Asian Pacific Journal of Tropical Disease

journal homepage: http://www.apjtcm.com

Review article https://doi.org/10.12980/apjtd.7.2017D6-366 ©2017 by the Asian Pacific Journal of Tropical Disease. All rights reserved.

HIV/AIDS in sub-Saharan Africa: Current status, challenges and prospects

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ARTICLE INFO

Article history:
Received 12 Oct 2016
Received in revised form 31 Oct, 2nd revised form 4 Nov, 3rd revised form 8 Nov 2016
Accepted 25 Jan 2017
Available online 12 Apr 2017

Keywords:
HIV
AIDS
Sub-Saharan Africa
Prevalence
Occurrence
Scourge
Sex

ABSTRACT

The problem of HIV/AIDS was sort of a fairy tale and mere information till the immunological disorder was scientifically confirmed. Today, HIV/AIDS has continued to be a serious international health concern, and sub-Saharan Africa remains the most affected region. Over 25.6 million persons are currently living with HIV in sub-Saharan Africa. This accounts for two-thirds of the recent overall world HIV infections and more than 70 percent of all AIDS-related deaths. In 2015, Eastern and Southern Africa had about 7.1% adult HIV prevalence rate (about 19 million HIV patients), while Western and Central Africa accounted for about 2.2% (about 6.5 million HIV patients). Few countries now boast of numerous signs of gradual to moderate declines in HIV occurrence. However, HIV prevalence rate has continued to increase in countries like Lesotho (22.7%), Botswana (22.2%) and South Africa (19.2%). The nature, procedure and result of the scourge in this region have been fashioned by a mind-boggling interaction of traditional, behavioural, social and material factors. Even if there are notably strong prevention, treatment and care programmes, too many sexual partners are engaging in risky sexual practices. The aim of this article is to discuss the current trends of HIV/AIDS in sub-Saharan Africa, the factors that might have contributed to high prevalence of the virus in the region, the effect of the HIV/AIDS scourge, the prevention programmes and the way forward.

1. Introduction

More than two decades ago, HIV/AIDS started in just few isolated cases and has spiralled into the most important epidemic in the trend of history. Today, HIV/AIDS has continued to be a serious international health concern, and sub-Saharan Africa is the foremost affected region. Sub-Saharan Africa has about 25.6 million persons living with HIV, accounting for two-thirds of the recent overall world HIV infections and more than 70 percent of all AIDS-related deaths. Sadly, more than half of the HIV-infected population in sub-Saharan Africa are women and children[1].

It is still indistinct why the HIV infection and AIDS are especially destructive in sub-Saharan Africa. A number of distinctive reasons have been developed to give an explanation for the high prevalence and uneven circulation of the virus in this region. They include the existence of different strains of HIV, economic marginalization and poverty, high rates of sexually transmitted infections (STIs) and other opportunistic infections, sexual networking and sexual contact patterns, excessive stages of concurrent sexual companions, the absence of male circumcision, jail congestion, the position of core groups, for instance, commercial sex workers, and populace mobility. Also, the nature, procedure and result of the plague in this region have been fashioned by a mind- boggling interaction of traditional, behavioural, social, and material factors[2-5].

The precise effect of HIV/AIDS scourge is still obscure. However, the pestilence is liable to affect almost every part of life in Africa. In this review, we summarized the social and economic impacts of HIV/AIDS in sub-Saharan Africa which include grievous emotional turmoil, a serious reduction in life expectancy, a first-rate lack of both expert and unskilled labour, increasing expenses of medical services and socio-economic disordering[6-8].

In spite of the broad spread of the HIV/AIDS scourge, the stigmatization of patients continues to be a noteworthy dilemma in Africa. Considering that the HIV/AIDS vaccine/cure may not be available sooner rather than later, efforts to lessen the spread and the effects must be geared toward changing high-risk sexual conduct, particularly, in environments facilitating high-risk sexual behaviour[9,10].

There is a need for more media tools to fight discriminatory practices against HIV-infected patients in sub-Saharan Africa. Interestingly, this review focused on the general trend of HIV/AIDS in sub-Saharan Africa, country-specific prevalence and reasons for the high HIV prevalence, and proffered the way forward in sub-Sahara Africa.

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The journal implements double-blind peer review practiced by specially invited international editorial board members.

2. Prevalence of HIV/AIDS in sub-Saharan Africa

2.1. Global and sub-Saharan Africa trends

Sub-Saharan Africa has essentially the most severe HIV and AIDS epidemic in the world, although the burden of the epidemic continues to differ greatly between nations and regions. In 2015, 36.7 million people were reported to be living with HIV/AIDS globally, of which 25.6 million (69.8% globally) are from sub-Saharan Africa alone. There appears to have been a decrease in the number of HIV-infected people both globally and in the sub-Saharan Africa. The eastern and southern regions of Africa are the most affected areas in the continent[11]. The number of HIV patients in sub-Saharan Africa and globally from 2001 to 2015 from the reports of Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO) was shown in Figure 1.

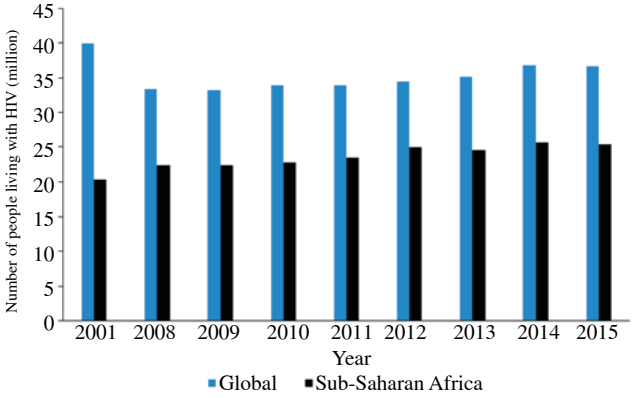

Figure 1. Global and sub-Saharan Africa HIV epidemic from 2001 to 2015 (people of all age).

Data published by the UNAIDS (UNAIDS, 2016 http://www.unaids.org/sites/ default/files/media_asset/ UNAIDS_FactSheet_en.pdf) indicate that more than 78 million persons have so far been infected with the HIV that causes AIDS since the beginning of the epidemic. Approximately, 2.1 million new infections occurred worldwide in 2015, of which 1.37 million (65.2%) were also from sub-Sahara Africa alone (Figure 2). Globally, new cases of HIV have gradually reduced from about 5 million to 2.1 million between 2001 and 2015, while in sub-Saharan Africa it has reduced from 3.4 million to 1.37 million cases within the same period (Figure 2). New cases of HIV infection have reduced globally and also in sub-Saharan Africa by 6% and 22% since 2010, respectively. As shown in Figure 3, the HIV prevalence in sub-Saharan region of Africa is about 4.5%, but it varies greatly between regions within sub-Saharan Africa as well as individual countries. By comparison, worldwide HIV prevalence of 0.8% has remained almost steady since 2001 but that of sub-Saharan Africa region continues to decrease gradually since 2001. Also since 2011, there has been less than 0.2% decrease in HIV prevalence in sub-Saharan Africa.

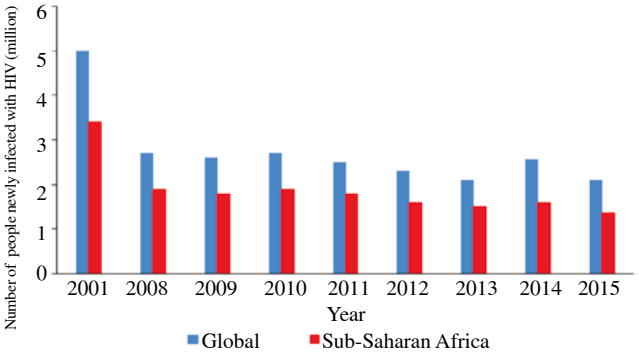

Figure 2. New HIV infections in the global and sub-Saharan Africa from 2001, 2008–2015.

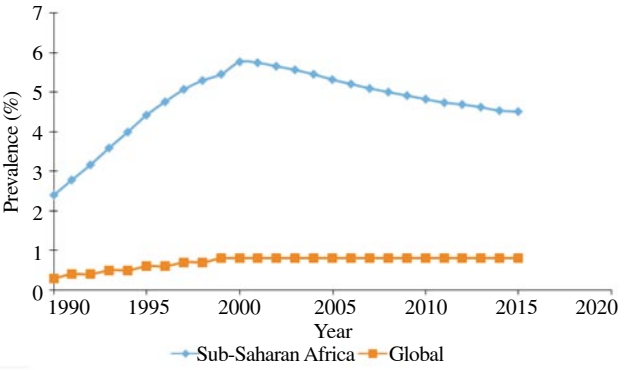

Figure 3. Global and sub-Saharan Africa prevalence of HIV from 2001, 2008–2015 (aged 15–49).

About 1.1 million people have died of AIDS-related death globally in 2015. Out of this number, about 72.7% are from sub-Saharan (Figure 4). AIDS has taken the lives of more than 35 million (29.6–40.8 million) people globally since the beginning of the epidemic. The AIDS-related deaths have decreased globally and in the sub-Saharan Africa from an estimate of 3 million and 2.3 million in 2001, respectively to 1.1 million and 0.8 million in 2015, respectively (Figure 4). Also, deaths associated with AIDS have reduced worldwide by 45% compared to the peak in 2005[12]. This may be as a result of local and international campaign on HIV prevention and health-related risks.

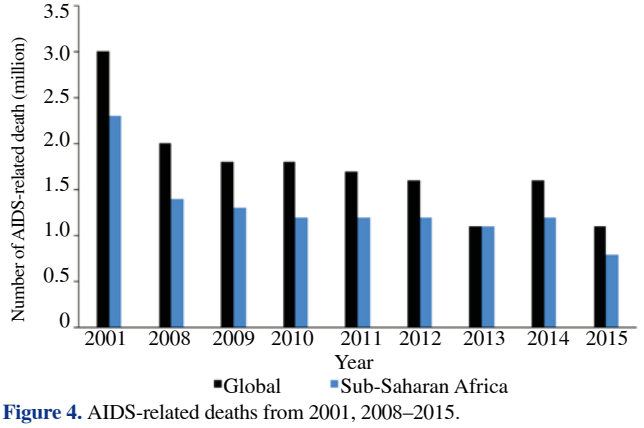

Figure 4. AIDS-related deaths from 2001, 2008–2015.

Interestingly, 17 million people globally now have access to antiretroviral therapy as of December 2015, compared to 15.8 million people in June 2015 and 7.5 million in 2010. It indicated that in 2015, 46% (43%–50%) of all adults living with the virus have access to the drugs, up from 23% (21%–25%) in 2010 as a result of increase in funding, health facilities and HIV-related awareness[13].

2.2. Country-specific epidemics in African subregions

The sub-Saharan Africa, being the hardest hit region by the epidemics, is the abode for only about 13% of the world population with nearly 70% of people living with HIV. The number of people with the virus and the prevalence rates vary from subregion to subregion. In 2015, the estimate of HIV/AIDS patients in Eastern and Southern Africa was 19 million persons with a 7.1% adult prevalence rate, as compared to 6.5 million in Western and Central Africa (2.2%), 2.0 million in Latin America and Caribbean (0.5%), 1.5 million in Eastern Europe and Central Asia (0.9%) and 5.1 million in Asia and the Pacific[14].

2.3. HIV and AIDS trend among the countries in Western and Central African subregions

The epidemic is diverse and changeable in Western and Central African subregions with an estimate of 2.2–27 million people living with HIV at the end of 2015. Once again, women accounted for nearly 60% of the total number of people living with the virus in this subregion. New cases of HIV decreased by 8% between 2010 and 2015, with 310 000–530 000 new HIV cases in 2015 alone. AIDS-related deaths have also reduced between 2010 and 2015 by 10%, while an estimated number of 250 000–430 000 people died of AIDS-related causes in 2015. Of all the HIV patients in Western and Central Africa, only 1.8 million (20%) were accessing lifesaving antiretroviral therapy at the end of 2015[15]. This contributes negatively in the ongoing effort to bring the virus prevalence rate to zero.

There is still evidence of HIV spreading in Western and Central Africa sub-region. According to UNAIDS regional and country estimates (UNAIDS, 2016 http://www.unaids.org/en/regionscountries/countries/), Democratic Republic of Congo (DRC) has the highest number of people living with HIV (370 000) in Central Africa, followed by Rwanda (200 000) and Central African Republic (120 000) (Table 1). In West Africa, Nigeria, a populous and well known country in Africa (with a population of over 120 million), has the highest population of HIV patients in this subregion (3 500 000) (higher than DRC) followed by countries like, Cameroon (620 000), Cote d'Ivoire (460 000) and Ghana (270 000) (Table 2).

Table 1

People living with HIV/AIDS, and deaths and orphans due to AIDS in Central African countries in 2015.

Countries	People living with HIV (No.)	Prevalence rate (Adults aged 15–49)	Living with HIV (No.)			AIDS-relative	
			Adults (age ⩾ 15)	Women (age ⩾ 15)	Children (aged 0–14)	Deaths	Orphans (aged 0–17)
Burundi	77 000 (61 000–92 000)	1.0% (0.8%–1.3%)	68 000 (53 000–82 000)	41 000 (32 000–49 000)	9 100 (7 400–11 000)	3 000 (1 800–4 000)	69 000 (59 000–79 000)
Central African Republic	120 000 (100 000–130 000)	3.7% (3.2%–4.2%)	110 000 (95 000–120 000)	64 000 (56 000–73 000)	9 400 (8 500–10 000)	7 800 (7 000–8 600)	82 000 (75 000–88 000)
Democratic Republic of Congo	370 000 (290 000–460 000)	0.8% (0.7%–1.1%)	330 000 (260 000–410 000)	200 000 (160 000–250 000)	42 000 (34 000–51 000)	22 000 (16 000–28 000)	330 000 (260 000–400 000)
Republic of Congo	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rwanda	200 000 (180 000–220 000)	2.9% (2.6%–3.2%)	190 000 (170 000–210 000)	110 000 (100 000–130 000)	11 000 (9 200–13 000)	2 900 (2 300–3 500)	70 000 (61 000–79 000)

Table 2

People living with HIV/AIDS, and deaths and orphans due to AIDS in West African countries in 2015.

Countries	People living with HIV	Prevalence rate Adults aged 15–49	Living with HIV (No.)			AIDS-relative	
			Adults (age ⩾ 15)	Women (age ⩾ 15)	Children (aged 0–14)	Deaths	Orphans (aged 0–17)
Benin	69 000 (54 000–92 000)	1.1% (0.8%–1.4%)	64 000 (51 000–85 000)	38 000 (30 000–50 000)	4 800 (3 500–6 400)	2 800 (1 900–4 100)	36 000 (25 000–50 000)
Burkina Faso	95 000 (79 000–120 000)	0.8% (0.7%–1.0%)	88 000 (72 000–110 000)	53 000 (44 000–65 000)	7 700 (6 000–9 600)	3 600 (2 500–4 900)	71 000 (57 000–88 000)
Cameroon	620 000 (550 000–690 000)	4.5% (3.9%–5.0%)	580 000 (520 000–650 000)	340 000 (310 000–390 000)	39 000 (34 000–44 000)	33 000 (30 000–36 000)	310 000 (290 000–350 000)
Cape Verde	3 200 (2 700–3 900)	1.0% (0.8%–1.2%)	3 100 (2 600–3 800)	1 700 (1 400–2 000)	<200 (<200–<200)	<200 (<100–<200)	1 600 (1 200–2 000)
Chad	170 000 (130 000–210 000)	2.0% (1.6%–2.6%)	150 000 (120 000–190 000)	88 000 (71 000–110 000)	18 000 (14 000–22 000)	8 500 (6 400–11 000)	100 000 (82 000–130 000)
Cote d'Ivoire	460 000 (400 000–530 000)	3.2% (2.7%–3.6%)	440 000 (370 000–500 000)	250 000 (220 000–290 000)	29 000 (24 000–34 000)	25 000 (20 000–30 000)	230 000 (180 000–280 000)
Equatorial Guinea	27 000 (25 000–30 000)	4.9% (4.4%–5.3%)	25 000 (23 000–27 000)	14 000 (13 000–16 000)	2 400 (2 200–2 600)	1 100 (<1 000–1 200)	9 200 (7 300–11 000)
Gabon	47 000 (40 000–54 000)	3.8% (3.1%–4.4%)	44 000 (37 000–51 000)	30 000 (25 000–35 000)	2 600 (2 200–3 100)	1 300 (<1 000–1 600)	16 000 (12 000–19 000)
Gambia	21 000 (17 000–25 000)	1.8% (1.5%–2.2%)	19 000 (15 000–22 000)	11 000 (9500–14 000)	1 800 (1 500–2 300)	1 000 (<1 000–1 300)	11 000 (8 600–15 000)
Ghana	270 000 (230 000–330 000)	1.6% (1.3%–1.9%)	260 000 (210 000–300 000)	150 000 (130 000–190 000)	19 000 (15 000–22 000)	13 000 (10 000–16 000)	160 000 (130 000–190 000)
Guinea	120 000 (100 000–140 000)	1.6% (1.3%–1.8%)	110 000 (93 000–130 000)	68 000 (57 000–80 000)	7 000 (6 000–8 000)	4 600 (3 700–5 600)	49 000 (39 000–58 000)
Guinea-Bissau	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Liberia	30 000 (25 000–35 000)	1.1% (0.9%- .3%)	26 000 (22 000–31 000)	16 000 (13 000–19 000)	3 900 (3 400–4 400)	1 900 (1 600–2 300)	28 000 (25 000–32 000)
Mali	120 000(100 000–150 000)	1.3% (1.0%–1.5%)	66 000 (94 000–140 000)	12 000 (56 000 – 79 000)	6 500 (9 900–14 000)	66 000 (5 400–7 800)	110 000 (55 000 – 79 000)
Mauritania	14 000 (8800–21 000)	0.6% (0.3%–0.9%)	12 000 (7 600–19 000)	6 600 (4 200–10 000)	1 300 (<1 000–1 600)	<1 000 (<1 000–1 300)	9 400 (7 600–12 000)
Niger	49 000 (43 000–55 000)	0.5% (0.4%–0.5%)	43 000 (38 000–49 000)	22 000 (20 000–25 000)	5 900 (5 100–6 800)	3 600 (3 100–4 200)	69 000 (58 000–82 000)
Nigeria	3 500 000 (2 600 000–4 500 000)	3.1% (2.1%–3.6%)	3 200 000 (2 400 000–4 200 000)	1 900 000 (1 400 000–2 400 000)	260 000 (190 000–360 000)	180 000 (120 000–250 000)	1 800 000 (1 300 000–2 600 000)
Senegal	70 000 (61 000–79 000)	0.5% (0.4%–0.6%)	41 000 (34 000–50 000)	26 000 (22 000–32 000)	26 000 (22 000–32 000)	2 200 (1 800–2 800)	25 000 (19 000–32 000)
Sierra Leone	51 000 (44 000–58 000)	1.3% (1.1%–1.5%)	47 000 (40 000–54 000)	28 000 (24 000–32 000)	4 400 (3 800–5 000)	2 500 (2 100–2 900)	23 000 (18 000–28 000)

The HIV prevalence rate among adults aged from 15 to 49 is generally decreasing gradually. At the end of 2015 according to WHO (WHO, 2015 http://api.worldbank.org/v2/en/indicator/SH.DYN.AIDS.ZS?downloadformat=excel), Equatorial Guinea once again had the highest prevalence rate of 4.9%. It is interesting that the HIV prevalence rates have reduced from the highest peak in Equatorial Guinea (from 6.3% in 2012 to 4.9% in 2015), Cameroon (from 5.5% in 2003 to 4.5% in 2015), Gabon (from 5.9% in 2002 to 3.8% in 2015), Central African Republic (from 9.9% in 2000 to 43.7% in 2015), Cote d'Ivoire (from 5.5% in 2000 to 3.2% in 2015), Nigeria (from 3.7% in 2007 to 3.1% in 2015), Rwanda (from 6.3% in 1996 to 2.9% in 2015), and Chad (from 3.5% in 2005 to 2.0% in 2015) (Figure 5 and Table 3). WHO also reported that there was no significant decrease in HIV prevalence rates in Benin (since 2007), Cape Verde (since 2009), Ghana (since 2011), Guinea (2006), Gambia (since 2012), Guinea-Bissau (since 2007) and Niger (since 2013) (Figures 3 and 5). Compared with 2014 HIV prevalence rates, there was significant decrease in Equatorial Guinea between 2014 and 2015, and also in Central African Republic, Cameroon, Cote d'Ivoire and Chad. Also, in this region, women and children are the most affected. According to UNAIDS (UNAIDS, 2016 http://www.unaids.org/en/regionscountries/countries/), Nigeria, Cameroon, Cote d'Ivoire and DRC had the highest number of women and children living with the virus, including the number of AIDS-related deaths and the number of orphans (aged from 0 to 17) (Tables 1 and 2).

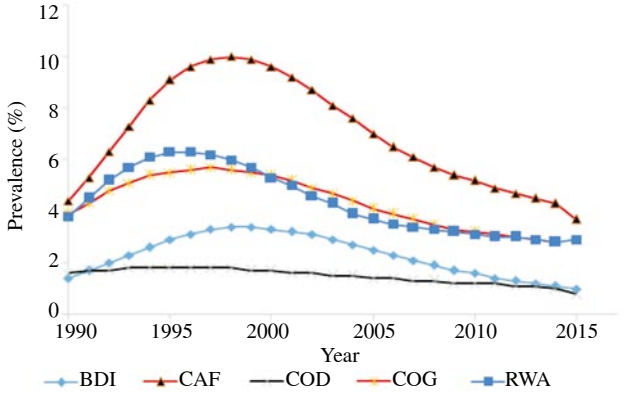

Figure 5. Prevalence of HIV in Central African countries from 1990 to 2015 (aged 15–49).
BDI: Burundi; CAF: Central African Republic; COD: Democratic Republic of Congo; COG: Republic of Congo; RWA: Rwanda.

2.4. HIV and AIDS trends among the countries in Eastern and Southern Africa subregions

There were estimated 19 million people living with HIV in Eastern and Southern Africa, 78% higher than Western and Central African subregions according to UNAIDS (UNAIDS, 2016 http://www.unaids.org/sites/ default/files/media_asset/ UNAIDS_FactSheet_en.pdf). Their recent reports indicate that there were an estimated 960000 (830000–1.1 million) new HIV cases in 2015 alone and about 14% reduction in new HIV cases between 2010 and 2015. More than half of the number of HIV patients in this sub-region were women and

Table 3
Prevalence of HIV in West African countries from 1990 to 2015 (percent of total population aged 15–49).

Years	Countries																			
	BEN	BFA	CIV	CMR	CPV	GAB	GHA	GIN	GMB	GNB	GNQ	LBR	MLI	MRT	NER	NGA	SEN	SLE	STP	TCD
1990	0.5	3.4	2.9	2.6	0.3	1.2	1.3	0.7	0.1	0.3	0.1	0.5	1.6	0.2	0.3	1.2	0.2	0.1	0.3	1.3
1991	0.6	3.6	3.3	3.0	0.4	1.5	1.4	0.9	0.2	0.4	0.1	0.7	1.9	0.2	0.3	1.4	0.2	0.1	0.9	1.5
1992	0.7	3.8	3.7	3.4	0.4	1.9	1.6	1.1	0.3	0.5	0.1	0.9	2.0	0.3	0.4	1.6	0.2	0.1	1.2	1.7
1993	0.8	3.8	4.2	3.8	0.5	2.3	1.8	1.3	0.4	0.6	0.2	1.1	2.2	0.3	0.5	1.8	0.3	0.1	1.3	1.9
1994	0.9	3.7	4.5	4.2	0.6	2.8	1.9	1.5	0.5	0.7	0.3	1.3	2.2	0.4	0.6	2.1	0.3	0.1	1.4	2.1
1995	1.0	3.6	4.9	4.6	0.6	3.3	2.1	1.7	0.6	0.9	0.4	1.6	2.2	0.5	0.7	2.4	0.4	0.2	1.4	2.3
1996	1.1	3.4	5.1	4.9	0.7	3.8	2.2	1.8	0.8	1.1	0.5	1.8	2.2	0.6	0.8	2.6	0.4	0.3	1.5	2.5
1997	1.2	3.2	5.3	5.1	0.7	4.3	2.3	1.9	0.9	1.4	0.7	2.0	2.1	0.6	1.0	2.9	0.5	0.5	1.5	2.7
1998	1.3	2.9	5.5	5.3	0.8	4.8	2.3	1.9	1.1	1.6	0.9	2.1	2.0	0.7	1.1	3.1	0.6	0.6	1.6	2.9
1999	1.3	2.7	5.5	5.4	0.8	5.2	2.3	1.9	1.3	1.9	1.2	2.2	1.9	0.8	1.1	3.3	0.7	0.8	1.6	3.1
2000	1.4	2.4	5.5	5.5	0.8	5.5	2.3	1.9	1.5	2.2	1.5	2.3	1.8	0.8	1.2	3.5	0.7	1.0	1.7	3.3
2001	1.4	2.2	5.4	5.5	0.9	5.7	2.3	1.9	1.7	2.5	1.9	2.3	1.7	0.9	1.2	3.6	0.8	1.1	1.7	3.4
2002	1.4	1.9	5.3	5.5	0.9	5.9	2.2	1.8	1.8	2.8	2.3	2.3	1.6	0.9	1.2	3.6	0.9	1.3	1.7	3.5
2003	1.4	1.7	5.2	5.5	0.9	5.9	2.2	1.8	1.9	3.0	2.8	2.3	1.5	0.9	1.2	3.7	0.9	1.4	1.6	3.5
2004	1.3	1.6	5.0	5.4	0.9	5.8	2.1	1.7	2.0	3.3	3.3	2.2	1.4	0.9	1.2	3.7	0.9	1.6	1.6	3.5
2005	1.3	1.4	4.8	5.3	0.9	5.7	2.0	1.7	2.1	3.5	3.9	2.1	1.4	0.9	1.1	3.7	0.9	1.6	1.5	3.5
2006	1.3	1.3	4.6	5.3	0.9	5.6	1.9	1.6	2.1	3.6	4.4	1.9	1.4	0.9	1.0	3.7	0.9	1.7	1.4	3.4
2007	1.2	1.2	4.4	5.2	0.9	5.5	1.9	1.6	2.1	3.7	4.9	1.8	1.4	0.9	1.0	3.7	0.8	1.7	1.4	3.3
2008	1.2	1.2	4.2	5.2	0.9	5.2	1.8	1.6	2.1	3.8	5.4	1.7	1.4	0.8	0.9	3.6	0.8	1.7	1.3	3.2
2009	1.2	1.1	4.1	5.1	1.0	5.0	1.7	1.6	2.1	3.9	5.7	1.6	1.4	0.8	0.8	3.6	0.7	1.7	1.2	3.1
2010	1.2	1.1	4.0	5.1	1.0	4.7	1.7	1.6	2.0	3.9	6.1	1.5	1.4	0.8	0.7	3.5	0.7	1.6	1.1	3.0
2011	1.2	1.0	3.8	5.0	1.0	4.5	1.6	1.6	2.0	3.9	6.2	1.4	1.4	0.8	0.7	3.4	0.7	1.6	1.0	2.9
2012	1.2	1.0	3.7	4.9	1.0	4.3	1.6	1.6	1.9	3.8	6.3	1.3	1.4	0.7	0.6	3.4	0.6	1.5	0.9	2.8
2013	1.2	1.0	3.6	4.9	1.1	4.1	1.5	1.6	1.9	3.8	6.3	1.2	1.4	0.7	0.5	3.3	0.6	1.5	0.8	2.6
2014	1.1	0.9	3.5	4.8	1.1	3.9	1.5	1.6	1.8	3.7	6.2	1.2	1.4	0.7	0.5	3.2	0.5	1.4	0.8	2.5
2015	1.1	0.8	3.2	4.5	1.0	3.8	1.6	1.6	1.8	ND	4.9	1.1	1.3	0.6	0.5	3.1	0.5	1.3	ND	2.0

BEN: Benin; BFA: Burkina Faso; CIV: Cote d'Ivoire; CMR: Cameroon; CPV: Cape Verde; GAB: Gabon; GHA: Ghana; GIN: Guinea; GMB: Gambia; GNB: Guinea-Bissau; GNQ: Equatorial Guinea; LBR: Liberia; MLI: Mali; MRT: Mauritania; NER: Niger; NGA: Nigeria; SEN: Senegal; SLE: Sierra Leone; STP: Sao Tome and Principe; TCD: Chad.

46% of the global total of new HIV infected persons live in this sub-region. At the end of 2015, 470 000 people died of AIDS-related causes and there was 38% of reduction between 2010 and 2015. Of all the HIV patients in this sub-region, only 10.3 million (54%) of all the people living with HIV were accessing antiretroviral therapy at the end of 2015. It is also reported that this region had more percentage of adult women (59%) aged 15 years and above than men (44%) accessing therapy within the same period[16].

Generally, eastern and southern regions of Africa now boast of numerous signs of gradual, modest declines in mode of HIV occurrence. In some countries (where epidemic is the most severe in the world), HIV rates are still on the upward thrust. There may be hope that the epidemic will reach its average limit naturally, over which it could not rise again. For that reason, it has been assumed that the very high HIV occurrence rates in some nations have reached a plateau[17]. Regrettably, this seems now not to be the case, as yet. According to a recent report by WHO (WHO, 2015 http://api.worldbank.org/v2/en/indicator/ SH.DYN.AIDS.ZS?downloadformat=excel), South Africa has the highest number of people living with HIV (7 million), followed by Kenya (1.5 million), Uganda (1.5 million), Mozambique (1.5 million), Tanzania (1.4 million), Zimbabwe (1.4 million) and Zambia (1.2 million) (Tables 4 and 5). For many times in 2015, the HIV prevalence rate in Swaziland has been the highest in the world at 28.2% of persons aged 15–49. This has continued to increase ever since 1995. Also, the HIV prevalence rates according to a 2015 report by WHO were high in other countries like, Lesotho (22.7%), Botswana (22.2%), South Africa (19.2%), Zimbabwe (14.7%), Namibia (13.3%), Zambia (12.9%), Mozambique (10.5%), Malawi (9.1%), Uganda (7.1%) and Kenya (5.9%) (Figures 6 and 7). These HIV prevalence rates in these countries are higher than what were reported in any other region. In spite of the global efforts to reduce HIV transmission, the prevalence

Table 4

People living with HIV/AIDS, and deaths and orphans due to AIDS in East African countries in 2015.

Countries	People living with HIV (No.)	Prevalence rate Adults aged 15–49	Living with HIV (No.)			AIDS-relative	
			Adults (age ⩾ 15)	Women (age ⩾ 15)	Children (aged 0–14)	Deaths	Orphans (aged 0–17)
Djibouti	9 400 (6 600–13 000)	1.6% (1.1%–2.2%)	8 500 (5 900–12 000)	4 800 (3 400–6 800)	< 1 000 (< 1 000–1 300)	< 1 000 (< 500–< 1 000)	5 300 (3 800–7 300)
Eritrea	14 000 (11 000–18 000)	0.6% (0.5%–0.8%)	13 000 (10 000–16 000)	8 200 (6 500–11 000)	1 400 (< 1 000–1 800)	< 500 (< 500–< 1 000)	8 400 (6 000–12 000)
Ethiopia	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kenya	1 500 000 (1 300 000–1 800 000)	5.9% (4.9%–7.0%)	1 400 000 (1 200 000–1 700 000)	830 000 (700 000–970 000)	98 000 (81 000–120 000)	36 000 (26 000–47 000)	660 000 (540 000–810 000)
Somalia	30 000 (21 000–41 000)	0.5% (0.3%–0.7%)	27 000 (18 000–37 000)	14 000 (9500–19 000)	3 100 (2 400–4 000)	2 000 (1 500–2 700)	25 000 (19 000–32 000)
South Sudan	180 000 (110 000–240 000)	2.5% (1.6%–3.4%)	170 000 (110 000–220 000)	97 000 (63 000–130 000)	14 000 (9 200–19 000)	12 000 (7300–16 000)	100 000 (68 000–140 000)
Sudan	56 000 (33 000–90 000)	0.3% (0.1%–0.4%)	52 000 (30 000–85 000)	25 000 (14 000–39 000)	3 500 (2 800–4 500)	3 000 (2 100–4 300)	21 000 (14 000–28 000)
Tanzania	1 400 000 (1 200 000–1 600 000)	4.7% (4.2%–5.3%)	1 300 000 (1 200 000–1 500 000)	780 000 (700 000–870 000)	91 000 (77 000–110 000)	36 000 (29 000–42 000)	790 000 (700 000–880 000)
Uganda	1 500 000 (1 300 000–1 600 000)	7.1% (6.6%–7.7%)	1 400 000 (1 300 000–1 500 000)	790 000 (730 000–870 000)	96 000 (84 000–110 000)	28 000 (22 000–35 000)	660 000 (550 000–790 000)

Source: UNAIDS regional and country estimates (http://www.unaids.org/en/regionscountries/countries/).

Table 5

People living with HIV/AIDS, and deaths and orphans due to AIDS in Southern African countries in 2015.

Countries	People living with HIV (No.)	Prevalence rate Adults aged 15–49	Living with HIV (No.)			AIDS-relative	
			Adults (age ⩾ 15)	Women (age ⩾ 15)	Children (aged 0–14)	Deaths	Orphans (aged 0–17)
Angola	320 000 (220 000–440 000)	2.2% (1.5%–3.1%)	290 000 (200 000–410 000)	170 000 (120 000–240 000)	25 000 (17 000–37 000)	12 000 (6 900–19 000)	130 000 (85 000–190 000)
Botswana	350 000 (330 000–370 000)	22.2% (20.9%–23.4%)	340 000 (320 000–360 000)	190 000 (180 000–210 000)	8 500 (7300–10 000)	3 200 (2 800–3 600)	60 000 (51 000–66 000)
Lesotho	310 000 (280 000–330 000)	22.7% (20.8%–24.3%)	290 000 (270 000–320 000)	170 000 (160 000–190 000)	13 000 (12 000–14 000)	9 900 (8 700–11 000)	73 000 (59 000–83 000)
Madagascar	48 000 (39 000–58 000)	0.4% (0.3%–0.4%)	44 000 (36 000–154 000)	19 000 (16 000–23 000)	110 000 (81 000–160 000)	3 800 (3 300–4 400)	590 000 (430 000–790 000)
Malawi	980 000 (900 000–1 100 000)	9.1% (8.4%–9.9%)	890 000 (820 000–970 000)	540 000 (500 000–590 000)	84 000 (75 000–92 000)	27 000 (22 000–31 000)	530 000 (460 000–590 000)
Mauritius	8 200 (6 800–9 600)	0.9% (0.7%–1.1%)	8 100 (6 700–9 600)	2 000 (1 700–2 400)	N/A	< 500 (< 500–< 500)	N/A
Mozambique	1 500 000 (1 200 000–1 900 000)	10.5% (8.3%–13.3%)	1 400 000 (1 100 000–1 700 000)	830 000 (680 000–1 000 000)	3 800 (3 300–4 400)	32 000 (28 000–38 000)	41 000 (33 000–49 000)
Namibia	210 000 (200 000–230 000)	13.3% (12.2%–14.5%)	200 000 (190 000–220 000)	120 000 (110 000–130 000)	10 000 (9 400–11 000)	3 100 (2 500–3 900)	45 000 (36 000–52 000)
South Africa	7 000 000 (6 700 000–7 400 000)	19.2% (18.4%–20.0%)	6 700 000 (6 400 000–7 200 000)	4 000 000 (3 800 000–4 300 000)	240 000 (210 000–260 000)	180 000 (150 000–220 000)	2 100 000 (1 800 000–2 400 000)
Swaziland	220 000 (200 000–240 000)	28.8% (26.7%–30.5%)	210 000 (190 000–230 000)	120 000 (110 000–130 000)	10 000 (9 700–11 000)	3 800 (3 300–4 200)	47 000 (40 000–52 000)
Zambia	1 200 000 (1 200 000–1 300 000)	12.9% (12.3%–13.4%)	1 100 000 (1 100 000–1 200 000)	1 100 000 (1 100 000–1 200 000)	85 000 (77 000–94 000)	20 000 (16 000–24 000)	380 000 (310 000–450 000)
Zimbabwe	1 400 000 (1 300 000–1 500 000)	14.7% (13.3%–16.0%)	1 300 000 (1 200 000–1 500 000)	790 000 (720 000–860 000)	77 000 (68 000–86 000)	29 000 (25 000–34 000)	450 000 (400 000–500 000)

Source: UNAIDS regional and country estimates (http://www.unaids.org/en/regionscountries/countries/).

rates continue to increase yearly in countries like Kenya (from 5.3% in 2014 to 5.9% in 2015), Swaziland (from 27.0% in 2008 to 28.8% in 2015) and South Africa (from 18.0% in 2005 to 19.2% in 2015). There are modest declines in HIV prevalence rates in Namibia, Botswana, Zimbabwe and Malawi. As shown in Tables 4 and 5, these countries with high prevalence of HIV also were reported to have the highest number of women and children living with the virus, including the number of AIDS-related deaths and the number of orphans (aged 0–17)[18].

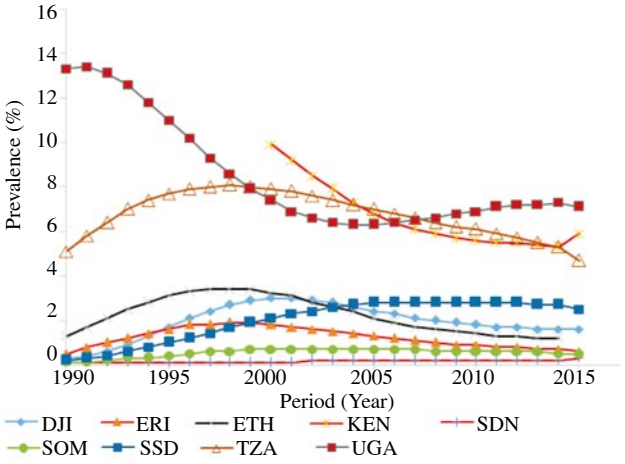

Figure 6. Prevalence of HIV in East African countries from 1990 to 2015, (aged 15–49).
DJI: Djibouti; ERI: Eritrea; ETH: Ethiopia; KEN: Kenya; SDN: Sudan; SOM: Somalia; SSD: South Sudan; TZA: Tanzania; UGA: Uganda.

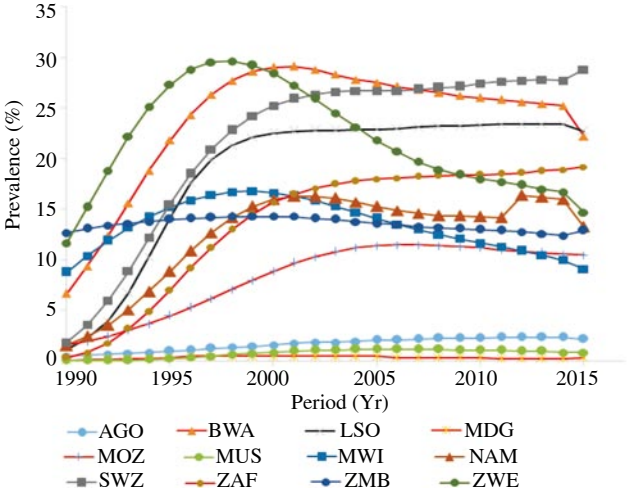

Figure 7. Prevalence of HIV in Southern African countries from 1990 to 2015 (percent of total population aged 15–49).
AGO: Angola; BWA: Botswana; LSO: Lesotho; MDG: Madagascar; MOZ: Mozambique; MUS: Mauritius; MWI: Malawi; NAM: Namibia; SWZ: Swaziland; ZAF: South Africa; ZMB: Zambia; ZWE: Zimbabwe.

3. Reasons for the high prevalence of HIV/AIDS in sub-Saharan Africa

As the search for the predominant cause of spread and immoderate occurrence of HIV in sub-Saharan Africa compared to different regions keeps on, there are two schools of thought that is believed to have contributed to the spread of the virus. Firstly, western countries were allegedly accused of fostering the spread of HIV within the black race, especially in Africa. On the other way round, researchers from the West have identified diverse African sexual practises as facilitators or promoters of HIV transmission in the region[19]. Additionally, history will never forget that leaders in Africa and international communities were sluggish to respond to the epidemic. The poor knowledge of HIV transmission mechanisms by Africans in addition to certain detrimental cultural beliefs tends to dwarf the giant strides being made by African and international stakeholders to eradicate the virus in Africa.

The main factor that fuelled the epidemic in Africa is the ignorance of the disease by the people. Even though it is regularly debatable and once in a while misleading to make generalisations, Africa has a huge variety of beliefs, habits, spiritual and healing practices. A few have been practised for many centuries. It's also true that cultural differences are obvious within and between nations. Common practices for which an ethnic group or a community is known, are crucial in preserving their cultural identity and continuity. However, some have damaging facets and ought to be discontinued or amended[20,21]. According to Faria *et al.*[22] and Barrera *et al.*[23], an intricate interplay of social, cultural, material, and behavioural factors forms the nature, process and outcome of the epidemic in Africa (Figure 8). This interaction of a couple of elements obscures causal linkages and prevents categorical conclusions. Therefore, no single factor in isolation could be said to be responsible for the spread of the virus in sub-Saharan Africa, as discussed later in this review. The HIV/AIDS epidemics in Africa are diverse, tricky and seem to progress unabated.

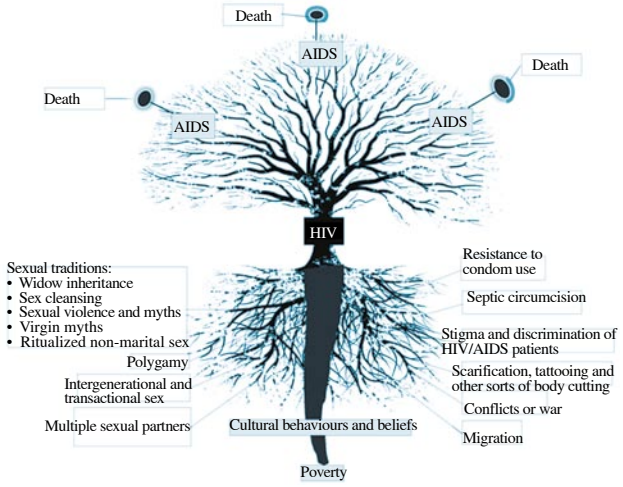

Figure 8. The schematic tree for the root causes of high prevalence of HIV and AIDS in sub-Saharan Africa.

3.1. The initial responses to HIV in Africa and the West

According to Meylakhs *et al.*[24], in the wake of the HIV epidemic in eighties, it became marred with scepticism and denial in Africa. As a result of burdensome structural adjustment programmes, and declining populations in the industrialised countries of the world, HIV/AIDS was seen and initially misconceived by some local and national leaders in Africa as a western ploy to stop Africans from

increasing demographically. That contributed to the reason why the acronym AIDS was popularly referred to as an 'American invention/idea to discourage/decrease sex or, in its French equivalent, SIDA, as 'syndrome imaginaire pour decourager les amoureux' (imaginary syndrome to discourage lovers)[24]. Thus, without many sources of competing information, this was sensible to folks toiling and suffering every day to make ends meet. However, it surely slowed the sort of response that was needed and the consequences had been tragic. The rejection by some authorities in many parts of Africa, for instance in South Africa, to the use of lifesaving antiretroviral drugs for treatment of HIV apparently resulted in the loss of many lives according to Tandwa (Tandwa, 2016 http://www.news24.com/SouthAfrica/News/mbeki-was-right-about-hiv-and-aids-researchers-20160310).

Although the attempt to deny the existence of HIV/AIDS is now receding, it has not disappeared among the younger generations. This is because many young people today in Africa have not yet believed in HIV existence but rather believed in the ancient idea that "what one does not know, cannot affect one." In 2007, the Archbishop of Maputo was said to have alleged that the West were exporting condoms contaminated with the virus to kill off Africans[25].

In the West, HIV was at first recognized to spread amongst gays and bisexual men, who engaged in unprotected intercourse. The public and health professionals were quickly educating the gay community in their large numbers in New York, San Francisco and other cities with large gay populations on the importance of using condoms. This made the rate of AIDS cases decline in those cities, creating the impression that condoms were the answer. In fact, the incidence and occurrence of AIDS went down quickly, by and large because gays reduced their sexual risk behaviours such as the number of sexual partners. A cutting-edge report showed that since the inception of HIV in US, the homosexual and bisexual guys, especially younger African American are possibly the most affected. Today in USA and other industrialized nations, the prevalence of HIV is less than 1%, unlike in some sub-Saharan Africa countries, such as Botswana, Lesotho and Swaziland with prevalence rate above 20%[26,27]. So, the quest for why sub-Saharan Africa is the most affected is yet a puzzle and an unanswered question. The undoubtable elements contributing to high prevalence of HIV in sub-Saharan Africa were shown schematically as a tree in Figure 8.

3.2. Cultural behaviours and beliefs

Sub-Saharan Africa has a huge variety of varying traditions among its nations which also vary from one locality to another. The cultural behaviours and beliefs as discussed later abounding in Africa include widow inheritance, postpartum abstinence, sexual cleansing, sexual violence, virgin myth, ritualized non-marital sex, circumcision, blood oath and all forms of body cutting. A large number of these traditions are seen as fundamental contributing variables to the raising HIV/AIDS pandemic in the area. However, there is a need to comprehend that the general population are doing it with genuine motives and something should be done to make those social practices free as a suspected vehicle for HIV transmission.

3.2.1. Widow inheritance

In the traditions of sub-Saharan African countries, like Kenya, Nigeria, Zimbabwe, *etc.*, widow inheritance is nonetheless one of the challenges of widowhood notably in the rural areas and it is very popular among African households. This means that a widow is obliged to choose and marry a member of her deceased husband's family. If any of the husband's family members do not show interest, then she is free to bring in any man into her house. It is called "Nhaka" (in the Shona language) in Zimbabwe. In South-East Nigeria, it is called "Nwaulo" (concubine) in local language[28,29].

Much like what was obtainable in the ancient Jewish tradition, the practice was meant to ensure protection and security to the widow and orphans. This is because they believe that the husband's circle of relatives had paid the dowry before wedding with the woman, and that routinely made the widow an inherited asset of her husband. This takes after the rule that, when a man kicks the bucket, the spouse ought to be acquired and as an acquired lady, she can't utilize a condom (it is skin to skin). Nevertheless, in this situation, HIV test isn't customarily considered before sexual activity. Thus, if the widow's better half dies of AIDS-related causes, the new spouse will be exposed or it could be the new husband who will infect the widow. That will make HIV spread from home to home. On the off chance that the offer is turned down by the widow, she may face excommunication or outcaste by the late husband's family[30]. It has been reported that there are homes where all the males have died due to this widow inheritance and this may be accountable for the high rate of HIV in regions where such practices is still in existence[31]. There is a dire need to make enactment in African nations to bring an end to this tradition officially.

3.2.2. Postpartum sexual abstinence

In reality, individuals in a specific situation can be presented to more serious danger of HIV as a consequence of their cultural beliefs. In numerous parts of sub-Saharan Africa, breastfeeding implies sexual restraint of women. Therefore, men are not allowed to have sex with their spouses during pregnancy and breastfeeding to keep away from harming or infecting the infant. To worsen the scenario, in a few rural communities, women generally breastfeed their toddlers for an average of 365 days or more. This notion is meant to allow the woman to space out births naturally[32].

It was reported in Malawi that men who did not have sexual relationship with their spouses during breastfeeding were more exposed to risk-taking behaviour than folks who did continue to have intercourse with their wives[33]. Likewise, another study in Southern Benin, showed that over half (32%) of men met favoured extra-marital relations during postpartum abstinence period of wives[34]. This could be exceptionally dangerous to both men and women of all ages, especially in this era of HIV/AIDS scourge.

3.2.3. Sexual cleansing

This practice is popular in some parts of Zambia, Uganda, Kenya, Tanzania, Mozambique, Senegal, Ghana and Nigeria. To keep this custom, the widow will have to be cleaned sexually or else she may in no way be able to marry again. This is an exceptionally normal

practice in a few areas in which the deceased man's relative engages in sexual relations with a widow in the conviction that this will dispel evil forces within the circle of relatives[35].

Therefore, on this drawback, women are compelled to have sexual intimacy with a man generally referred to as sex cleaner or "namandwa", without any form of protection. However, in Malawi, efforts have been made to educate sex cleaners on the essentials of condom use while they are performing any of such kind of custom[36]. Frankly speaking, traditional rituals could be amended in a way to admire such way of life without causing harms. In Malawi for instance, during such practises according to Banda and Kunkeyani, cleaners are forced to use condom, and in any other case the cleaner might be suspended or expelled from the healers if he engaged in an unprotected intercourse with a widow[36].

3.2.4. Sexual violence and myths

In sub-Saharan Africa, as talked about beforehand, young ladies represent more than 75% of HIV infected patients and are around three times more prone to be infected than young fellows of the same age. Things being what they are, what makes young ladies so disproportionately vulnerable and why large contemporary HIV/AIDS manage efforts could not stem the scourge in women and girls? The reports of high rates of HIV infection in women have brought into sharp focal point that the problem of gender-based violence unleashed on women. There is a growing cognizance that women and girls' danger of and vulnerability to HIV infection are formed by profound established and pervasive sexual orientation imbalances, namely, savagery against them in exact[37,38].

The sexual brutality executed by an intimate partner is across the board in sub-Saharan Africa. In spite of the fact that it has been in existence for centuries within the worldwide culture, sexual assault is neither a custom nor a convention in any place. A case in point is that in Africa, it is typical for a husband to have intercourse with his wife whenever as he desires, and it's far a custom that the spouse cannot reject it. In others words, it makes it appear as if sexual brutality is a way of life[39].

The connections between intimate partner brutality and HIV/AIDS are clarified by biological, also sociocultural and economic variables. They encompass direct transmission through sexual savagery, backhanded transmission through sexual risk taking, and indirect transmission via incapability to bargain for condom use, aberrant transmission by cooperating with more dangerous/more seasoned men, and brutality as a result of being HIV positive. One of the main routes of HIV and STIs transmission to women is forced sex, especially with an infected partner. The odds of contracting HIV is higher as a consequence of STI, level of injury, vaginal cuts and scraped spots that happen when force is utilized[40,41].

Researches have shown that women's experience of violence is linked to increased risk-taking together with having numerous sexual companions, non-primary partners (or partnerships outside marriage) or engaging in transactional sexual intercourse[42]. For example, one study in South Africa confirmed that women who experienced intimate partner violence were three instances much more likely to engage in transactional sex than women who did not experience gender-based violence. Moreover, females who were reported to have transactional sex and had non-primary sexual companions had one and half fold higher odds of being HIV infected than those who were not report to engage in transactional intercourse[43]. There is also another report that 27.6% of all men interviewed have had forced sex with a woman or girl, and about half (42.4%) have been physically violent to their intimate sexual partner[44].

A similar study in Tanzania compared HIV-negative and HIV-positive young women and observed that HIV-positive women were 7–10 times more inclined to have been subjected to undesirable sex through assault, beatings or different forms of coercion[45]. Also, in terms of rape crimes, Zimbabwe took the 9th position globally and it is on report that at least a woman is raped every 1 h 30 min in Zimbabwe. Zimbabwe countrywide statistics show that 500 women had been sexually abused monthly, namely, about 16 women being raped every day. In the case of child rape, according to Bulawayo24 News (http://bulawayo24.com/index-id-news-sc-national-byo-50485.html), it increased from 2 192 in 2010 to 3 112 in 2014. It is noteworthy that numerous instances of sexual assault in Africa went unreported in an atmosphere of mystery and dissent.

Today, sexual violence has been still talked as a vital issue that contributes to women's HIV risk. It's an evidence that a forced sexual intercourse may well cause pain, harm and other damage that could encourage HIV transmission. Notwithstanding, investigation on the connection between partner violence, male dominance and HIV infection is needed in all sub-Saharan Africa nations to ascertain why women are more affected by the virus.

3.2.5. Virgin cleansing fable

In some localities and ethnic groups, people wrongly believe that having sexual intercourse with a young girl, particularly a virgin including children and babies, cures disease including HIV/AIDS. So, it follows the precept that the more youthful the virgin, the more effective the therapy. Although an equivalent myth prevailed on the subject of syphilis and gonorrhoea (in the Dark Ages of medieval Europe), brothels were set up in Liverpool since 1827 to provide this cure. It's far obvious that this perception is untrue and scientifically baseless[46].

People believe virgins have magical and mysterious powers to get them rid of impurity after sexual contact. In some countries, like Zambia, Zimbabwe, Nigeria, and particularly in South Africa in which South African national crime statistics (https://africacheck.org/factsheets/guide-rape-statis tics-in-south-africa/) reported that the rate of rape of minors is rising and infant rape is not a new phenomenon, but recent media attention, particularly on infant rape, appears to show that it is on the increase in South Africa according to reported cases in 2014 (43 195 rape cases)[47].

3.2.6. Ritualised non-marital sexual intercourse

It is not astonishing that in some ethnic gatherings across the African subregions, premarital and extramarital sexual intercourse are ritualized. According to Butler (in BBC Magazine http://www.bbc.com/news/magazine-36843769), the most traumatic cultural exercise is the ritualised sexual initiation of prepubescent and

pubescent young girls among the Chewa and Yao ethnic groups of Malawi. The practice is regarded as "fisi" (hyena in the local language). It entails sexual activities between a grown-up man and pre-adult young ladies on the finish of an initiation ceremony and it takes exceptional forms. The ritual ceremony begins with instructing men and pre-adult young ladies on the roles they will play in the process, followed by keeping all of them together in doors for several weeks. Three to four male instructors will have sexual intercourse with the girls at the close of the period of seclusion. In keeping with local notion, the procedure enhances and ensures the fertility of the girls. Therefore, before a young lady gets married, she must have gone through the ritual processes. As the nearby saying goes, 'No fisi, no spouse'[36]. Another form of "fisi" is ritualised extramarital sex in form of a consensual adultery. If a woman has undergone "fisi" ritual and does not get pregnant, the husband can hire another man to have sex with his wife to impregnate her[48]. Another form of this practice in Nigeria according to Ezeh[49] and Finer *et al.*[50], is a situation where an impotent husband forces the wife to engage in extramarital affair in order to get pregnant for him. And in some local traditions, in a family without a male child, the first or second daughter is obliged to have premarital sex with anyone to produce a male child for her father. The most striking form of this fetish tradition is "fisi" known as "kulongosola mwana" (taking the baby back). It is situation where nursing mother is expected to sleep with another man before the husband resumes sexual relations with her. The HIV/AIDS status of the men who play the "fisi" function may not be known, thereby making women both married and unmarried more prone to an unmeasurable risk of infection.

Furthermore, some funeral rituals are said to involve sexual licence. This practice is peculiar in Kenya, among Luhya people of Wanga, for instance, in the recognition of the dead (lung'anyo, or returning to the shadow of the dead), and it involves all the married members of the community. It usually takes place a month after the person's death. It is based on the idea that the spirit of the deceased person needs to be provided with a peaceful entry into the spirit world. The custom encourages the procedure by purging the living from disasters and shame connecting with the dead and furthermore remembers and conciliates the dead. It consists of eating, drinking and dancing, and culminates in sexual intercourse among those gathered, married and unmarried. Pregnancies that entail this custom are believed to be the rebirth of the deceased[30]. The use of protection in such a ceremony may be forbidden as it defeats the ideology of reincarnation through sexual intercourse. Such multiple acts of sexual intercourse create the opportunity for the spread of HIV.

3.2.7. Imperviousness to condom use

Before HIV infection was discovered, condom use was by one means or another peripheral in Africa. It had in no way been certainly a sturdy contraceptive method in Africa for family planning, given that contraception is not a subject of most of African. Unlike before, condom use was meant for family planning and prostitution. However, in these days, new technology has improved condom manufacturing which is used as one of the HIV prevention packages and it has reached successfully to the target market. More and more risk groups are being educated on how to use condom although few use it. Nevertheless, many studies revealed that the knowledge about HIV risk does not markedly translate into amendment of harmful sexual behaviours. By and large, the utilization of condom in sub-Saharan Africa is still low and that might be as a consequence of socio-cultural connection[51].

Rejection of condom in Africa, and additionally in Asia, is backed up by customary thoughts, negative constructions against AIDS and solid deception on condoms. One of the main contributors is gender inequity around sexual issues, which is a problem that needed to be approached in the context of HIV infection. Men for all intents and purposes dominate women, and women are in weak position to negotiate safer sex[52].

In Africa, sex is the most unthinkable subject to be approached because the fundamental norm is that sexual intercourse is a thing to be done and not to be discussed openly about. In fact, sex is not routinely talked about straightforwardly nor discussed openly. Individuals who dare approach sexuality are thought of, as having gotten a wrong moral or education or are related to sex workers[53]. This is one of the reasons why efforts to abate the spread of the virus is not encouraging in sub-Saharan Africa.

Two lines of arguments stand clear in the issue of condom use for HIV prevention. Some religious groups have noted that condom use advances promiscuity and flippancy in relationship, and limits birth artificially, while other secular groups advocated condom use, supported by a concept known as 'safe sex'. While these religious bodies argued that the concept of safe sex leads to moral decadence and occasional condom failure, with abstinence advocated as the best option, other bodies have campaigned that condom use remains one of the best HIV prevention technique since the condoms are usually not manufactured with holes or nettings that enable viral passage[54]. In any case, some individuals in Africa hold the notion that condom is hard to put on and lessen delight in sex. Others have cling to the wrong ideas that STIs (including HIV) can be prevented by taking antibiotics before or after sexual intercourse, and again, someone's HIV status can be ascertained from their bodily appearance, and therefore condom use is pointless[55].

3.2.8. Conventional surgical procedures

3.2.8.1. Male circumcision

The act of male circumcision has been a social practice dated back to historic Jewish religion, and it is practised widely throughout Africa, in some Pacific Island cultures, and also in Muslim religion. The culture occurs in broader population of such communities and it is justified as a preventive and hygienic intervention. In most sub-Saharan African nations, circumcision is usually played out on different occasions such as some days after delivery, for initiation to adulthood, for social propensities and for religious purposes. Usually in these kinds of ceremonies, group circumcision is usually performed with the same blade and there is greater risk of HIV transmission[56]. In any case, health experts have been hesitant to coordinate and integrate male circumcision as an open measure for

HIV counteractive action in view of a shortage of solid exploratory data on the issue, and on the grounds that the methodology itself could encourage transmission if the equipment used is not sterile, and might leave an injury that is risky until recuperating have happened.

There are reports that male circumcision provides significant protection against STIs such as syphilis and gonorrhoea, including HIV infection, and circumcised males are two to eight times less likely to become infected with HIV. In line with the report, the foreskin offers a portal of entry and it is also at risk of traumatic epithelial disruption during sexual intercourse. Keratinisation of circumcised penis might lessen the risk of HIV penetration, especially if it is at early childhood. They have also found that where there are most of the men uncircumcised, STDs are more common, which implies that the rate of HIV transmission will increase[57].

In contrast, Ediau *et al.* posed an argument that circumcised men have greater chance of contracting HIV than others considering that their prepuce have been removed, and an intact prepuce may offer a protective effect against HIV due to the fact that lysozyme beneath the prepuce contains an agent for killing HIV *in vitro*[58]. There is now compelling evidence that male circumcision reduces the risk of heterosexually acquired HIV infection in men by approximately 60%[58]. Recently, WHO performed three randomized controlled trials which have shown that male circumcision is safe. That made WHO and USAIDS suggest and emphasize that male circumcision needs to be taken into consideration as an efficacious intervention for HIV prevention in regions and countries with heterosexual epidemics, high HIV prevalence and low male circumcision incidence[59].

3.2.8.2. Female circumcision

According to WHO, this social practice is otherwise known as female genital mutilation (FGM) and there is a robust advocacy motion highlighting the destructive impacts of such act. FGM is of three levels depending on what is removed and the most hurtful of all is kind III. This is a procedure having different names depending on what is excised like vulvectomy, clitoridectomy, infibulation or pharaonic circumcision that is body parts like clitoris, labia minora, and labia majora are cut out, then stitched or held together leaving a little exit for pee and monthly cycle blood. This is broadly viewed as a grave and harmful abuse that denies the essential human rights of the women, who are then referred to as victims or survivors of the technique. The main reasons behind FGM mentioned above are the protection of custom and tradition, gender identity, control of girls' sexuality, hygiene, avoidance of discrimination and health issues[60]. Lamentably, this practice is just a social life of communities and is apparently, not religious beliefs.

FGM is practiced by Muslims and non-Muslims in Egypt, Eastern, Central and Western Africa. A lighter form of the procedure is being practiced in some parts of Middle East and South Asia. This is usually done customarily using the same blade, but in some countries, wealthy families usually seek the services of medical personal so as to keep away from the related peril[61].

There is a robust opposition to FGM by human right groups and health professional bodies against all forms of FGM because of the associated risks like extreme pain, immoderate bleeding, shock, genital tissue swelling due to inflammation, STI transmission, urination problems, impaired wound healing, menstrual problems, death and mental outcomes[62].

Even though this practice is being executed secretly, in the meantime, all efforts should be made to minimise the harms without condoning or encouraging FGM, even when the practice has been criminalised.

3.2.9. Practices of other body cuttings and blood oath/rituals

In Africa and different other societies all over the world, numerous ethnic groups practice tattooing, scarification and others sorts of body cutting, that have their starting points in historic human records. The scarification is an unchangeable form of cosmetic surgical treatment that punctures or cuts styles and themes are made into the dermis or upper levels of skin, for body embellishment. In sub-Saharan Africa, the practice is famous among many tribes which dates back centuries. The practice is performed for a few reasons: beauty, costumes, curing some illness or increasing delight during intercourse. The normal facial scarification is performed by all individuals from a tribe, a family, or a community as a sign to recognize each other[63,64]. Nowadays, the exercise is dying gradually due to innovation and furthermore because in a few nations, it is prohibited.

Regardless of the purpose, the truth is that once a sharp tool (needle, razor, knife, and so forth) pierces a person's skin, blood and tissue fragments will adhere to the tool. Then whilst the same tool is used, and the blood and fragment is specifically exchanged to the circulation system of the next individual. To date, there are no studies that have specifically linked these practices to the spread of HIV, especially given clear knowledge about modes of transmission. The existence of a certain risk related to sharing tools is widely recognized[65].

In addition, other rituals among some groups require exposure to human or animal blood. It is referred to the practice called brotherhood which is widespread in East and Central Africa among pastoral groups such as Masai tribe. The practice consists of exchange of venous blood following a small cut. Thereafter people become a blood brother. Thus, in some West Africa tribes, a practice called blood pact or oath also exists, in which two or many persons gather in secrecy, cut themselves slightly and suck mutually the blood of each other. This act means that they promise one another to remain faithful in love or friendship until the end of their life. Basically, the blood brotherhood and blood pact have the same meaning. This kind of friendship is nearly vanished in urban areas due to western civilisation[66,67].

3.3. Multiple sexual partners

Within African societies, the tradition and customs of polygamy, intergenerational and transactional/value-based sex are very rife. The primary motivation that men marry several women is to have many kids that will grow up and inherit their fathers' house, land and so on. Children in Africa are great assets. Conversely, childlessness

remains the main cause of divorce, as a childless marriage is taken into consideration to be equivalent to no marriage in any respect. As there is no social insurance system, people traditionally have a large family to ensure an adequate workforce within the family, and have children that will care for them when they get older. In the light of this, even a monogamous man could possibly change to polygamy if his first spouse does not give birth in the few years following marriage. In the same way, a man whose wife gives birth to daughters only will likely consider marrying another woman in order to have a male child. In Africa, any baby is welcome yet people think that men are more superior and capable to lead a family. Also, men marry many wives to show their economic power and it is consistent with some customs, a man who is able to marry and maintain a lot of wives is admired for his manhood[68,69].

As a consequence of destitution particularly among African women, some of them resort to intergenerational and value-based sexual acts. People who engage in such act cannot be termed sex-workers (even if the acts share many features) because they do it in a few occasions to resolve a specific troubles or desires, which will not become their occupation. In some societies, poverty makes certain families vulnerable to old but rich married men who sexually exploit young ladies in such families in exchange for social welfare benefits for the girl and her family. In a few occasions, the old man may eventually marry off the young girl as a second or third wife. This can also be called "sugar daddies". Research has shown plainly that this kind of relationship is a central point in the feminisation of AIDS in Africa[70]. Intergenerational sex is suspected to lead the high rates of infection among African girls. Some studies even showed that young women in sub-Sahara are up to 6 times more prone to be HIV positive than young men[71].

Certainly or unequivocally, according to Adogu *et al.*[72], every one of these practices introduces a system of unprotected sex which is a risk for all groups. HIV spreads when people have more than one sexual partner and condoms are not used consistently. Transgenerational sex suggests infidelity and increases extramarital unprotected sex. Precisely, in Africa according to the custom, schoolgirls engage in such relation to earn money and maybe to take good care of their family. Such customary practices foster value-based and intergenerational sex. The worst is that, in some areas it seems the families take pride when their daughter is engaged in relationship with her teacher[72]. In conformity with what has been explained above, all these examples show an imperative method for HIV infection spread which is profoundly established in most African sub-Saharan nations.

3.4. Poverty, conflict/war, migration and HIV/AIDS

It is no longer hidden that poverty, conflict, migration and displacement of vulnerable population have contributed immensely to the widespread of HIV in sub-Saharan Africa. The old assumption that vulnerable individuals in Africa will eventually become infected with HIV and add to the number of already infected individuals in sub-Saharan African countries is becoming increasingly possible. A robust relationship between poverty, conflict, migration and HIV/AIDS have been reported[73]. Therefore, poverty is characterized by limited human and monetary resources, and it exhibits as a risk factor to HIV/AIDS. The link that has arisen between poverty and HIV/AIDS over the years has led to the conclusion that "poverty and HIV/AIDS are interrelated". Research also confirmed both the quantitative and qualitative elements of this dynamic relationship. However, the exact nature of the relationship is relatively ambiguous. Indeed the way in which the relationship is consummated varies from person to person[74]. This is principally not far from the truth for the sub-Saharan African countries where the poverty has eaten deep in the population.

Political unsteadiness and struggle contribute to the spread of HIV/AIDS in various ways. Since the end of the cold war, armed conflicts, defined as a known armed violent clash among more than two well organised parties with continuity between the clashes in disputes about power over government and territory, have changed from being primarily interstate to intrastate. Most of the known armed conflicts were as a result of internal conflict. Countries experiencing political and/or financial instability are more susceptible to diseases such as HIV/AIDS. During conflict or war, people become extremely vulnerable to HIV infection. Soldiers are living in a stressful environment, separated from their family, while civilians would be more prone to sexual assaults and have to survive in situations of abject poverty, which may push them into selling of sex for survival (also known as survival sex). Moreover, conflicts disrupt social institutions and family life, largely because of wars and conflicts, regularly prompt migration or displacement of individuals[75,76].

Also, migration has been a catalyst in the rapid spread of HIV and the relation between population mobility and the spread of HIV/AIDS is not undisputed. The spread of infectious diseases that are transmitted from person to person will follow the movement of people. To distinguish amongst classes of migrants, the word migrant is normally restricted to those who move for voluntary motives (internally or internationally), whilst refugees and internally displaced persons are individuals who move involuntarily (generally because of wars or other violent conflicts, however, also because of human rights abuse). The problems of refugees and internally displaced persons are similar to those of all migrants, but the fundamental problems are usually exacerbated[77]. The extent of migration can explain the dissimilarity in HIV prevalence figures in different parts of Africa. In the case of Southern Africa, the generally seasonal or transitory way of migration (especially labour migration), with migrants returning home to their households on a regular basis, has facilitated the rapid unfolding of HIV/AIDS in a way. For instance, a study in South Africa determining if there is association between migrant miners and HIV, suggested and showed that migrant miners in South Africa directly or indirectly contributed to the spread of the virus in Swaziland and Lesotho[78,79].

The casual relationship between poverty, conflict, population mobility/migration and HIV transmission was shown in Figure 9. War or conflict leads to poverty or vice versa. Poverty increases the risk of HIV/AIDS when it propels the unemployed into unskilled migratory labour force in search of work that is usually transitory and/or seasonal, which increases their risk of HIV/AIDS. Poverty also

drives girls and women to risk behaviours like exchanging sex for food, and to resort to sex work for survival when they are excluded from formal area of employment and all alternative work may be too low-paying to cover their basic needs[80,81].

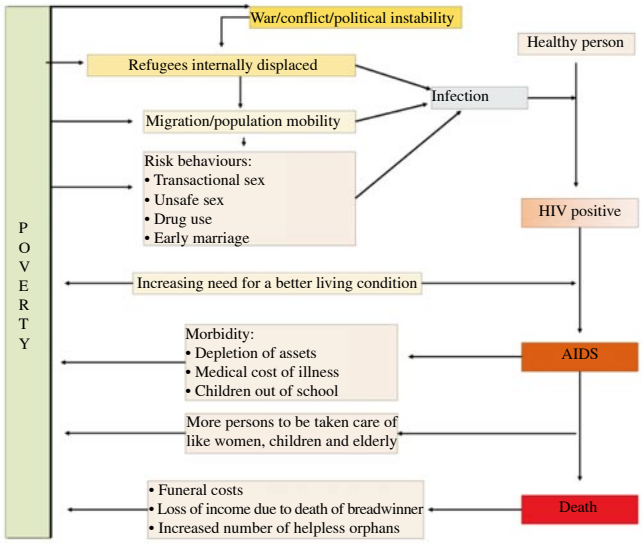

Figure 9. Inter-relationship between poverty, conflicts, migration and HIV transmission.

4. Blood transfusion and HIV

According to WHO (WHO, 2014 http://www.aho.afro.who.int/pt-pt/blog/2014/08/07/blood-safety-and-maternal-mortality-african-region), HIV transmission has been correlated with poor blood transfusion services in resource-limited areas of the world. This is especially true in sub-Saharan Africa where there are inadequate blood screening facilities and poor monitoring of blood transfusion centers. This problem is further heightened by the poor economic status of the people, leading to the presence of people who donate blood for monetary gains and a higher HIV transmission. Using serological tools, Okocha *et al.* showed a high HIV prevalence of 3.1% in 1410 prospective blood donors in a Nigerian Teaching Hospital[82].

5. HIV/AIDS associated stigma and discrimination

Although several factors implicated as a main impetus of the pandemic in this region have been discussed, HIV/AIDS-related stigma is the most important single barrier and threat to controlling HIV/AIDS pandemic in sub-Saharan Africa. In sub-Saharan Africa, stigmatization of HIV/AIDS patients have been described as various forms such as moral, physical, and social stigma. The physical stigma is evident when HIV negative individuals do not want to sleep, share meal, drink with the same cup, *etc.*, with people known to be HIV positive. This form of stigma is the worst due to the immoral perception of HIV patients as being promiscuous, unfaithful to their partners and being rebuffed by God as a consequence of their immorality. Moral stigma has a tendency to be linked to physical stigma and it is possible that it is the cause of physical stigma. The other form of stigma is social stigma which has been associated with vulnerable groups such as commercial sex workers and lorry drivers who acquire HIV/AIDS as they are more likely to be promiscuous and unfaithful than other social groups. Researchers argue that social stigma does not flourish alone in communities as it is usually interlinked with moral and physical stigma[9,83].

HIV/AIDS-related stigma is pervasive in many ethnic groups in sub-Saharan Africa and numerous factors have nurtured HIV/AID-associated stigma to become pervasive such as ignorance of the mode of transmission of the disease, the notion that the patients got HIV through only unprotected sex, incurable nature of the disease, physical impairments, loss of weight and disfigurement[84].

There are reports that HIV/AIDS-related stigma and discrimination have resulted in losing jobs and lodges for HIV patients, including difficulty in accessing healthcare and education among people living with the virus. HIV/AIDS positive patients have also suffered stigma and discrimination in the family, at church and marriage institution. A culture of denial exists among some families that had HIV positive individuals. Such families conceal victims from the public and stop them from accessing health care due to HIV/AIDS-associated stigma. Studies have shown that due to HIV/AIDS-related stigma, persons who intend to get married are compelled to do a HIV test before any marriage rites which can be performed and those who are found positive were not encouraged to get married especially when the other partner is free of the virus[85].

Although strenuous efforts have been made to discourage stigmatization and discrimination of HIV/AIDS patients in sub-Saharan Africa, there is more need to be done. There is now a matter of urgency to intensify HIV/AIDS education, and including it in school curriculum at almost every level. Also there is a need for everybody in a community to treat persons living with HIV/AIDS as normal people. Governments should ensure that people living with HIV/AIDS have equal access to education, healthcare, housing and jobs. Also, the fundamental rights of persons living with the virus should adequately be promoted.

6. The key affected populations in sub-Saharan Africa

According to AVERT (http://www.avert.org/professionals/hiv-social-issues/key-affected-populations), in this subregion, the risk groups are those who for one reason or another are more prone to acquire the virus. It could be as a result of their high-risk behaviours including drug injection, or the fear of accessing lifesaving drugs as a result of societal marginalization. In order to achieve the vision of reducing new cases of HIV transmission to zero, the following groups should be targeted with fitting preventive programmes, information and services. They include people who inject drugs, sex workers, men who have sex with men, prisoners, transgender people, women, kids, young persons and adolescents.

6.1. People who inject drugs

United Nations Office on Drugs and Crime (UNODC, 2015 http://www.unodc.org/documents/wdr2015/ World_Drug_Report_2015.pdf) reported that people who use drugs intravenously have high risk of contracting the virus and it accounts for ever increasing proportion of those living with the virus. Researches have shown

that the prevalence rate of HIV in people in this group is 28 times more compared to the rest of the population. In addition, apart from sub-Saharan Africa, almost one third of global HIV infections are due to injecting of drugs. The reasons why this group is at risk of HIV transmission include sharing of needles, criminalisation and marginalisation (drug paraphernalia laws), poverty, imprisonment and detention experience. In spite of the high risk of acquiring HIV through this means, this group lack the access to HIV prevention, healthcare and treatment[86].

6.2. Men who have sex with men

There is a report that men who have sex with men are 19 times more likely to be living with the virus than the people in general. With the exception of countries such as Nigeria, there are relatively few epidemiological studies of HIV infection among homosexuals in the region. Due to the illegality of same-sex marriage in most sub-Saharan African countries, these groups of people are usually not covered in most national HIV/AIDS epidemiological studies and control programs in the region[87].

However, the majority of Africa nations have continued to ignore, infringe on and abuse the human rights of this group. According to United Nations Population Fund (UNPF, 2015 http://www.unfpa.org/sites /default/files/pub-pdf/MSMIT_for_Web.pdf), this population has been driven underground in many countries with punitive laws, thereby increasing their risk of acquiring HIV and stopping them from accessing healthcare including HIV services. The following factors put this group at risk of acquiring HIV: sexual relations within this group; biological factors like unprotected anal sex. There is a higher risk of HIV transmission through anal sex than vaginal sex due to the fact that the wall of the anus is thin and can be torn easily, thereby creating a point of entry of the virus into the bloodstream. Other reasons include behavioural factors like inconsistent use of condoms, presences of commercial blood donors and alcoholism[88].

6.3. Sex workers

According to the UNAIDS prevention gap report (UNAIDS, 2016 http://www.unaids.org/en/resources/documents/2016/prevention-gap), sex workers are among the highest risk of groups for HIV. The prevalence of HIV among this group in low- and middle-income countries is estimated to be 12%. This, however, varies significantly between regions and countries. A study conducted in sixteen sub-Saharan Africa countries showed that the sex workers have an average HIV prevalence of 37%. They also reported a prevalence of eight times higher compared to the general population in Ghana and Nigeria. However, this group usually share common factors, irrespective of their background and the following are the reasons why they are particularly at risk of HIV transmission: inconsistent condom use; multiple partners; stigmatization, marginalization and criminalization of the act and rape[89,90].

6.4. Prisoners

According to reports from HIV Justice Network (http://www.hivjustice.net/wp-content/uploads/2016/05/AHJ2.final2_.10May2016.pdf) and Institute for Criminal Research (ICPR, http://www.prisonstudies.org/highest-to-lowest/occupancy-level?field_region_ taxonomy_tid=All), the prevalence among prisons varies and is higher in incarcerated women. The HIV prevention and education programmes are rarely made available to inmates and many prisoners living with HIV, and they lack the access to life-saving antiretroviral treatment. Prisons are fertile and the high risk environment for acquiring HIV due to the following reasons: sharing of needles and drug use, high-risk sex, use of unsterile equipment for tattooing and rape. Prisoners are at risk of becoming ill as a result of violence, malnutrition, drugs, overcrowding as well as stress.

6.5. Transgender people

There are about 25 million transgender persons living around the world today and they are one of the groups mostly affected by the HIV scourge. These are the group whose gender identity and expression are not aligned to social expectations of their biological sex at birth. They are at risk of HIV as a result of overlapping legal, social, cultural and economic factors, sex work as viable option for source of income, and hormone injection is common form of gender enhancement[91].

6.6. Women, children and adolescent people

As previously shown, in many regions, women are mostly affected by HIV infection than men, since the start of the epidemic. Also, among the young people with new cases of infection, and young women and adolescent girls account for a disproportionate number of new cases. Women are at higher risk of contracting the virus due to intimate partner violence, gender inequality, lack of the access to healthcare services and education. Also, children are at risk of acquiring the virus due to mother-to-child transmission, sexual transmission and injecting of drugs[92]. Young people may belong to all the groups at risk previously discussed.

7. Impacts of HIV/AIDS on sub-Saharan Africa

The effect and the impact of HIV/AIDS in this region is being felt in almost all sectors of development. HIV/AIDS scourge has resulted in the following consequences in sub-Saharan Africa: increased number of HIV patients which demands more trained health personnel; increased level of poverty, health care cost and financial burden of funeral ceremony; increased burden of responsibilities on children or orphans in affected homes; decreased the number of school enrolments as a result of financial burden, decreased fertility and birth rate, decreased in skilled labour force, economic and social progress (Age between 15 and 49 is the most affected) [93]. The economic and social impact of this pandemic is worsening as a result of economic meltdown in most nations. Alteration in the population structure and dynamics has been recognized as a significant impact of this infection in sub-Saharan Africa. This is due to its high prevalence among the mid-age groups and its attendant

high mortality among such people[94].

The HIV/AIDS pandemic have been hinted to have profound effects on the economic progress of Africa. This infection has led to a diminished labour force in this region, with attendant reduction in agricultural productivity, increased poverty levels and economic stagnancy. The high mortality and morbidity associated with HIV infection cause a decrease in the tax returns and an attendant increase in government spending, leading to a decline in economic growth. There is also loss of skilled personnel in core sectors of the economy and an increased importation of expensive antiretroviral drugs into the Africa region[95]. Using a macroeconomic model, Maijama *et al.* hinted the long-term devastating effects of HIV/AIDS on African economy, thus requiring interventions from the international community[96].

8. Preventive strategies

The HIV prevention programmes and interventions are aiming at reducing the transmission of the virus. They are actualized to either protect communities and their dwells or are carried out as public health policies. At first, HIV prevention programmes concentrated basically on keeping the sexual transmission of the virus via behaviour change. For various years, the slogan ABC approach – "Abstain from sex, Be faithful to your partner, use a Condom well and consistently", was utilized as a part of reaction to the developing pestilence in sub-Saharan Africa.

In any case, by the mid-2000s, it got to be apparent that powerful HIV prevention needs to consider basic economic, socio-cultural, political, legitimate and other contextual factors. As the intricate way of the worldwide HIV pandemic has turned out to be clear, types of 'mix counteractive action' have supplanted ABC-sort approaches to a great extent. For carrying out an effective HIV prevention strategy, an effective combination of behavioural, structural and biomedical interventions is required[97].

According to UNAIDS report (http://www.unaids.org/ en/media/unaids/contentassets/documents/pcb/2012/20120516_ThematicSegment_background_paper_en.pdf), a combinative prevention programme should consider factors specific to each setting, including the degree of infrastructure development, local culture and custom as well as populace most affected by HIV. They can be executed at the individual, group and populace levels. UNAIDS (http://www.unaids.org/en/resources/documents/2016/prevention-gap) has called for consolidated ways to deal with scaled-up HIV prevention, to reinvigorate the worldwide reaction and to have a managed effect on worldwide HIV occurrence rates.

"Know your epidemic, know your response" is the first approach for combinative prevention programme, and it is comprised of a series of exercises to aid in categorisation of the epidemic (such as generalised or concentrated). According to UNAIDS (http://www.unaids.org/ en/media/unaids/contentassets/documents/pcb/2012/20120516_ThematicSegment_background_paper_en.pdf), this includes looking at some factors such as HIV transmission modes, key affected people and key epidemiological trends (that is the number of new cases of HIV among young people). The planning process should be inclusive based on known evidence, aware of the modes of virus transmission and the most affected populace, and should determine and identify the geographic variations in HIV prevalence and structural factors that might fuel it, and identify the number of main affected populace. Once these factors are known, then a package of ordered biomedical, behavioural and structural prevention interventions on HIV can be developed and implemented.

8.1. Behavioural interventions

The UK Consortium on AIDS and International Development (http://stopaids. org.uk/wp-content/uploads/2013/08/Combination-Prevention.pdf) is of the opinion that this intervention aims at reducing the danger of HIV transmission by addressing the unsafe practices, such as decreaseing the number of sexual partners, enhancing treatment adherence among HIV positive patients, increasing the utilization of clean needles among individuals who infuse medications, or increasing in the steady and right utilization of condoms. To date, these forms of interventions have been the most successfully demonstrated. The case of behavioural interventions are information provision (such as sex instruction), counselling and different types of psycho-social backing, safe new born child sustaining guidelines, stigma and segregation lessening programs and money exchange programmes[98].

8.2. Biomedical interventions

This intervention approach utilizes a blend of clinical and therapeutic ways to diminish HIV transmission. One of the instances of this approaches, male circumcision, is a basic medical system that has appeared to decrease the danger of HIV transmission by up to 60% during unprotected heterosexual sex. So as to be successful, biomedical intervention methods are rarely actualized independently and are frequently utilized in conjunction with behavioural intervention. For instance, when a man is circumcised, he can frequently check his HIV status and get counselling and training about condom use and more secure sex. Examples of this intervention method are condoms for male and female, sex and reproductive health services, wilful medical male circumcision, lifesaving drugs to prevent mother-to-child transmission, pre-exposure prophylaxis, post-exposure prophylaxis and treatment as counteractive action, HIV testing and guiding, testing and treatment of STIs, syringe and needle programs, opioid substitution treatment and blood screening[99].

8.3. Structural interventions

This intervention method tries to address hidden elements that make groups or individuals more vulnerable to contract the virus. The underlying factors can be social, financial, political or environmental. These intervention methods are substantially hard to execute in light of the fact that they deal with profound and established socioeconomic issues, for example, poverty, sexual orientation imbalance and social marginalization. They can likewise be dependent on the collaboration of governments to accomplish

law or policy reform. Such policies acknowledge the socio-cultural dimensions of HIV infection, address discriminatory practices against HIV patients, identify risk groups and ensure that HIV treatment and care are affordable as well as accessible. Examples of structural intervention methods are interventions to address sexual orientation, financial and social disparity, decriminalization of sex work, homosexuality and drug, intervention to shield people from police provocation and brutality and laws ensuring the privileges of individuals living with HIV[100,101].

8.4. Utilizing new tools and innovation

Recently, various new HIV prevention tools have emerged, which expand the viability of these intervention services. According to Social Tech Guide (http://www.socialtech.org.uk/projects/ young-africa-live/), for instance, even in low-income nations, cell telephone proprietorship and web access have become impressive and have changed the way individuals communicate and get information. Exploiting this shift, Young Africa Live, a private social network dedicated to educating young people about sex, HIV/AIDS, rape and gender issues in a lively and fun mobile-web format, empowers youngsters to discuss subjects that influence their everyday lives including sex, HIV, assault and sex issues, and in addition where to get tested for HIV. The online platform now has 1.8 million clients crosswise South Africa and it is expanding to Kenya and Tanzania.

9. Challenges

The HIV pandemic in sub-Saharan Africa is compounded by the unalloyed discrimination of HIV patients even in clinical settings. These patients are faced with discriminatory practices, stigma and low acceptance by their respective communities[102]. Poor health infrastructures pose a serious problem to HIV containment in these parts of the world[103]. Public discussion of sex-related issues in sub-Saharan Africa limits the dissemination of HIV information especially from teachers to their students. While most youths are unready to subject themselves to HIV serological tests, HIV-infected patients in this region are afraid to disclose their serological status to their loved ones. This may be due to the fear of being mis-understood, accused, stigmatized or abandoned[104]. Due to the observed poor literacy and lack of inclusion into community plans, deaf individuals and other physically challenged persons may be affected by poor communication and access to HIV-related information and prevention measures. Though accidental cuts, resulting from the use of public-based saloons, have been identified as a potential risk to HIV transmission[105], there is little or no monitoring of hair-dressing saloons to ensure compliance with universal practices and HIV prevention measures.

10. Prospects

A long-term sustained effort and planning is required in tackling HIV infection in sub-Saharan Africa from both governments and the international community. In addition, any successful campaign for HIV prevention in the past need to be repeated, and also scaled up, particularly in line with the 2015 WHO vision (WHO, 2015 http://apps.who.int/iris/bitstream/10665/186275/1/9789241509565_eng.pdf).

As the epidemic continues to develop, all the sub-Saharan Africa nations need to assess and evaluate to assign and allocate all that are currently limited in HIV treatment resources. There are also very important hurdles to overcome, especially HIV-related stigma and discrimination, the issue of gender sensitivity/inequality and criminal legislation specific to HIV infected persons. More HIV patients would be encouraged to get tested and seek out medical treatment, if such barriers are removed, thereby reducing the burden of HIV in the region[106].

Despite the advances in HIV treatment, clinical therapy remains really palliative. Moreover, it has presently been reported that HIV resistance to most drugs may pose serious threat to its control. And many HIV positive patients have no access to lifesaving drugs and well equipped medical facilities. When most of factors discussed are taken into consideration in the quest to eliminate the virus, UNAIDS vision of reducing cases of new HIV infection, discrimination and deaths due to AIDS will be achieved[107].

We believe that it is possible that in not too distant future, HIV/AIDS will be seen in the way as diabetes and other chronic diseases, which can be managed by changing certain lifestyles and taking the right medication. That does not mean the HIV/AIDS will be eliminated completely, but it does mean individual that HIV positive patients can live their normal lives with the virus.

11. Conclusions

HIV continues to spread throughout the world, shadowed by increasing challenges due to poverty and poor healthcare service in different communities and localities in sub-Saharan Africa. The HIV/AIDS epidemic has made a nasty dent on sub-Saharan Africa's development and has contributed to discrimination against those who live on the fringes of society or people at risk of contracting virus because of their behaviours, race, ethnicity, gender, sexual orientation or social characteristics. It has been shown that HIV/AIDS epidemic is firmly rooted in behaviour of humans, driven by cultural, economic, and social factors, which is essentially to be identified and possible eradicated.

This article has put forward the current trends of HIV, the interacting variables that have contributed to the effects of HIV/AIDS in the sub-Saharan Africa's improvement, and healthy living. The high prevalence rate of HIV/AIDS in this region has created an unprecedented effect. So, understanding these variables that have influenced the path of HIV/AIDS scourge constitutes an important stake, both on the humanitarian and economic aspects for Sub-Saharan Africa due to the fact it's far step in eradicating the virus.

Despite the fact that the epidemic in this region had advanced, and in contrast to what could be believed, it is yet not too late for concrete actions to be taken. For an effective prevention and education programmes to work out, a careful consideration of how gender, culture and race, including other discussed factors, interact to influence risk perceptions and risk behaviours is highly needed. Finally, this article has provided possible answers for the questions

asked at the onset: Why HIV prevalence is high in sub-Saharan Africa? What could possibly drive the epidemic in the region?

Conflict of interest statement

We declare that we have no conflict of interest.

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