policies on enhancing the effectiveness of HIV prevention strategies: see *(figure 4.1*) above

METHODOLOGY

The study discusses Research Design, Population size, Sampling techniques, sample size calculation, Research Instruments, Validity and Reliability of the Instrument, Ethical Consideration, and data collection, analysis and presentation procedures in this subtopic.

Research Design Population Size Sampling Techniques **and Sample Size Calculation**

The study employed "Convergent Parallel Mixed Method Research Design"; it gathered primary data from people living with HIV, Authorities of Ministry of Health, Ministry of Labor and Social Welfare, the Association for People Living with HIV, /AIDS, Social Marketing Group and community leaders in Zoba-Ma'akel/Eritrea, using both quantitative and qualitative data collection methods. Besides, the study collected secondary data from various offices: Ministry of Health Zoba-Maekel Branch, Ministry of Labor and Social Welfare Zoba-Ma'akel Branch, Eritrea Social Marketing group and the Communicable Diseases Control Division (CDCD).

The size of population was estimated at 5,000 HIV positive people living in Zoba-Ma'akel region of Eritrea in 7 Subregions called Serejeka, Gala-Nefhi, Berik, South Western Asmara (SWA) South-Eastern-Asmara (SEA), North-Western-Asmara (NWA), North-Eastern-Asmara (NEA) (NACP, 2021). The study picked the first two and the last three subregions (Serejeka, Galanefhi, SEA, NWA and NEA) based on high HIV prevalence rate and settlement. The first 3 regions are rural and the other 4 are urban settlements. The study population included literate people living with HIV aged 18 and above from urban and rural areas. The study excluded people with mental health problems and people under 18 years old.

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The study took 150 sample size from people living with HIV in the five subregions using Yamane's formula (Yang, 2021). The study used purposive, snowballing and quota sampling techniques.

Research Instruments Validity Reliability and Ethical Consideration

The study employed triangulation data-collecting instruments including questionnaires, focal group discussion guides, and interview schedules. It used a pilot study to refine data-collecting instruments. Before the actual research, the study conducted pilot study in two selected Sub-regions of Zoba-Ma'akel (North-Western-Asmara and Serejeka Sub-Regions among People living with HIV. The study excluded subject of the pilot study(pretest) from sample size, and it tested and refined the data collecting instruments using the result of the pilot study. Then research instruments turn out more consistent with the research objectives. Similarly, to realize the validity of the data collecting instrument, the study used content and criterion validity assessment methods. Items of the research instruments were repeatedly assessed, subjected to changes and finally approved by supervisors. finally, the scores of the instruments were compared to the scores of the pilot study, and the conformity of the 2 outcomes was assured.

The study used the Half-split reliability assessment technique to meet the reliability of research-instruments. During the pilot study, the research-instruments were divided into 2 halves. The first half was labeled with odd numbers and the other half with even numbers. Then, the halves were administered to respondents, who provided their responses, which subsequently scored. Following the collection and scoring of the research-instruments, the scores of the two halves were correlated to each other. As such the study used correlation analysis of split-half scores as a measurement for consistency and reliability of the research-instruments. Moreover, the study ensured confidentiality and privacy of respondents, and secured informed consent from participants. Despite challenges that were related to the sensitive nature of the topic, the study proceeded well with respect for ethical standards.

Data Collection, Analysis and Presentation Procedures

The study distributed 150 questionnaires among people living with HIV, and 96% of them were fully responded. In the focus discussion session, 30 HIV positive people were involved in 5 discussion groups. Each group was made up of 6 people, and 93% of the respondents actively participated during the discussions. The moderator held a facilitating role, and audio-recorder and pencil-paper methods were used to record the data. In addition, interviews were conducted with representatives from Eritrea Social Marketing Group, Ministry of Health, Ministry of Labor and Social Welfare, and Association for People Living with HIV, and audio recorder and pencil-paper methods were used to record the data.

Then, the study analyzed the quantitative and qualitative data separately: the former was processed using Statistical Package for Social Sciences (SPSS) version 2016 for categorization, purification, coding, and analysis. Then the findings were presented with figures produced in Excel version 2016 and tables generated using SPSS 2016. Then, the latter were analyzed using thematic and content qualitative data analyses methods. Finally, the study compared both findings to identify discrepancies and sought additional information from respondents to resolve these differences. Once the discrepancy was cleared, the study consolidated both findings into a single cohesive work.

RESULTS

The study discusses Demographic information of the respondents, HIV prevalence rate, Main HIV Prevention strategies, Innovative prevention strategies, summary, conclusion and recommendation in this subtopic.

Demographic Information of The Respondents

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The respondents of the study were above the age of 25 years. Majority of them were in the age range of 26 - 49 years old. The quantitative study had high representation of female respondents (59%), whereas the qualitative study involved an equal distribution of men and women respondents. Urban settlers constituted 83% of respondents. High HIV prevalence rates were observed among urban dwellers. Regarding marital status,62% of HIV positive respondents were married. The number of women, widow HIV-positive, respondents (77%) were greater than that of widowed men (15%). This suggests high mortality rates among HIV positive men. Concerning level of education 30%, 20%, 30% and 20% of the respondents were with elementary, junior, secondary, and tertiary levels of education respectively. This reveals higher HIV prevalence among respondents with elementary and secondary level education as compared to respondents with elementary and tertiary levels of education. Fifty-seven percent (33% men and 24%) of respondents were unemployed, with high number of unemployed women. The length of time that the respondents lived with HIV spans from 17 to 24 years, indicating successful management of the infection through Antiretroviral Therapy and comprehensive knowledge of HIV/AIDS [Field study,2023].

HIV Prevalence Rate in Zoba-Ma'akel

Based on the findings, the study observed notable decline in HIV prevalence among the general population over the past two decades in the voluntary HIV counseling and testing sites in Zoba-Maekel. According to data obtained from Ministry of Health-Communicable Diseases Control Division (MoH-CDCD) (2021), HIV prevalence in Voluntary HIV Counseling Testing (VCT) and Prevention Mother to child Transmission (PMTC) sites in Zoba Ma'akel decreased in the previous ten years. It decreased from 2.9% in 2010 to 0.33% in 2020 among VCT attendees, and from 1.1 % in 2010 to 0.51% in 2020 among pregnant women tested in prevention Mother to Child Transmission (PMCT) sites (MoH-CDCD,2021). This progress has supported by the responses obtained from the qualitative and quantitative respondents.

According to a male interviewee, carrier supporter, from the Ministry of Health communicable diseases control division on 14 April, 2023, this achievement is attributed to the high discipline and commitment of the people of the Region. He said:

We do have a well-disciplined society that strictly observes and follows the procedures of HIV prevention strategies that are put in place by health authorities.

Similarly, the background information of the quantitative study respondents (PLHIV), asserts a decrease in new HIV infections in the region: 60% and 4% of respondents were infected 22 and 18 years ago respectively [Field study, 2023].

However, despite this decline, new HIV infections persist and the reduction rate was unequal (not the same) among both genders. Thus, it demands continuous preventive measures. Gender disparities in HIV prevalence is evident from the data obtained in voluntary testing counseling testing sites. According to data obtained from Communicable Disease Control Division, women consistently are exhibiting high HIV prevalence rates as compared to men. HIV prevalence among men decreased by 98.5% over the past two decades, whereas it decreased by 88.6% among women (MoH-CDCD,2021). The study found out unemployment, stigma related to prevention tools, and cultural norms as major causes of high HIV prevalence among women in Zoba Ma'akel. Moreover, the study noted the need of focused efforts on women's empowerment programs to address these issues (Field study,2023).

As mentioned above, HIV prevalence among general population and especially among pregnant women attending antenatal care, supported by early infant diagnosis programs has shown a decreasing trend. Despite the overall progress among the general population, the study discovered HIV prevalence rate increase among key populations at high risk (KPHRG), such as female sex workers, long-distance truck drivers,

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military personnel, and TB patients. The study acknowledged mobility, unemployment, and susceptibility to opportunistic diseases contribute to this trend, and it recognized the inevitability of targeted interventions tailored to the unique challenges faced by these groups. Moreover, the study found that while HIV-related mortality has decreased since the introduction of Antiretroviral Therapy (ART), recent increases in mortality rates suggest challenges associated with aging HIV-positive individuals. It noted that men, in particular, experience high mortality rates due to factors such as depression and disregard of self-care. HIV positive woman interviewee from Galanefhi Sub-Region on 01Oct 2023 said:

> *We were living in Addis-Abeba Ethiopia. when the border war broke out between Eritrea and Ethiopia, in 1998, we were deported to our country of orgone Eritrea. My husband was truck driver, and died of HIV related death 22 years ago. Ten years ago, in social gathering for people living with HIV in Asmara, I came across with my fellow women who were my neighbors in Addis-Ababa Ethiopia. In chat, in tea- break, I learned that they have been deported, like me, and they are HIV positive widows just like me. When I asked them where their husbands were, they told me their husbands had died from HIV related death, like my husband, in the early 2000s. I was bewildered, as, to why HIV positive husbands are dying earlier than their wives*. I think, *Whether the women have more problem-coping capacity than men, or infected men practice promiscuous sexual behavior and engage in extramarital sex, and thereby risk themselves to reinfection and early death* [Field study 2023]

In addressing this issue, the study suggested targeted support for newly HIV infected men.

Main HIV Prevention Strategies in Zoba-Ma'akel

The study discussed HIV education as the cornerstone for all other HIV prevention strategies in the region. According to focus groups discussion (FGD) from Galanefhi Sub-Region on 30 Sept, 2023, HIV education encourages sex abstention until marriage, maintains trust in marital relationships, promotes condom use, encourages HIV testing, assists in accepting one HIV status, and helps to initiate Antiretroviral Therapy (ART) immediately after infection. At the same time, participants of focus group discussion session claimed stigma, discrimination, unemployment, and, gender and sexual and economic inequalities as obstacles to the ongoing HIV education programs in the region [Field study, 2023].

The study understands gender-based inequality and discrimination as pervasive issues that transcend boundaries and cultures and adversely affect health and human rights throughout the globe. The study noted the achievement so far met in mitigation of gender-based violence and HIV related stigmata. It observed the present of discrimination and HIV related stigma in the region. Some women avoid local HIV testing centers not to be seen by acquaintances. This highlights, how gender discrimination and stigma undermine HIV prevention efforts. Although there is a noted improvement, complete gender equality remains a distant goal (Amahazion, 2023).

According to the qualitative study respondents, although HIV related stigma, discrimination and unemployment have decreased in Zoba-Ma'akel since the 1990s, they continue to obstruct the progress of HIV prevention strategies. A female HIV positive respondent, from National Association for people living with HIV (BDHO Association) on 15 April, 2023 said:

> *After presenting our personal testimony, many people who had concealed their HIV infection, approached us and confessed their infections, and asked what they should do* [Field study ,2023].

"*BDHO*" is a local word s meaning "*Challenge*", and BDHO is an Eritrean organization that associates people living with HIV.

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Thirty-eight years old mother of 2 children, HIV positive interviewee from Galanefhi Sub-Region on 01 October, 2023 said:

When we tested HIV positive, the family of my husband blamed me for the infection and harassed me a lot. However, I did not know any man except my husband. Now, my husband is dead. I am not the only woman who faced this discrimination and isolation; most women of our Region experience isolation and discrimination.

Misconceptions about HIV transmission and moral judgments contribute to HIV related stigma discrimination, and it is deterring people from seeking of HIV testing and supports. Many people living with HIV conceal their HIV status to avoid discrimination. As per statement of the respondents in Zoba-Ma'akel, condom related stigma is preventing people, especially among women, from purchasing condoms [Field study, 2023].

The study identified unemployment as a major issue that is contributing to the spread of HIV infection in the region. According to a male interviewee from Ministry of Labor and Social Welfare on 20 Augst, 2023, many women turn to sex work due to lack of employment, which increases risk of HIV infection. Another male HIV-positive interviewee from Abashawl area on 21 Nov, 2023 said:

> *I live in a place where sex work is practiced explicitly, and I'm a first-hand witness to the miserable lives of the female sex workers. Almost all of them are single mothers. They get daily food, for themselves and their dependents, from sex work*.

Male HIV positive interviewee from BDHO association Zoba-Maekel-Branch head of the association, on 14 April 2023 said:

New HIV infection is high among Female sex workers (FSWs), and this is attributed to women's unemployment [Field study,2023].

A female interviewee from the National BDHO association on 15 April 2023 said:

> *"Ministry of Labr and Social Welfare (MLSW) sometimes makes efforts to provide training and work opportunities for female steelworkers; however, as it is insufficient and inaccessible to all, selling sex remains as an option, and continues even after the subjects knew their HIV infections* [Field study,2023].

Recognizing unemployment as a significant factor leading to sex work and subsequent HIV risk in Zoba-Ma'akel, the study highlighted the need for more comprehensive and accessible job creation programs to support women [Field study,2023]

Moreover, the study considered an expansion of HIV testing sites as an entry point for other HIV prevention strategies in Zoba-Maekel. The first rudimentary HIV testing service started in 1996 with 3 sites. This number increased to 31 in 2014, and further to 57 sites in 2020 (NACP, 2021). Antiretroviral therapy started in 2004, and HIV positive people who receive antiretroviral therapy were increasing from year to year which resulted to a significant decrease in HIV-related deaths. According to data collected from Communicable Disease Control Division, from 2011 to 2020, the number of antiretroviral therapy patients increased from 1,020 to 1,383, with a notable rise following the 2016 introduction of the "test and treat" strategy). Based on the findings the study noticed the number of women in Antiretroviral Therapy (ART) are greater than that of men, and it highlighted the need for targeted outreach to HIV-positive men.

Similarly, the study discussed CD4 tests, which measure immunity cell levels which is important for the prescription of antiretroviral therapy to the subjects. The study noted introduction of CD4 tests in Zoba-Maekel in 2004, with the introduction of antiretroviral therapies. Initially, antiretroviral therapies were given to individuals with CD4 cell counts below 350, but now all HIV-positive individuals receive Antiretroviral Therapy (NACP, 2021).

Moreover, the study discussed the introduction of HIV viral load tests in the region. HIV viral load test started in 2016, and it is conducted to assess

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the effectiveness of antiretroviral medication. The study highlighted the increasing number of eligible Antiretroviral Therapy patients for viral load tests from 2018 to 2020, and it noted high viral suppression rate that was above 90% within 3 years (NACP, 2021). The study found out that all the people who filled out the Questionnaires, the entire number of the people involved in the focus group discussion sessions and all HIV positive people who participated in the interview session have successfully suppressed their Viral load [Field study,2023]

Thereafter, the study discussed the distribution of condoms. In Eritrea distribution of condoms began in 1988 for family planning and prevention of sexual transmission infections like syphilis and gonorrhea. Later, in the early 2000s, to address the increasing HIV infection, a domestically produced new brand of male and female condoms called "Abusalama" started to be distributed by the Eritrea Social Marketing Group and Ministry of Health. A male interviewee from Eritrea Social Marketing Group (ESMG) on 10 Feb, 2023, said:

> *ESMG introduced a new brand of male and female condoms called "Abusalama" in 1998 and 1999 respectively; and nowadays, condoms are being distributed free of charge in public sector and at a nominal price in the private sector*.

Despite the increasing accessibility, the study noted transportation and condom related stigma as major problems that hinder the ideal condom distribution process in Zoba-Ma'akel. He continued said:

> *We do not have vehicles that are necessary for condom distribution all across the region. Consequently, condom distribution sites in the rural areas do not obtain condoms on time* [Field study,2023].

A male condom distributor interviewee from NEA, Geza-banda area, on 12 Feb,2023 said:

> *All our condom customers are men, and they don't buy condoms in the present other customers. They wait until other costumer leave the grocery. Moreover, there are condom customers who send children.* [Field study, 2023].

The study acknowledged the need for intervention that facilitates condom distribution activities and minimizes condom-related stigma.

Innovative Prevention Strategies in Zoba-Ma'akel

Prevention of the spread of HIV infection is a complex process. It is influenced by various external factors, and it needs innovative interventions on top of conventional prevention strategies. Different countries implement various innovative anti-HIV programs to complement the existing efforts (APA, 2024). In Zoba-Maekel/Eritrea, an Association for People living with HIV that is considered as an innovative prevention strategy, was founded in 2006 by volunteer HIV-positive individuals, and it is serving as a coordinating hub for HIV prevention activities. Starting from a small room in Asmara, the Association expanded throughout Zoba-Ma'akel, aiming to unify people living with HIV to address their health, social, and economic challenges (NACP, 2021). Male interviewee from BDHO association Zoba-Maekel-Branch on 15 April, 2023 said:

> *Our organization, provides regular HIV awareness programs along with its partners, and attempts to present psychological, moral and financial support, by soliciting sympathizers to its members in particular and to all people living with HIV in general*.

The size of BDHO association is growing from time to time. In 2021, there were 2,261 members in Zoba-Maekel, and 63% was women (NACP, 2021). HIV positive male interviewee from BDHO association Serejeka Sub-Region on 30 June, 2023, said,

Number of BDHO Association is not constant. It rises at one point of time and falls on other days [Field study ,2023].

According to the presented data, the number of women, mummers of the Association, was greater

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than that of men. Male interviewee from BDHO association Zoba-Maekel branch on 15 April, 2023) said:

> *Most of the members of the BDHO association are unemployed single mothers, as the burden of children upbringing merely falls upon them, they are compelled to join the association hoping for financial aid and job opportunities* [Field study, 2023].

The study noted the crucial roles of the association. The association mainly focuses on the provision of psychological and spiritual supports as well as training and job opportunities for PLHIV. Besides, the study noticed persistent fluctuations in the number of members of the association. This fluctuation is attributed to the lack of understanding of the objectives of the Association (NACP, 2021).

In addition, the study discussed the classification of key populations at high-risk groups (KPHRG) that are more susceptible to HIV infection. It discovered a shift in the HIV prevention strategy from the general population to the specific vulnerable groups. It revealed the categorization of female sex workers, long-distance truck drivers, military personnel, and TB patients as key population at high-risk group that need targeted HIV prevention interventions. Female interviewee, coordinator of HIV/AIDS program from Ministry of Health-Zoba Ma'akel Branch on 14 April, 2023 said:

> *Ministry of Health, Department AIDS Control Division Zoba-Ma'akel-Branch has classified female sex workers, long distance truck drivers, TB patients and Military personnel as KPHRG. They are receiving regular HIV education, condoms and free HIV testing services. Moreover, the ministry is distributing self- administer "oral test kits to female sex workers* [Field study,2023].

According to this interviewee "oral test kit" is a self-administered HIV screening clinical utensil. The study recognized the need to include permanent sex partners of female sex workers, wives of long-distance truck drivers, and military personnel within key population at high-risk groups (NACP, 2021).

Then, the study observed heterosexual HIV transmission as the predominant HIV transmission mode in Zoba-Ma'akel, and it discussed the introduction of couple testing as one of the Innovative HIV prevention strategies that is exercised in the region. According to the findings pregnant women in Zob-Ma'akel are encouraged to come to antenatal care along with their sex partners for HIV and STI tests, and the study noted an increase in the number of couple testing with time. In 2014; 6,423 couples were tested, and 18 men tested positive. By 2020, this number rose to 7,233 and 19 males tested HIV positive (NACP, 2021). The female interviewee, coordinator of HIV/AIDS program from Ministry of Health-Zoba Ma'akel Branch on 14 April, 2023 said:

> *Pregnant women are encouraged to bring their sex-partners to Antenatal care centers for HIV and sexual transmission infection tests* [Field study, 2023].

Moreover, the study discussed discordant results among couples pass through HIV test in Zoba-Ma'akel (NACP, 2021). Discordant results of couple-test refer to HIV positive test in one of the permanent sex partners and HIV negative test in the other part (Ssempijja, 2014). According to AIDS Control Program (2020), 25 discordant HV couples tests results were detected in 2017 in the region, and this figure decreased to 5 discordant HIV couple test results in 2020 (NACP, 2021).

In addition, the study identified the introduction of prophylaxis for likely HIV infection, post-exposure prophylaxis and pre-exposure prophylaxis, as innovative in the region. According to the reports of Ministry of Health, Prophylaxes for HIV were introduced in the region in 2005 (Ministry of Health, 2015). Post-exposure-prophylaxis is short-term treatment after potential HIV exposure, and pre-exposure prophylaxis is antiretroviral therapy for HIV-negative individuals at risk before exposure, and both are serving as innovative prevention

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strategies in the region (Ministry of Health. (2015). The female interviewee, coordinator of HIV/AIDS program from Ministry of Health-Zoba Ma'akel Branch on 14 April, 2023 said:

Post exposure prophylaxis (POP) is given for occupational and accidental exposures throughout Zoba-Ma'akel, and Pre-Exposure Prophylaxis (PrEP)is recently presented, as pilot project for female sex workers, and there is plan to offer it to other vulnerable groups in the succeeding years. [Field study, 2023]

The study discovered the introduction of a quality control program for the accuracy of HIV and syphilis test results that involves sending samples from regional HIV testing centers to the National Health Laboratory for verification. The data obtained from the office of Communicable Diseases Control Division Zoba-Ma'akel Branch proves the reliability of testing centers with minimal HIV and syphilis discordant results (MoH-CDCD, 2021). The female interviewee, coordinator of HIV/AIDS program from Ministry of Health-Zoba Ma'akel Branch on 14 April, 2023 said:

> *Quality control for the results of HIV and STI tests is one of the main integrated innovative prevention strategies that is routinely followed in Zoba-Ma'akel and other parts of the country. The blood sample is sent to the National Laboratory for assessment* [Field study,2023].

Mycobacterium Tuberculosis (TB) poses a significant risk to people living with HIV, especially as pulmonary TB remains a common opportunistic infection among people living with HIV (Nardell, 2022). The study noted practicing of HIV-TB integrated prevention methods in Zoba-Ma'akel. HIV positive people who show symptoms of TB undergo TB screening. Those who tested TB positive receive Anti-TB medications, while those at high risk but tested negative take TB prevention treatment as a prophylaxis (NACP, 2021). The female interviewee from Ministry of Health Zoba-Ma'akel Branch on 14 April, 2023 said:

> *Any HIV positive person who shows the 4 cordial [heart] symptoms of presumably TB passes through TB screening at any visits to health facilities. HIV people who tested TB positive receive Anti-TB medicines, and the one who tested TB negative, but at high risk to TB infection take TB prevention treatment (TPT) as prophylaxis* [Field study,2023].

Data gathered from Ministry of Health Zoba-Ma'akel Branch archives illustrate the implementation of these integrated approaches in the region. Over the years, people living with HIV and TB patients have undergone TB screening and HIV testing, resulting in early detection and treatment. In 2017, for instance, 135 people living with HIV and 148 TB patients underwent testing, with subsequent management based on their results. This proactive approach helps in reducing TB burden among people living with HIV and improves health outcomes (MoH, 2021).

Finally, the study discussed the interplay of HIV testing and family planning services in Zoba-Maekel. The cooperation between HIV testing and family planning programs is vital for comprehensive healthcare care. Women at high-risk of HIV are referred from family planning to HIV testing centers, and women tested positive are directed to family planning centers for counseling. The female interviewee, coordinator of HIV/AIDS program from Ministry of Health-Zoba Ma'akel Branch on 14 April, 2023 said:

> *Interaction of HIV testing and family planning programs are observable in Zoba Ma'akel. Women suspected at high risk of HIV infection are referred to HIV testing sites, and women tested HIV positive are referred to family planning centers for counseling* [Field study, 2023].

Data obtained from the Ministry of Health Zoba-Maekel Branch (2021) confirm this collaboration. In 2017, for instance, 2,741 women were sent to HIV testing from family planning centers, and 32 HIV-positive women were referred to family planning centers for counseling (MoH, 2021).

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SUMMARY CONCLUSION AND RECOMMENDATION

Summary

The study provides a comprehensive overview of the HIV/AIDS epidemic globally, with a focus on its impact in Eritrea's Zoba-Ma'akel region. It discussed the emergence of HIV, its transmission modes, and the significant toll it has taken on the global populations. Notably, it highlighted the gender disparity in HIV prevalence rates, with women disproportionately affected. The study aimed to evaluate the effectiveness of HIV prevention strategies in Zoba-Ma'akel, employing a mixed-method research approach. Data collection methods included surveys, focus group discussions, and interviews with people living with HIV and experts. Findings indicated decline in HIV prevalence over the past two decades but persistent gender disparities, with women continuing to bear a high burden of infection.

The study discussed various prevention strategies, including HIV education, gender-based violence prevention, stigma reduction, employment initiatives, testing site expansion, and antiretroviral therapy provision and condom distribution. Similarly, the study identified several innovative HIV prevention interventions, such as the establishment of an association for people living with HIV (BDHO Association), introduction of targeted programs for key populations at high-risk group the importance of encouraging couple testing, the provision of prophylaxis for likely infection, the integrated program for HIV and TB infection and cooperation works of the HIV testing and family planning centers. Then, it put the innovative prevention as a supplementary program to the conventional (regular) HIV prevention strategies. Generally, the study underscored the challenges of ongoing HIV prevention response and the need for comprehensive targeted approaches to address the problem effectively.

Conclusion

The study employed a comprehensive research design, utilizing both quantitative and qualitative methods to gather data from diverse sources. Ethical considerations were paramount, ensuring confidentiality, privacy, and informed consent. It concluded the importance of evaluation of prevention strategies and implementation of innovative approaches to combat HIV/AIDS effectively.

Then, the study provides a detailed analysis of the HIV/AIDS situation in Eritrea's Zoba-Ma'akel region, emphasizing the progress made in reducing HIV prevalence rates, while addressing ongoing challenges and disparities, particularly concerning gender. Despite the notable decline in HIV prevalence rates over the past two decades, the study established the occurrence of new infections in Zoba-Ma'akel, and it highlighted the need for continued preventive efforts. Besides, the study concluded the challenge of gender disparities to HIV that is causing high prevalence rates among women than among men, and it suggested the introduction of necessary targeted interventions that address this imbalance.

The study noted the provision of various prevention strategies including HIV education, gender-based violence prevention, stigma reduction, job creation, expansion of HIV testing sites, and provision of Antiretroviral Therapy. At the same time, it noted the challenges that are caused by gender discrimination, HIV related stigma, unemployment and condom transportation problems in Zoba-Maekel, and emphasized the introduction of targeted interventions that address these problems.

Finally, the study recognized the introduction of several innovative HIV prevention interventions in Zoba-Ma'akel, such as association for people living with HIV, classification of key populations at high-risk group, the introduction of couple testing and identification of discordant couples, initiation of quality control programs for HIV/ syphilis tests, provision of prophylaxes, introduction of integration program for HIV-TB prevention and cooperation programs of the HIV testing and family planning institutions. Moreover, it noted the need to incorporate the permanent sex partners of long-distance truck

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drivers, military personnel and female sex workers into key populations at high-risk groups).

Recommendation

Based on the findings, the study understands the dynamic nature of HIV prevalence, and it recommended to the Ministry of Health Zoba-Ma'akel Branch the importance of continuous monitoring and evaluation of activities to assess the effectiveness of prevention strategies and prevalence rate.

To address the gender disparities in respect to HIV prevalence rates, the study recommended to Ministry of Health, Ministry of

Labor and Social Welfare Zoba-Ma'akel Branch and National AIDS Control Program the need for targeted interventions including promoting women's empowerment programs, improving women's access to healthcare services, solving societal norms that contribute to women's economic dependency and sexual inequality. Moreover, it recommends to National AIDS Control program the inclusion of wives of long-distance truck drivers and military personnel, and stable mates of female sex workers as key population in high-risk groups. Finally, the study recommends that the Ministry of Health focus on the impact of non-communicable diseases such as diabetes, hypertension asthma, etc., on people living with HIV.

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