



Trends of HIV Infection and Progress Towards the 95-95-95 Targets in Gambella Regional State from 2019 to 2023, Southwest ETHIOPIA

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Background: In 2022, there were 1.3 million new HIV infections, 630,000 AIDS-related deaths, and 39.0 million HIV-positive individuals worldwide. To put the world on track to eradicate AIDS by 2030, there are ambitious goals and commitments for 2025. However, the likelihood of these goals being met or even close to being met is highly dependent on the trend of new HIV infection, the prevalence of the disease, the commitment and capability of leaders, and the application of the planned strategies to achieve the goal.

Objective: To look trend of HIV infection is changing and how far we have come toward the three 95-95-95 goals in Gambella Regional State, Southwest Ethiopia, 2023.

Methods: From August 1 to August 20, 2023, a descriptive cross-sectional study was carried out. This study included all HIV testing service clients who were enrolled in HIV care and treatment and had viral load records or tests. The data were gathered from the electronic form of the territorial reports of District Health Information Software 2 (DHIS-2). Reviewing regional DHIS-2, a standardized checklist was used. Epi-Data version 3.1 software was used to enter the data. SPSS version 25 was used for the analysis. The proposed objectives' trend was described using a descriptive statistic.

Results: The number of people living with HIV decreased by 4.5%, new HIV infections decreased by 42.28% and adult HIV prevalence decreased from 4.37% to 3.69% between 2019 and 2023. The finding showed that the region progress toward the 95-95-95 goals was 73%, 75% and 95% in 2023.

Conclusion: In the Gambella region, HIV testing services and linking HIV-positive cases to HIV treatment have increased. Despite the good progress toward achieving the three 95 targets; first 95 targets for HIV diagnosis are impractical. As a result, adequate attention is required.

Keywords: trends, HIV infection, three 95, Gambella

Introduction

In 2022, there were 1.3 million new HIV infections, 630,000 AIDS-related deaths, and 39.0 million HIV-positive individuals worldwide. Globally, median HIV prevalence among the adult population (ages 15–49) was 0.7%. However, key populations like female sex workers, gay men, people who inject drugs, transgender persons and people in prisons had a higher median prevalence.¹ In 2022, Sub-Saharan Africa (SSA) was responsible for 76% of all HIV-infected individuals, 76% of all new HIV infections, and 75% of all HIV/AIDS-related deaths globally.¹ Additionally, there is a strong correlation between social determinants and the majority of HIV cases worldwide, which occur in low- and middle-income nations. There is still no cure for HIV, and many people living with the virus or at risk of contracting it do not have access to prevention, treatment, or care.²

Ethiopia's situation is comparable to that of other countries in the sub-Saharan region. It has a low intensity as its characteristic with a prevalence of 0.91%; it is both an epidemic and self-sustaining transmission. There are 610,350 people living with HIV, 8257 new HIV infections, and 11,322 annual AIDS-related deaths, according to estimates from the Ethiopian Public Health Institute (EPHI) for 2022 and 2023. National estimates for PLHIV, new HIV infections, and AIDS-related deaths in 2022 and 2023 show a reduction of 1%, 12.8%, and 11.8%, respectively, compared to previous

years. There are numerous regional variations, with the highest adult HIV prevalence in Gambella, which was 3.69% followed by 3.47% in Addis Ababa, and the lowest at 0.18% in the Somali region. The Gambella region is still one of the regions with the highest HIV prevalence overall. The estimated number of PLHIV in the region was 13,395, according to the EPHI HIV estimation and projection (2022/2023 Spectrum). During that very year, there were an expected 313 new HIV diseases and 396 HIV-related deaths.³

To eliminate HIV/AIDS as a public health threat by 2030, it is essential to meet 95-95-95 targets across all populations, including people of all ages and genders. The 95-95-95 targets indicate that 95% of all people living with HIV will know their status, 95% of all people diagnosed with HIV infection will receive life-sustaining ART and 95% of all people on ART will have attained viral suppression. Global progress toward the three 95 in 2022 shows; 86% of all PLHIV were aware of their status, 89% of the individuals who knew their status were getting treatment. Additionally, 93% of the patients receiving treatment had viral suppression.⁴ To reach the global goal, Ethiopia adopted the global 95-95-95 strategy. Ethiopia has met the second and third 95 targets nationally but there are still gaps among children as compared to adults. Among 84% of PLHIVs who knew their status, 98% were on antiretroviral therapy (ART) and 98% were virally suppressed; there is good treatment linkage and adherence once HIV+ is diagnosed. However, progress toward the three 95s HIV targets vary greatly from region to region.⁵ According to the Gambella Regional Health Bureau's annual performance report of 2022/2023 the regional progress to three 95 was revealed to be 73%, 75%, and 95%.⁶

Measurement of the success of global, national, and local efforts to control the HIV epidemic is important, according to evidence.⁷ The UNAIDS 2021 strategy encourages countries to track their progress in different populations and geographic areas to maximize equitable services, guarantee accountability, and determine why targets are not being met.⁸ Therefore, this study aimed to assess the trends of HIV infection and progress towards the 95-95-95 targets in Gambella Regional state. Thereby the health care system could take a lesson about how the pace of the program is going towards the achievement of the goal. Generally, the evidence will be used as baseline information for planning, monitoring, and evaluating the program throughout the health care system.

Methods

Study Area, Period, and Setting

From August 1, 2023, to August 20, 2023, the study was conducted in Gambella region state, southwest Ethiopia. The Gambella region of Ethiopia is in the south-western part of the country, about 766 kilometers from Addis Ababa. It borders Oromia to the north and east, the South-West regional state to the south, and South Sudan to the west. The Baro salient can be found in the western portion of the region, which is located between the Akobo and Baro Rivers. Twelve woredas, 263 kebeles, one city administration, one special Woreda, and three zones make up the region. According to UNHCR's estimates for 2023 and 2024, the region has a population of 547,103 and 378,075 refugees. Rural areas make up nearly 75% of the region's population. In the region, there are approximately 263 health posts, eight refugee health centers, 29 government health centers, and five hospitals. In the region, there are 28 facilities that provide anti-retroviral treatment (ART). Among the health facilities that provide ART; 19 are directly supported by PEPFAR.⁶

Population

A source population for the trend analysis was all clients who received HIV counseling and testing services between July 1, 2019, and June 30, 2023, were taken into consideration. This study included all HIV testing service clients who were enrolled in HIV care and treatment and had viral load records or tests.

Study Design and Data Collection

This is a descriptive cross-sectional study that used only secondary data in its entirety. The data sources used were district health information system (DHIS-2), SMART CARE, Regional laboratory data base and EPHI spectrum between July 1, 2019, and June 30, 2023. From SMART CARE and DHIS 2 the HTS including tested positive, lost to follow up and current on ART data were collected, triangulated and used. Whereas the viral load testing and suppression data were collected from regional laboratory data base. In addition, the EPHI projection/spectrums were used as a source for HIV

infection, PLHI, prevalence and AIDs related death data. To collect the required data from the above mentioned data sources, a standardized checklist was used to collect and extract data. National comprehensive HIV prevention, care, and treatment guidelines were used to create the data extraction tool/checklist. Two public health professionals collected the data, under the direction of the principal investigator.

Definition of Terms

The following terms are interpreted in accordance with the UNAIDS and World Health Organization definitions;⁹ People living with HIV who know their HIV status: Percentage of people living with HIV who were aware of their status at the conclusion of the reporting period; People living with HIV on antiretroviral therapy: The percentage and number of adults and children receiving antiretroviral treatment out of all HIV patients at the end of the reporting period; People living with HIV who have suppressed viral loads: Number and percentage of people living with HIV who have suppressed viral loads at the end of the reporting period; Deaths from AIDS: Per 100,000 people, the total number of people who have died as a result of AIDS.

Quality Control

To ensure data quality, a data extraction sheet was prepared carefully in English in accordance with national HIV prevention, care, and treatment guidelines. A pre-test on the data extraction sheet was conducted before actual data collection, and possible amendments were made. Data collectors received two-day orientation for the purpose of the study, the data extraction sheet, and the procedures for data extraction. On-site feedback and careful monitoring of the data collection procedures were provided.

Data Processing, Management and Data Analysis

After the data were gathered from various sources, it was compiled using Excel, and the consistency and completeness of each variable was checked. When a set of data came from more than one source, validation was done, and the most recent version of UNAIDS or WHO was used. Epi-Data version 3.1 software was used to clean, code, and enter the data. Statistical Package for the Social Sciences (SPSS) version 25 was used for the analysis. Prior to performing actual data analysis, exploratory data analysis was carried out to check for any potential errors, assumptions, and computation, transformation, or recoding. The proposed objectives' trend was described using a descriptive statistic. The frequency and percentage of categorical variables were calculated and presented in a table and graph. The initial Kolmogorov–Smirnov and Shapiro–Wilk tests were used to validate the distributional assumptions for a continuous variable. The normal and skewed distributions of continuous variables were checked using the mean with standard deviation (SD) and median (interquartile range, IQR), respectively. To determine how the proposed objectives' longitudinal trends changed, trend analysis was performed.

Ethical Clearance

The Gambella Regional Health Bureau issued permission letters and ethical clearance letters. The regional health bureau received clear explanations of the study's purpose, procedure, duration, potential risks, and benefits. Because we used document review as a data source, the informed consent requirement was waived. In addition, anonymous methods were used throughout the research process to protect the confidentiality of the data.

Results

Regional HIV Related Estimates and Projections Trend from 2019-2023

According to the trend data, the number of people living with HIV decreased by 4.5% between 2019 and 2023, with the highest number (13,896) occurring in 2019. Regarding new HIV infections, there was a sharp decrease of 42.48% between 2019 and 2023. Similarly, the adult HIV prevalence decreased from 4.37% in 2019 to 3.69% in 2022/2023. On the other hand, the number of AIDS-related deaths decreased dramatically from 2019 to 2021, reaching a peak in 2022 before beginning to decline^{3,10–12} (Table 1).

Table 1 HIV and AIDS Estimates of Gambella Region; Southwest Ethiopia from 2019 to 2023

Year	People Living with HIV	New HIV Infections	AIDS Related Deaths	Adult HIV Prevalence
2019	13,896	459	275	4.37%
2020	13,505	448	352	4.0%
2021	13,498	390	325	3.9%
2022	13,395	313	396	3.69%
2023	13,263	264	320	3.60%

Notes: The Ethiopian Public Health Institute HIV Related Estimates and Projections in Ethiopia for the Year-2019-2023.

Services for HIV Counseling and Testing (HTC)

The current study's result indicated that there were fluctuations in the HIV testing and counseling services (HTC) coverage. The highest HTC service coverage was 41,490 in 2023. In addition to that the contribution of PITC for the overall testing from 2019 to 2023 was 80.40%, 86.99%, 80.28%, 74.34% and 67.53%, respectively. Regarding HIV positivity and yield data; the trend depicts a sharp increment from 2019 to 2023. The mean (SD) yield of HIV was 2.84 (2.30–3.5) (Figures 1 and 2).

Connection to Treatment and Care (Just Started on ART)

Table 2 describes trends in connection to treatment and care between 2019 and 2023. As shown in the table, the proxy linkage was greater than 100% in all years. Since 2019, the ART proxy linkage was 138% (Table 2).

Total Current on ART

The current study demonstrated an improved pattern in the trend of total ART current; from 5466 in 2019 to 8997 in 2023, according to the trend analysis, both children and adults are now receiving ART. But from the total current on ART clients' majority were adults. As shown in the below graph adults on ART were around 95% of the total clients from 2019 to 2023 (Figure 3).

Trend of overall HTC service

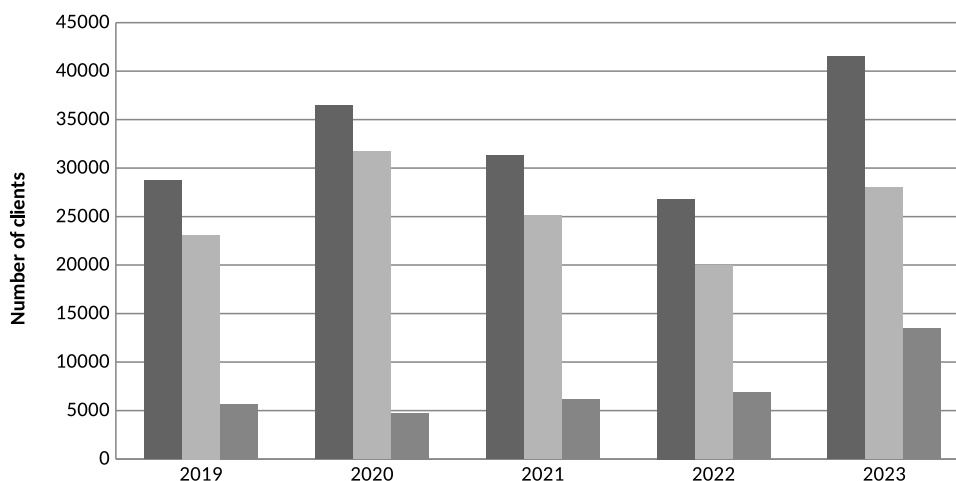


Figure 1 Trend of overall HTC services in Gambella region; southwest Ethiopia; 2023.

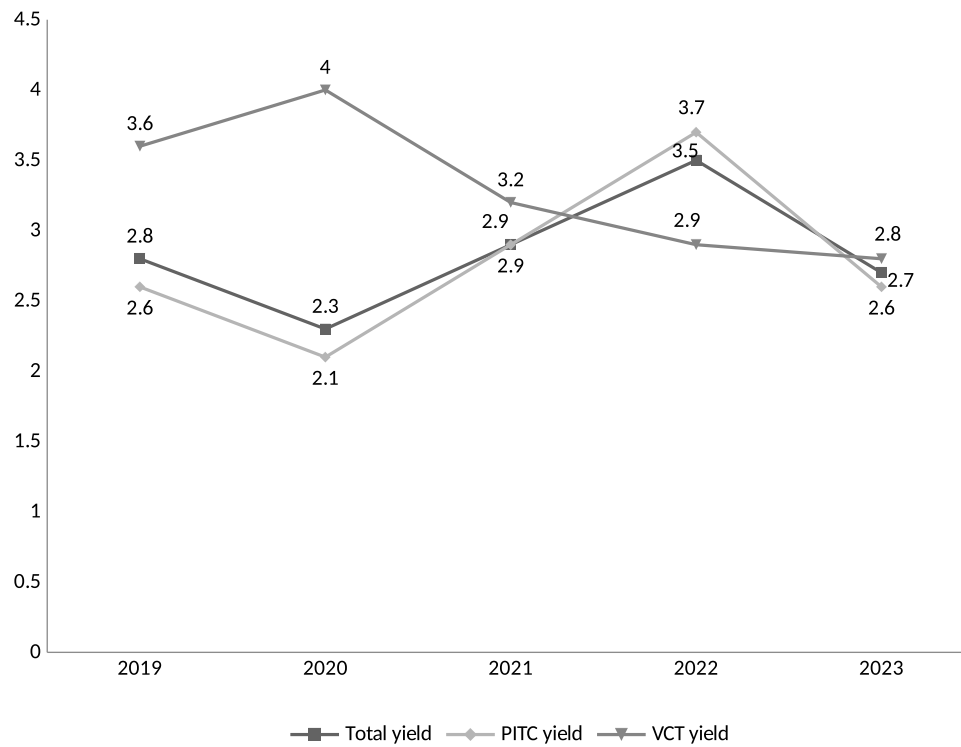


Figure 2 Trend of yield by testing modality in Gambella region; southwest Ethiopia; 2023.

Viral Load Testing and Suppression Coverage

The current study reported that the viral load testing and suppression coverage increased from 2019 to 2023. As shown in the table the region achieved the third 95 in 2021 and also continued the success as of 2023. Similarly, viral load testing coverage also increased between periods of 2019 and 2023. However, the testing coverage was performed of all PLWH on ART each year (Table 3).

Regional Progress Towards the Three 95

In 2023, nearly three-fourth (73%) of PLHIV knows their status at regional level. The percentage of HIV-positive individuals who are aware of their HIV status has increased from 42% in 2019 to 73% in 2023 (Figure 4).

Figure 5 shows that high treatment coverage level has been achieved regionally from 44% in 2019 to 75% in 2023. The current finding indicated that the achievement is promising to reach the second point of the 95-95-95 target if progress continues (Figure 5).

Table 2 Trend Indicating the Number of Adults and Children with HIV Infection Newly Started on ART in Gambella Region; Southwest Ethiopia; 2023

Year	Total Positive	Number of Adults and Children with HIV Infection Newly Started on ART	ART Proxy Linkage Rate
2019	796	1098	138%
2020	852	862	101%
2021	920	968	105%
2022	941	1034	110%
2023	1118	1231	110%

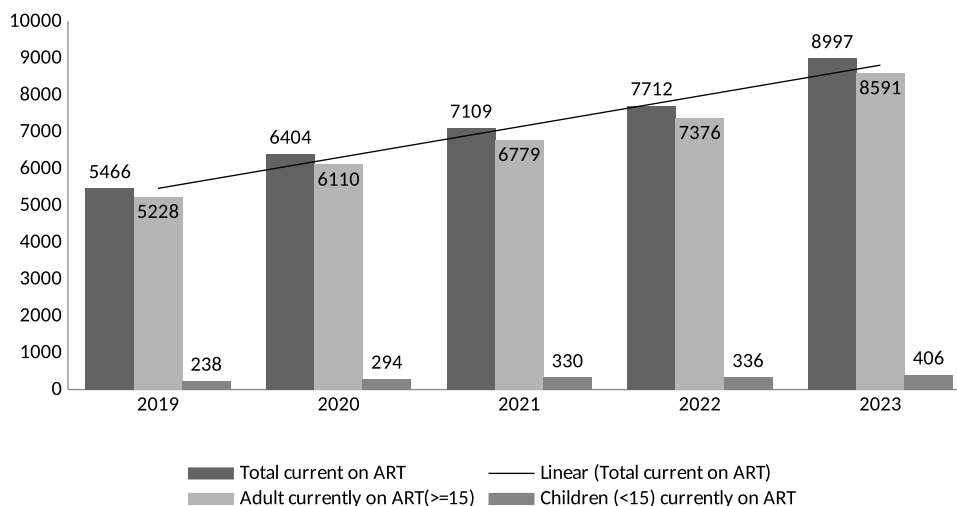


Figure 3 Trend of total current on ART in Gambella region; southwest Ethiopia; 2023.

Unlike the first and second 95s, 95% of all people in the region receiving antiretroviral therapy were found to be virally suppressed after ARV therapy in 2021–2023. The least number of viral load suppressions was recorded in 2019 and 2020 with 89% and 92%, respectively.

Discussion

This study, the first in the region, has indicated the trend of HIV infection and progress toward the 95-95-95. Our study has demonstrated results that are consistent with other studies in the literature.

Accordingly, in the current study both the number of people living with HIV and the number of new HIV infections decreased over the past years. This result is consistent with different global and national surveys and studies.^{1,13–15} This could be the result of various interventions like the implementation of the new ARV treatment guidelines in previous years. Furthermore, it might be due to the improved action especially focused on the awareness of HIV transmission. The finding suggests that all levels of HIV epidemic prevention and control interventions must be strengthened.

The current study depicts that the adult HIV prevalence decreased from 2019 to 2023. This figure is higher than the national prevalence.^{3,10,12} The possible explanation for this difference is the existence of different socio cultural related factors and also less behavioral and biomedical interventions in the region. Therefore, addressing the socio cultural related factors through strengthening behavioral and biomedical interventions is needed to reduce the regional HIV prevalence. Moreover, the result highlights the importance of developing and implementing various HIV-related interventions, including but not limited to health education and stigma reduction programs, behavior modification campaigns, increased accessibility to HIV testing, and programs targeted at high-risk groups.

With regard to the prevalence of new HIV infections, PLHIV, and adult HIV, the number of AIDS-related deaths exhibits a somewhat divergent pattern. There was a decreasing pattern of AIDS-related deaths from the years 2019 up to 2021 but the AIDS-related deaths showed an increasing pattern in the year 2022 before beginning to decline again in

Table 3 Trend of Viral Load Testing Coverage in Gambella Region; Southwest Ethiopia; 2023

Year	Total PLHIV on ART	VL Tested	VL Testing Coverage	VL Suppression (<1000 Copies/mL)	Percent of VL Suppression
2019	5466	3472	63.5%	3098	89%
2020	6404	4900	76.5%	4484	92%
2021	7109	5501	77.3%	5238	95%
2022	7712	5811	75.3%	5658	97%
2023	8997	7831	87.0%	7442	95%

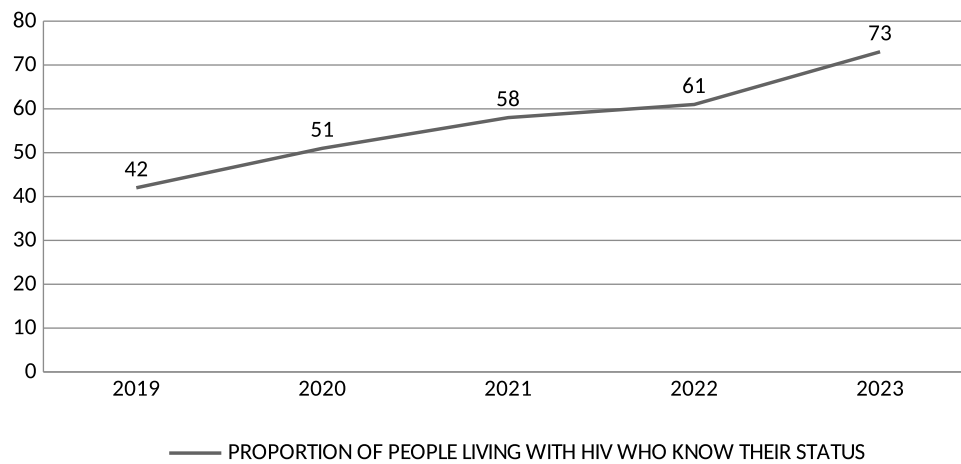


Figure 4 Proportion of People living with HIV who know their status in Gambella region; Southwest Ethiopia; 2023.

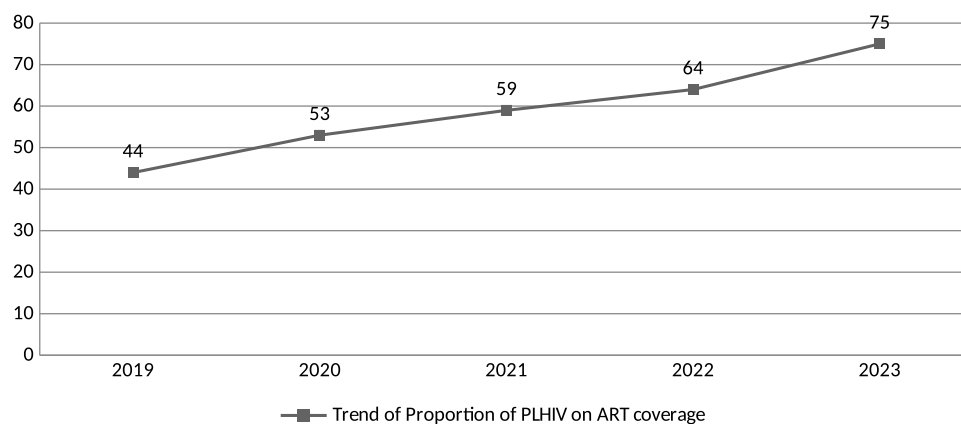


Figure 5 Proportion of People living with HIV on ART in Gambella region; Southwest Ethiopia; 2023.

2023. The COVID-19 pandemic's impact on HIV service consumption may be the cause of the rise in the death rate in 2022. As a result, health facilities had to prioritize the fight against COVID-19 over providing conventional HIV services, which resulted in a rise in service discontinuation and poor adherence.¹⁶ On the other hand, between 2019 and 2021, the total number of deaths linked to HIV decreased. This may be related to the spread of HAART, which slows the progression of the disease and enhances PLHWs' quality of life. The finding emphasizes how crucial it is to keep HIV-positive patients successfully on ART treatment to decrease the gamble of HIV-related mortality.¹⁷

From 2019 to 2023, there was a pattern of ups and downs in the Gambella region's HIV testing and counseling services. As shown in the current study, the trend was divided into three phases, 2019 to 2020, 2020 to 2022 and 2022 to 2023, with the overall phase from 2019 to 2023. The highest HTC service coverage was observed in phase three (41,490 in 2023). This may be due to the governments' and NGOs' rigorous HIV testing and counseling programs, improvements in healthcare infrastructure, and governments' focus on meeting UNAIDS 95-95-95 goals. Regarding the trend of HIV test positivity, or yield, since 2019, it has reached a peak of 3.5% in 2022.

The current finding also depicts that the regional performance in linkage to care and treatment from 2019 to 2023 was greater than 100%. The highest performance was observed in 2019 and the lowest was in 2020. This finding is supported by different global and national surveys.⁶ This was because, particularly in the Gambella region, Ethiopia fully implemented the new ARV treatment initiation criteria.¹⁸

The current study demonstrated an improved pattern in the trend of total ART current; from 5466 in 2019 to 8997 in 2023, according to the trend analysis, more people in both age groups are taking ART as compared to prior years. But

from the total current on ART clients' majority were adults. This finding is supported by global and national studies.⁶ The possible reason for the current progress on ART in the region is the result of interventions by the government and stakeholders on linking to care and retention of care. Besides, to increase the total pediatrics current on ART the region started implementing the Pediatric HIV Acceleration Initiative (PHAI) launched by the Ministry of Health in 2023.¹⁹ However, strengthening the initiative is needed to increase the number of pediatrics on ART.

The finding showed that the Gambella region has made a lot of progress toward the 95-95-95 goals. This shows that the 95-95-95 goal can be reached by 2030 if gaps in the HIV testing and treatment chain are fixed right away. However, both the first 95 and the second 95% target will not be met until 2023. Unlike the initial and subsequent 95s, The Gambella region met the third goal, which was 95% viral suppression among those receiving treatment. This study's findings are comparable to those of previous ones carried out in Ethiopia.¹⁵ The implication of this finding is that the region should strengthen the HIV testing, care and treatment services to achieve the first and second 95 and also to sustain the third 95.

The fact that this study is retrospective and based on records may have a negative impact on its findings; it was impossible to determine the reliability of the recorded data, and there is a possibility of estimation bias. Furthermore, alterations in intervention programs may alter the trend's forecasted values over time. The trend and the factors that determined each outcome was not discussed very well, which may also have had an impact.

Conclusion and Recommendation

In the Gambella region, HIV testing services and positive results have increased over time over the past 5 years. The region has made significant progress toward achieving the 95-95-95 targets, of which the third 95% target for viral suppression is realizable, but the first and second 95 targets for HIV diagnosis are impractical. Without achieving this overarching goal, the epidemic cannot be controlled. As a result, adequate attention is required to prevent the current increase in adult HIV incidence, and it is crucial to diagnose those who carry the virus, which serves as the foundation for the other targets.

We must keep working toward the global goal, as must the world. This study only looked at a few holistic indices, such as PLHIV, new infections, AIDS-related deaths, and ART coverage. However, due to a lack of resources, it was unable to look at all of these indices. Thus, research in these areas can be carried out in the future.

Abbreviations

AIDs, Acquired immunodeficiency syndrome; ART, Anti-Retroviral Therapy; DHIS 2, District Health Information System; EPHI, Ethiopian Public Health Institute; HIV, Human immunodeficiency virus; HMIS, Health Management Information System; HTC, HIV testing and counseling service; IQR, Inter Quartile Range; NGOs, Non-Governmental Organizations; PEPFAR, The President's Emergency Plan for AIDS Relief; PITC, Provider-initiated HIV testing and counseling; PLHIV, People Living with HIV; SD, Standard Deviation; SPSS, Statistical Package for the Social Sciences; SSA, Sub Saharan Africa; UNAIDS, Joint United Nations Programme on HIV/AIDS; UNHCR, United Nations High Commissioner for Refugees; VCT, Voluntary counseling and testing; VL, Viral load.

Data Sharing Statement

The corresponding author can provide the datasets that were created and/or analyzed during the current study upon reasonable request.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically

reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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