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Public Health Impact of Viral Load Monitoring among People Living with HIV on Anti-Retroviral Therapy: A Review of Available Literature

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ABSTRACT

Background: Viral load testing is the gold standard for HIV treatment monitoring, periodic viral load tests are the most accurate way of determining whether antiretroviral treatment is working to suppress the replication of HIV. The achievement of viral suppression among persons living with HIV has a lot of benefits to the individual, community, and entire population level. Therefore, the review is aimed at summarizing and documenting the public health impact of viral load monitoring among PLHIV initiated on anti-retroviral therapy.

Methods: A literature search was conducted for relevant articles, reports, and HIV treatment guidelines on viral load suppression among PLHIV. Electronic databases [Medline and PubMed], National, WHO and US-CDC HIV treatment guidelines were searched to identify relevant literature published in English. All identified articles and reports on viral load monitoring and treatment outcomes among PLHIV on ART were reviewed.

Results: The search strategy identified three [3] WHO, five [5] UNAIDS, one [1] National and two [2] HIV treatment program reports. Furthermore, thirty-nine [39] peer reviewed articles were identified and summarized.

Conclusion: Viral load monitoring helps keep PLHIV in good health, prolonging, improving their quality life and reduces HIV related morbidity and mortality. It aids in early detection of antiretroviral treatment failure enabling clinicians in the management of HIV/AIDS. Viral load monitoring is the bed rock for global epidemic control as achieving undetectable viral load reduces or eliminates the risk of HIV transmission [undetectable equal untransmittable U = U], reduces the risk of HIV mother to child transmission, information from viral load monitoring could be used for surveillance purpose, as well as help in directing and improving HIV/AIDS programs interventions outcome.

Keywords: HIV; Viral Load Monitoring; Viral Suppression; Viral Non-Suppression; Treatment Failure; Anti-Retroviral; PLHIV

Abbreviations: ART: Antiretroviral Therapy; WHO: World Health Organization; EAC: Enhanced Adherence Counselling; MTCT: Mother to Child Transmission; POC: Point-of-Care

Introduction

The global HIV response has been remarkably successful. An estimated 21.7 million people living with HIV have access to life-saving antiretroviral therapy [ART] and the annual number of HIV-related deaths and new HIV infections have both fallen [1]. As countries strive to reach the UNAIDS 95:95:95 targets [i.e., for 95% of PLHIV to be aware of their diagnosis, 95% of those who know their diagnosis to receive ART, and 95% of those on ART to have durable viral load suppression [2], new guidelines, tools and implementation strategies are vitally important. Research have shown that Viral load monitoring via routine measurement is a vital tool to assess the impact of HIV treatment efforts [3-7] and has been endorsed by the World Health Organization [WHO] as the primary method for monitoring response to ART [8]. This recommendation is based on research demonstrating that viral suppression is associated with decreased HIV disease progression and mortality among PLHIV, and the prevention of HIV transmission to sexual partners [9,10]. Initially, the 2010 World Health Organization consolidated guidelines on ARV recommended using clinical outcomes and CD4 count for routine monitoring of ART treatment. However, the value of viral load testing as a more sensitive and earlier indicator of treatment failure has widely been recognized. WHO 2013 consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection strongly recommend using VL monitoring for detecting virological failure and/or confirming treatment failure among HIV infected individuals on ART [11]. Hence, VL monitoring has become the gold standard for monitoring response to anti-retroviral treatment in low, medium, and high-income settings. A viral load test is a measurement of the amount of HIV virus in a sample of blood, it is usually reported as the number of copies per milliliter [copies/mL]. A viral load test measures the amount of HIV in your blood.

A low viral load indicates that treatment is effective. A high viral load in a PLHIV on treatment indicates either that the medication is not being taken properly or that the virus is becoming resistant to the medication [12]. The goal of antiretroviral therapy is viral suppression. A brief historical background of Viral load testing indicates that in 1995 viral load tests could only measure down to 10,000 copies/mi. and by 1996-7 the test could measure down to 400 or 500 copies/ml. encouragingly, since 1998 most routinely used tests can measure down to 40 or 50 copies/mL and tests used for research purposes are even more sensitive [down to 5 or even 1 copy/mL] [13]. The national guidelines for HIV/AIDS Prevention, Care and Treatment and the World Health Organization consolidated guidelines on ARV stipulate that any Viral load result that is ≥1000 copy/mL is not suppressed and < 1000 copy/mL is suppressed [14]. A lot have been documented on the relevance of viral load monitoring in HIV care and treatment, however, limited information exists on the public health importance of viral load monitoring among PLHIV. Therefore, the current review was aimed at summarizing and documenting the public health significance of viral load monitoring among PLHIV initiated on Anti-retroviral therapy.

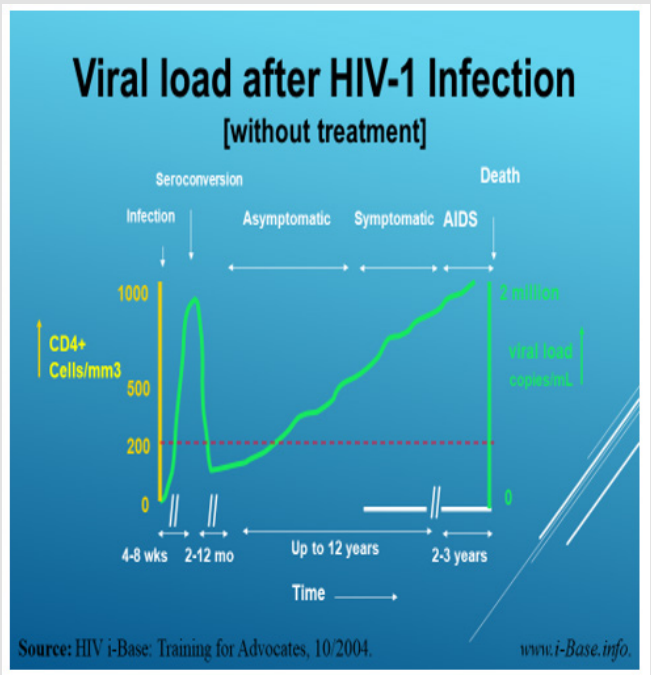

Figure 1: Graphical Representation of HIV RNA Load progression when Untreated [13].

Methodology

The search for relevant literature on viral load monitoring among PLHIV was conducted using electronic database such as PubMed, google scholar and MEDLINE using key words such as HIV, viral suppression, viralogic failure, treatment failure, undetectable and public health. All articles and grey literature on viral load monitoring among PLHIV were included in the review (Figure 1).

Principle of Viral Load Monitoring

As earlier discussed in previous sections of this work, viral load testing is now the recommended method for monitoring HIV patients once they have been initiated onto ART [15]. levels of HIV circulating in the bloodstream indicate that the virus is actively replicating, and these levels can be used, with the aid of molecular methods, to provide important information regarding the risk of disease progression and to predict the outcome of infection [16]. Evidence from research indicates that commencement on ART disrupts viral replication, resulting to a decreased level of virions [virus particles] in the host's bloodstream [13]. This slows the progression of the disease and improves the patient's prognosis [17,18]. Once subsumed onto ART, reduction in an individual's Viral Load levels can be used as an indicator of the efficiency and effectiveness of therapy. This is illustrated in Figure 2. VL testing is used to determine whether the virus is "undetectable" in the patient's blood [below the LOD of currently available technologies as measured in copies of the virus per millimetre] and is the most effective means of identifying virological failure in patients. Although still being used, especially in resource-limited settings, clinical signs and immunological [CD4] monitoring are generally lagging indicators of treatment failure, with misclassification of ART failure by these methods as high as 45% [UNITAID, 2015]. Untreated HIV infection is generally characterized by phases: [I] primary; [ii] acute; [iii] latency or chronic infection; and [iv] viral breakthrough/AIDS. Within the first weeks following primary infection, the acute phase is described by a spike in HIV viraemia, when the virus replicates unchecked by any immune system response.

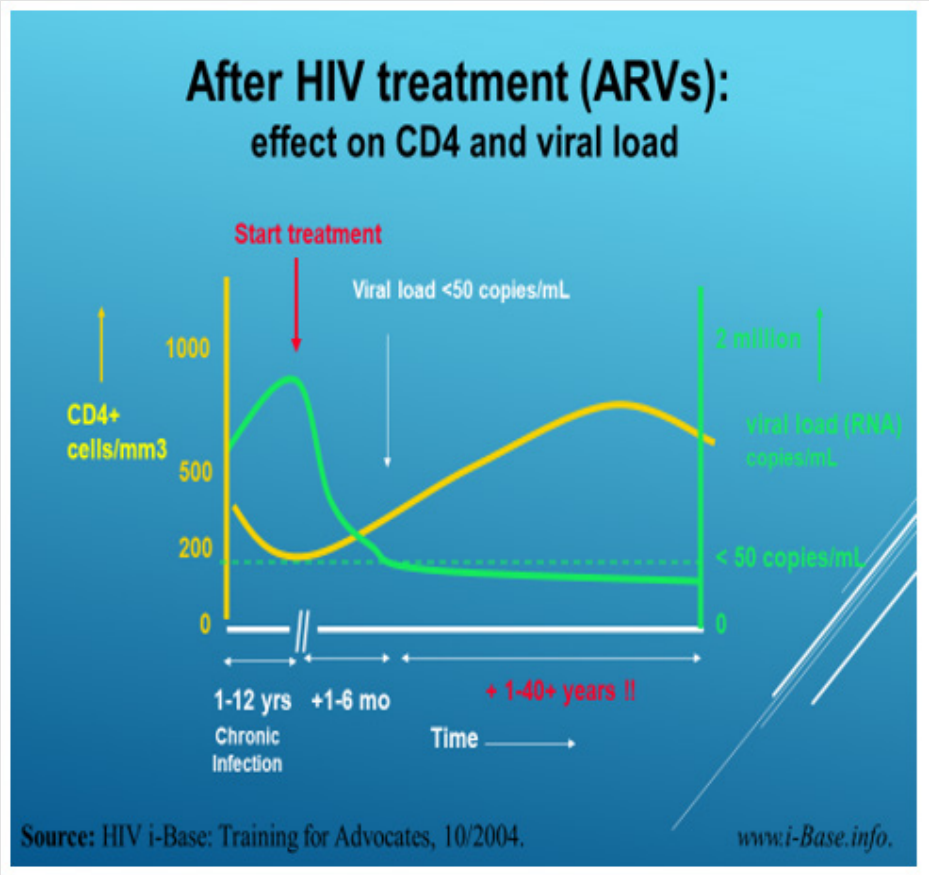

Figure 2: Graphical Representation of HIV RNA Load Decline when treated [13].

The acute stage is characterized by extremely high VL [millions of cp/mL HIV RNA] and high concentrations of p24 antigens that are shed by replicating virus during the early week's post-infection. The acute phase can last 2–12 weeks, after acute infection, antibodies against HIV infection appear [seroconversion] and are then present throughout the course of the disease; the antibody immune response partially suppresses the VL typically below 10 000 cp/mL and p24 levels become undetectable. Without ART, viral load increases over several years, gradually and then more rapidly as symptoms develop. However, once ART is initiated, it prevents HIV replication by inhibiting viral enzymes causing the viral load to decline. Further reports indicate that as soon as ART treatment is commenced, viral load drops sharply [1 log in first week, another log over next few weeks, then slower decline], then CD4 increases more slowly [compared to the sharp drop in viral load]. If viral load is reduced to under 50 copies/mL, then resistance is very unlikely to occur, and you could use treatment indefinitely. If viral load only gets to between 50 -500 copies/mL, then resistance will develop at some stage. CD4 count continues to increase but at a slower rate even after several years on-treatment. As you get older [>40/50/60 etc.] you would expect your CD4 count to drop a little naturally, but this is in longer terms and not related to HIV [13]. The following points captures the essence of viral load monitoring in HIV care and treatment; The use of VL [viralogic monitoring] is a more sensitive, timely, and reliable method of identifying treatment failure compared to clinical monitoring or use of CD4 count [immunologic monitoring]. VL monitoring allows patients with treatment failure to be switched more quickly to other regimens to reduce the development of drug resistance and to improve clinical outcomes. VL test results give clients a measure of understanding, control, and motivation to adhere to treatment and understand their HIV infection beyond what CD4 or their clinical status can provide. In settings where routine VL monitoring is available, frequent, or regular CD4 cell count monitoring [beyond baseline] is not necessary, especially among individuals who are stable on ART and virally suppressed. VL monitoring reduces the burden on both patients and health care workers as the need for frequent clinic visits can be reduced to once every 6 months for those who are virally suppressed.

Viral Suppression

Viral suppression refers to a viral load below the detection threshold using viral assays. Currently, the national guidelines for HIV prevention treatment and care, as well as WHO guidelines on the use of CD4, Viral Load and EID tests for initiation and monitoring of ART indicates that any viral load result <1000copies/ml is suppressed [14,15]. Furthermore, viral failure [Un suppression] is a persistently detectable viral load equal to or exceeding 1000 copies/mL [two consecutive viral load measurements within a 3-month interval with adherence support between measurements] after at least 6 months of using ART [14,15,18]. We use the term "suppressed" for VL <1000 because WHO is currently using that cut off. Traditionally this term has been used for when the VL is below the lower limit of detection. It has been reported that ongoing studies are examining this cut off and we will have an increased understanding of the risk of regimen failure with VL > 50 < 1000 cp/mL, there may be changes in definition of VS, but at this time, current WHO guidelines still use < 1000 copies [19].

HIV Viral Load Monitoring Cascade

Viral load is the ideal means of monitoring ART treatment response because it prevents HIV replication thereby causing the viral load to decline. As earlier established, Viral Load refers to the concentration of HIV RNA in the blood and remains a valuable indicator of a patient's response to antiretroviral therapy [ART] and risk for clinical progression, it is a more sensitive and reliable means of determining treatment failure compared to clinical and/or immunological criteria [19].This necessitated the World Health Organization [WHO] in 2013 to recommend viral load testing as part of routine therapeutic monitoring for all HIV-infected children and adults on ART in order to assess treatment response and detect treatment failure [11]. The HIV viral load monitoring cascade gives a step wise processes and procedure for conducting a viral load test during ART treatment. Ideally, viral load testing should be performed at regular intervals for all individuals receiving ART to monitor treatment response [routine viral load monitoring]. This agrees perfectly with the WHO 2016 consolidated guidelines on the use of Antiretroviral drugs for treating and preventing HIV that recommends that "Viral load testing should be performed early after initiating ART [within 6 months], at 12 months and then at least every 12 months to detect treatment failure. If viral load testing is not routinely available, CD4 count and clinical monitoring should be used to diagnose treatment failure, with targeted viral load testing to confirm viral failure where possible" [15].

Hence, this review will consider two types of viral load low monitoring, namely.

- Routine Viral Load Monitoring
- Targeted viral load monitoring.

Routine Viral Load Monitoring

This type of viral load test is done at specific regular intervals to detect change in viral load for patients on ART. The result of this test can trigger step-up adherence support and/or switching ART regimen. Patients will be tested using routine viral load monitoring tests to identify virological failure [14,19].

Targeted Viral Load Monitoring

This type of viral load testing is used for confirmation of treatment failure and usually done in settings where routine viral load testing is not available to confirm cases of suspected clinical or immunological failure [14, 19].

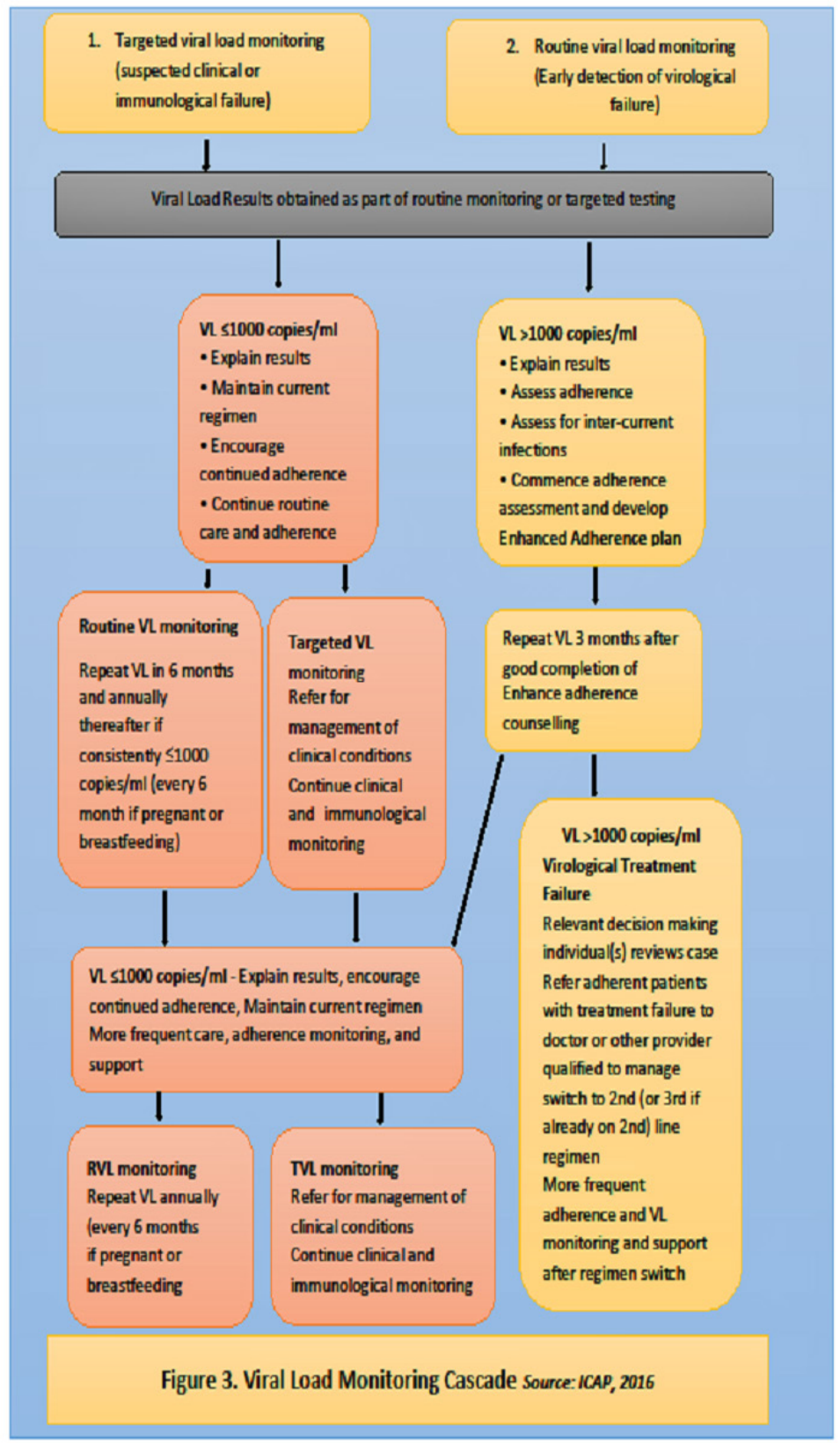
1. Targeted viral load monitoring (suspected clinical or immunological failure)
2. Routine viral load monitoring (Early detection of virological failure)
Viral Load Results obtained as part of routine monitoring or targeted testing
VL ≤1000 copies/ml
• Explain results
• Maintain current regimen
• Encourage continued adherence
• Continue routine care and adherence
VL >1000 copies/ml
• Explain results
• Assess adherence
• Assess for inter-current infections
• Commence adherence assessment and develop Enhanced Adherence plan
Routine VL monitoring
Repeat VL in 6 months and annually thereafter if consistently ≤1000 copies/ml (every 6 month if pregnant or breastfeeding)
Targeted VL monitoring
Refer for management of clinical conditions
Continue clinical and immunological monitoring
Repeat VL 3 months after good completion of Enhance adherence counselling
VL >1000 copies/ml
Virological Treatment Failure
Relevant decision making individual(s) reviews case
Refer adherent patients with treatment failure to doctor or other provider qualified to manage switch to 2nd (or 3rd if already on 2nd) line regimen
More frequent adherence and VL monitoring and support after regimen switch
VL ≤1000 copies/ml - Explain results, encourage continued adherence, Maintain current regimen
More frequent care, adherence monitoring, and support
RVL monitoring
Repeat VL annually (every 6 months if pregnant or breastfeeding
TVL monitoring
Refer for management of clinical conditions
Continue clinical and immunological monitoring
Figure 3. Viral Load Monitoring Cascade Source: ICAP, 2016

Figure 3.

Schedule for Routine Viral Load Monitoring

Routine Viral Load Schedule for Children, Adolescents and Adults on ART

In the case of non-pregnant adults, adolescents, and children on ART in settings where routine viral load monitoring is available, viral load testing should routinely be performed at 6 months after ART initiation, at 12 months, and then annually [every 12 months]. Thereafter if the client is stable on ART i.e., the patient has a viral load result that ≤1000 copies/ml and has no debilitating medical condition, indicating successful HIV treatment [14,19]. However, if an individual develops a new or recurrent WHO stage 3 or 4 condition or has a CD4 count meeting criteria for immunological failure, a viral load should be obtained at that time to assess for viralogic treatment failure. Also, if at any point in time the viral load is found to be >1000 copies/ml, a detailed adherence assessment [enhance adherence counselling] should be conducted and interventions to improve adherence should be provided, and the viral load repeated as shown in Figure 3. For patients who transfer into care from another facility and have been on ART for at least 6 months, viral load testing should be performed at the first visit, unless there is a documented viral load result within the past 6 months.

Routine Viral Load Schedule Pregnant or Breastfeeding Women on ART

For pregnant and lactating women newly subsumed on ART, viral load testing should be performed at 6 months after ART initiation. For pregnant or breastfeeding women already on ART for at least 6 months at the time of presentation for antenatal or postnatal care, a viral load should be performed at the first visit. If they are a documented viral load result ≤1000 copies/ml within the past 3 months, and adherence remains good, this viral load at first visit may be deferred until 6 months has elapsed from the prior result. When viral load monitoring first becomes available at an antenatal or postnatal care facility, viral load should be performed for all pregnant and breastfeeding women on ART at their next clinic visit. If the viral load result is ≤1000 copies/ml, then the viral load should be repeated every 6 months while the patient is either pregnant or breastfeeding. When the patient is no longer pregnant or breastfeeding, the viral load can be repeated on an annual basis, as per the schedule described above for non-pregnant or breastfeeding adults. If however a pregnant or breastfeeding woman develops a new or recurrent WHO stage 3 or 4 condition or has a CD4 count meeting criteria for immunological failure, a viral load should be obtained at that time in order to assess for viralogic treatment failure. However, if at any point in time the viral load is found to be >1000 copies/ml, a detailed adherence assessment should be conducted and interventions to improve adherence should be provided. The viral load should be repeated as shown in Figure 3 and expert consultation is advised [14,19]. In addition, enhanced prophylaxis for the infant should be considered.

Interpretation of Viral Load Test Results

Interpretation of viral load results and subsequent steps are outlined in Figure 3.

Viral Load Results ≤1000 copies/ml

A viral load ≤1000 copies/ml indicate that viral replication is sufficiently controlled, and therefore the patient is on an appropriate ART regimen and adherence is good. The actual value and meaning of the viral load test result should be explained to the patient at the next clinic visit. The following points should be addressed:

1. ART is working to stop HIV from reproducing.
2. No change in medication is recommended.
3. The patient should continue to take ART as prescribed.
4. The viral load will be repeated in 12 months [6 months if the patient is pregnant or breastfeeding].

Patients with viral load ≤1000 copies/ml should continue to receive routine HIV care and adherence support.

Viral Load Results >1000 Copies/ml

A viral load >1000 copies/ml indicate that viral replication is not well controlled. This may be due to sub-optimal adherence and/or may indicate that the patient's HIV is resistant to one or more drugs in the patient's ART regimen. It is important to bear in mind, however, that a concomitant or recent infection may result in a transient increase in viral load [as well as a transient decrease in CD4 cell count]. Therefore, the interpretation of viral load results should consider whether the patient had an intercurrent infection at the time the specimen was collected. During the review of the viral load result, the clinician must ensure that the patient is contacted to come to the clinic as soon as possible, ideally within 1 week. At this visit, the actual value and meaning of the viral load test result should be explained to the patient, including the following points:

1. The viral load is elevated [the goal is to have a viral load ≤1000 copies/ml]
2. A viral load >1000 copies/ml indicate that HIV is replicating in the body.
3. This could be happening because the patient is, or was, not taking ART properly [e.g., missing doses, etc.], or that the medications are no longer able to stop the virus [i.e., the HIV has developed resistance]
4. Resistance to medications usually develops from missing doses.
5. Over time ongoing HIV replication can result in reduced CD4 cells [the body's defenses against infections and cancers] and the patient could become sick.

Patients with viral load >1000 copies/ml should undergo adherence assessment found in the Viral Load Based on identified barriers, an enhanced adherence counselling [EAC] plan including specific interventions should be developed with the patient. The patient should be seen monthly for at least two additional sessions. At each session an adherence assessment should be conducted, and the treatment plan should be updated as needed to address barriers. After 3 or more sessions and once good adherence has been achieved, a repeat viral load test should be sent and the algorithm in Figure 3 should be followed depending on the results [19].

Management of Patients with an Unsuppressed Viral Load Result

It has been well established that anti-retroviral therapy [ART] suppresses HIV replication, thereby transforming HIV infection from a deadly disease into a manageable chronic illness [15]. As well as reduce the transmissibility of the virus, this is evidence in the recent HPTN052 clinical trial which demonstrated that viral suppression due to ART can reduce HIV transmission by up to 96% [20]. To optimise the benefits of ART globally, the third targets of the Joint United Nations Programme for HIV/AIDS [UNAIDS] 90-90-90 target call on at least 90% of those on ART to achieve viral suppression by 2020 [21] is very critical. Hence, any individual on ART diagnosed with virological failure becomes an emergency case and it is recommended that all measure should be put in place for clinical management of the patient to ensure viral suppression is attain, this agrees with the World Health Organisation [WHO] recommendation that periodic assessment of viral loads [at least once a year] should be provided for all PLHIV on ART and to ensure the achievement of viral load suppression in those with high plasma viral loads [>1000 copies/ ml] by addressing the common reasons for it [15]. Suboptimal adherence to ART is the major reason for high viral load and, therefore, WHO recommends enhanced adherence counselling [EAC] to address this problem [22]. The other common reasons for high viral load include drug resistance, malabsorption, drug–drug interactions, drug-associated side effects and addressing these reasons may require a change in the ART regimen [23]. WHO recommends that, if the viral load is high, EAC be carried out, followed by a second/repeat viral load test after 3 months. If the viral load levels remain high, virological treatment failure is concluded and patient should have a switch in ART regimen [22], this is illustrated in Figure 3. Studies have shown that EAC leads to viral suppression among ART patients diagnosed with an initial high viral load [23-25].

Public Health Importance of Viral Load Suppression among People Living with HIV on Anti-Retroviral Therapy

The principal purpose of antiretroviral therapy is to keep people living with HIV in good health and this is achieved when the replication of HIV virus is halted, resulting to a low level of viral particles in the body. Universally, the benefits of viral load suppression in prolonging and improving the lives of People Living with HIV/AIDS [PLWHA] have been greatly demonstrated [26,27]. Hence, it forms the essence of anti-retroviral treatment amongst person infected with HIV/AIDS. Several public health importance of HIV load suppression among PLHIV have been extensively reported. Viral load monitoring enables early detection of antiretroviral treatment failure, as well as enables clinicians to switch failing patients earlier to new drug regimens, before the accumulation of drug resistance mutations, thereby reducing the spread of highly resistant virus. In other words, VL testing provides benefits that run both ways: it helps to prevent unnecessary switching to second-line therapies, and it also supports migration to second-line treatment in a timely manner, thus saving patients' lives [18,23,28,29]. Also, in identifying viralogic failure more quickly, which helps in improving health outcomes, a study has established that the mortality rate among patients with viralogic failure who are switched to a second-line regimen is significantly lower than those not switched or when the switch is delayed. In Uganda, mortality rates of patients not switched to second-line ART was found to be 11.9%, compared to 1.2% among those who switched [30]. Furthermore, in identifying viralogic failure [viral Unsuppression] quickly, it helps in preventing the development of drug resistance. A multicenter study conducted in southern Africa, genotypes were performed on 183 samples of individuals with virological failure, 80% had at least one resistance mutation, with 40% having cross-resistance to nucleoside reverse transcriptase inhibitors [28].

All patients should have their viral load regularly, because an increased or detectable viral load in a patient on antiretroviral therapy indicates either non-adherence [most common] or development of drug resistance [31].

Numerous studies have shown that when People living with HIV are subsumed on ART and take antiretroviral medications daily as prescribe, as well as who achieve and maintain an undetectable viral load have effectively no or reduce risk of sexually transmitting the virus to an HIV-negative partner [9,10,32,33]. HIV viral load is "undetectable" when the levels of virus in the blood stream are so low that they cannot be measured. When a person takes their HIV medications every day as they are prescribed, the HIV medications can prevent the virus from replicating [or making copies of itself]. When this happens, the amount of HIV in a person's blood stream goes down to a level so low that viral load tests are not able to detect HIV in the person's blood: so, we say the person's viral load is undetectable. Four large multinational research studies involving couples in which one partner was living with HIV and the other was not—HPTN 052, Opposites Attract, PARTNER and PARTNER 2 studies observed no HIV transmission to the HIV-negative partner while the partner with HIV had a durably undetectable viral load. These studies followed approximately 3,000 male-female and male-male couples over many years while they did not use condoms.

Over the course of the PARTNER and Opposites Attract studies, couples reported engaging in more than 74,000 condomless episodes of vaginal or anal intercourse [5,6,10,20,24,34,35]. Currently, this discovery constitutes the only way of achieving global HIV epidemic control. Hence, the increase drive to identify all persons infected with HIV to place them on highly active antiretroviral, as well as support them to achieve an undetectable viral suppression, thereby promoting the global HIV epidemic control strategy known as undetectable equal untransmittable [U = U]. Furthermore, enormous studies have also reported the benefits of viral suppression in the prevention of mother to child transmission of HIV. Mother-to-child transmission of HIV is the spread of HIV from a woman living with HIV to her child during pregnancy, childbirth [also called labour and delivery], or breastfeeding [through breast milk and is known as perinatal transmission of HIV [36]. Analyses of viral load levels from studies conducted in Thailand [37], Cote d'Ivoire [38], Uganda [39], and Kenya [40] demonstrated a direct positive correlation between maternal plasma viral load and risk of transmission to the infant. Another study conducted in the United Kingdom and Ireland amongst over 10,000 pregnant women with HIV demonstrated that Mother to child transmission [MTCT] rates were lower among women who had a viral load <50 copies/mL near delivery compared with women who had higher viral loads [0.09 percent transmission versus 1.0 and 2.6 percent with viral load ranges 50-399 copies/mL and 400-999 copies/mL, respectively [41]. Furthermore, this is evidenced in recent gains from PMTCT intervention, specifically eastern and southern Africa where in 2017 an estimated 93% of women living with HIV had initiated, or were already on, ART during pregnancy. As a result, the percentage of children in the region who acquired HIV from their mother dropped from around 18% in 2010 to 10% in 2017 [1]. A more recent study conducted in Malawi involving women who did not take antiretroviral therapy [ART] until the beginning of delivery revealed that the transmission rate was 0.5% among women with a viral load below 1000 copies/ml, compared to 7.5% among women with a viral load above 10,000 copies/ml. This same study demonstrated that Lower maternal viral load [<1000 copies/mL] was associated with reduced odds of perinatal MTCT [adjusted odds ratio AOR = 0.1; 95% confidence interval CI = 0.01-0.4, compared with maternal viral load >10,000 copies/mL [42].

Several studies have established that antiretroviral therapy [ART] reduces HIV-related morbidity and mortality at all stages of HIV infection and reduces HIV transmission, as well as improves the overall health status, survival, and quality of life of PLWHA. However, this is dependent on the ability to achieve viral suppression. [43-46]. A study conducted in the United State, demonstrated a correlation between detectable viral load and suboptimal control of diabetes and hypertension, two comorbidities of increasing importance in the management of the patients with HIV infection [47]. Information on viral load of person living with HIV can be used as a surveillance tool. Viral load monitoring data among key population [MSM, PWID and FSW] in low- and middle-income countries illustrates the incidence of HIV in India [48]. This finding supports the suggestion that VL information may be used to provide an understanding of HIV transmission "hot spots" and epidemic trends, thereby allowing persons with high viral load to be targeted with individualized interventions such as index testing services. Currently, patient viral load information is being used as an important step in interpreting HIV recency surveillance, thereby guiding public health response toward breaking the chain of transmission in identified populations and geo-location with ongoing HIV transmission [49].

Data on viral load suppression among PLHIV on ART can be used to guide program interventions, for example, information from a study conducted in Indonesia among MSM, PWID, FSWs and transgender women revealed that higher education is statistically associated with viral suppression and clients with higher age band were more likely to achieve suppression than younger participants [50]. Furthermore, another study conducted in Cambodia illustrated that HIV positives female commercial sex workers [FSMs] who participated in community-level HIV prevention program were eight [8] times more likely to achieve viral suppression than those who did not participate [51]. The above determinants of VL suppression as identified in the studies can help ART programs to differentiate services and prioritize individual support where treatment and prevention efforts can have the greatest impacts. In addition, viral load information indicating geographic locations, specific hospital, hot spots, as well as diverse age group and sub-populations might provide information on the need to for tailored program support [48]. Furthermore, Point-of-care [POC] viral load testing has been shown to improve retention in HIV care and treatment among PLHIV, ensuring HIV patients get their VL results on the same day the test was done, instead of waiting for a longer period of time for the result to arrive from the reference lab has been shown to improve retention in care, thereby reducing the prevalence of interruption in care among PLHIV [52].

Recommendation

Viral load monitoring is essential and the preferred approach to diagnose and confirm treatment failure among PLHIV on ART. Hence, it should have routinized. PLHIV on ART with an Un suppression should be supported with services and follow ups to ensure there are virally suppressed. The achievement of optimal treatment outcome [viral suppression] among PLHIV requires a multi-disciplinary health team and this should be instituted across HIV care and treatment programs aim at addressing the root causes of poor performance on VL monitoring. Effective and efficient viral load monitoring among PLHIV has enormous public health implications thus efforts should be intensified at local, national and internationals level to ensure PLHIV are identified, subsumed on ART and supported to achieve viral suppression.

Limitations

This review has a limitation. The data from reviewed articles and reports were not subjected to any mathematical or statistical analysis as only summaries were done.

Strength

To the best of our knowledge, this is the first review that will extensively document the public Health significance of viral load monitoring among PLHIV.

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