

## Assessing the Implementation of Universal Test and Treat Services and Health Benefits for HIV Patients in Healthcare Facilities in Nairobi, Kenya

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### Abstract

This study examines the implementation of Universal Test and Treat (UTT) for HIV-positive individuals in Kenya, a strategy commonly referred to as Treatment as Prevention (TaSP). UTT is globally recognized for its effectiveness in reducing HIV disease progression, mortality, and transmission. Kenya's high HIV burden accounts for 4% of global infections and a prevalence rate of 5% by the end of 2022, as the country faces significant challenges in fully implementing UTT. The research attempted to respond to the question, to what does the implementation of the universal test and treat policy support health benefits for HIV patients? Using the Theory of Change as a framework, the research employed a mixed-methods approach surveying healthcare workers through a cross-sectional descriptive survey design. The findings revealed convergent views on the benefits of UTT therapy, a moderate positive correlation, and a significant relationship between the implementation of UTT and increased health benefits. Implications in practice, programs should enhance the delivery of same-day ART initiation through simplified drug regimens to maximize patient adherence and outcomes. Policies that promote UTT could significantly enhance the quality of care through uninterrupted implementation. The use of mixed methods provided a comprehensive understanding of the impact of test-and-treat services. The study observed that developing tools to address potential limitations in the care cascade is crucial for enhancing the effectiveness of UTT and improving the overall management of HIV in Kenya.

**Keywords:** Universal Test Treat, Human Immunodeficiency Virus (HIV), Health Benefits, Healthcare workers, and Health Facilities

### I. Introduction

#### Research Background

As the global community commits to ending the HIV/AIDS epidemic by 2030, nations worldwide have intensified efforts to expand awareness and enhance strategies for increased antiretroviral therapy (ART) coverage. The

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World Health Organization (WHO) has challenged public health systems, particularly in resource-poor settings, to ensure that over 19.5 million people in need of ART can access these life-saving treatments by 2030. ART, when widely accessible, not only reduces HIV transmission and prolongs life expectancy but also strengthens the overall health infrastructure, moving countries closer to achieving HIV control and Universal Health Coverage (UHC). However, despite progress, significant gaps remain in identifying people living with HIV (PLHIV) and ensuring their sustained access to ART, particularly in sub-Saharan Africa (SSA), a region that accounts for approximately 70% of the global HIV burden. The greatest HIV incidence rates are concentrated in Eastern and Southern Africa, with unique challenges affecting different population groups (UNAIDS, 2024). In Kenya, where the adult HIV prevalence rate stands at 5%, with women disproportionately affected (Waruru et al., 2021), the introduction of differentiated ART models has led to improvements in treatment uptake (Pham et al., 2022).

Nevertheless, substantial barriers persist, including weak health systems leading to long waiting times, delayed ART start, poor appointment management, high patient attrition rates, poor adherence, and psychosocial support, and insufficient human and financial resources to support ARV commodities, which hinder the effectiveness of ART programs. This study seeks to systematically review the strategies aimed at improving Kenya's achievement of the second 95 UNAIDS target in Nairobi, focusing on the uptake and implementation of test and treat policies by healthcare workers and their effect on patient health outcomes.

This study focused on the application of the universal test and treat services, also referred to as treatment-as-prevention of HIV by healthcare workers in HIV clinics as the independent variable. This follows the World Health Organization's policy on initiating antiretroviral treatment (ART) on the same-day of positive HIV or within 14 days of diagnosis in terms of acceptability of same-day treatment, appointment management, adherence, and psychosocial support, and resources for UTT. The Theory of Change underpins this study by providing a framework for understanding how and why UTT services lead to improved health outcomes. The theory suggests that by implementing UTT, key short-term outcomes such as timely initiation of ART, better appointment adherence, and enhanced psychosocial support can be achieved. According to this theory, these results are expected to lead to patient outcomes in terms of health benefits, including early and sustained viral suppression, increased retention in care, and improved quality of life for individuals living with HIV. Ultimately, these changes contribute to the broader goal of reducing disease progression, deaths related to HIV, and transmission (Parker et al., 2021), thereby enhancing the overall effectiveness and functionality of the health system. The dependent variable in this study was improved health benefits, measured in terms of these critical outcomes and their impact on broader treatment coverage.

### Gap in the Literature

While countries have continued to make advancements in awareness and develop strategies and policies to support increased ART coverage (Parker et al., 2021), there has been significant progress in increasing ART coverage and improving HIV care outcomes, but critical gaps remain in the literature, particularly in the context of resource-limited settings like sub-Saharan Africa (UNAIDS, 2024). First, there is limited understanding of the specific challenges to therapy initiation and retention among different population groups, particularly among heterosexual adolescent girls and other susceptible people in Eastern and Southern Africa (Braitstein et al., 2021). There are also gaps in the continuum of care showing that at least 20% of PLHIV have not been started on antiretroviral therapy (MacKellar et al., 2022), hence the need to address this challenge. Although differentiated ART delivery models have been introduced to bridge some of these challenges (Pham et al., 2022), this literature lacks comprehensive evaluations of these models, especially concerning their impact on patient retention and viral load suppression in varied contexts (Bekolo et al., 2023). Additionally, existing studies have not adequately addressed the human (Mwangangi et al., 2024) and financial resource constraints (Habte et al., 2022) that continue to impede the scaling up of ART services, nor have they explored innovative solutions to mitigate these challenges. Furthermore, while there is acknowledgment of the importance of patient-friendly approaches in improving retention and treatment outcomes (Green et al., 2020), there is a need for more focused research on the role of healthcare workers in facilitating the uptake and adherence to test-and-treat policies.

### Aim and Originality of the Study

The primary aim was to evaluate the gaps in the implementation of the UTT policies, with a specific focus on immediate ART initiation, appointment management, adherence, psychosocial support, and the availability of ART resources in resource-limited settings like Kenya and propose innovative solutions to improve the scaling up of ART services. This study offers original contributions to the existing literature by addressing critical gaps in the understanding and implementation of UTT, it provides a comprehensive evaluation of the effectiveness of the strategies and uniquely focuses on the role of psychosocial support, an area often overlooked in existing

research, and proposing innovative solutions. This study adds valuable insights into optimizing ART programs, and the findings are expected to inform future policies and interventions on public health outcomes.

## II. Literature Review and Development of Hypotheses

The literature review focused on projects that implement strategies designed to ease burdens on the system, eventually leading to better-quality patient benefits in treatment and proceeding progress to epidemic control. In Ghana, micro-health insurance models are widely used to increase access to health services, hence being indispensable. In Ghana, like many other African countries, at least 50 people are infected with HIV every day, and a national prevalence rate of 1.5 (Sakyi et al., 2024). Modern technology was used to evaluate the performance of this novel approach toward reaching the third sustainable development goal on health and wellbeing. This application of tools was found to be effective in evaluating the functioning of health financing in this resource-limited country, where the focus is more on HIV and other communicable diseases (Essuman et al., 2024). The use of technology in micro-health insurance schemes was reported to significantly improve efficiency in enhancing health risk management in the public sector where there is a great need for medical services (Sarpong et al., 2023).

To assess the efficacy of treatment-as-prevention interventions, this study investigated the perceptions of newly diagnosed HIV clients in South Africa. The aim was to evaluate both positive and negative experiences related to antiretroviral therapy (ART) linkage within the recommended 3-month period post-diagnosis. The study identified personal factors, such as interactions with other people living with HIV and social support, as key drivers of immediate ART initiation. Conversely, medical factors, including the challenges of daily pill intake and inadequate or lack of treatment preparation, as well as systemic issues within the healthcare system, were reported as barriers to timely linkage to therapy. Addressing these reported barriers comprehensively through improved service delivery approaches has the potential to enhance the effectiveness of this strategy in HIV control efforts (Nicol et al., 2023).

A longitudinal study conducted in Ethiopia examined medical records of adults receiving care in twenty clinics, spanning both pre-and post-treatment as prevention eras. Comparison of care and treatment outcomes between the two groups revealed significant findings: the post-treatment era cohort exhibited a higher incidence of treatment failure cases and a twofold increase in mortality rates compared to their counterparts from the previous era. However, the post-treatment era also demonstrated superior retention rates in care. These results led to the conclusion that immediate treatment initiation as a strategy enhances quality of life, reduces morbidity and mortality rates, and consequently improves the likelihood of achieving epidemic control (Girum et al., 2020).

An assessment of the influence of the UTT was conducted in Indonesia through a longitudinal cohort study, which involved reviewing medical records of clients receiving Antiretroviral Therapy (ART). The study aimed to evaluate service uptake and retention of therapy amidst a surge in HIV clients seeking services. Out of 402 clients tested, results indicated a reactive rate of 11%, with 90% of them successfully enrolled in therapy. Treatment adherence rates were consistently high, nearly matching the enrollment percentage, while only 15% of clients were lost to care. The study revealed a notable expansion in clients on treatment rising from 83% to 92% in the periods before and after UTT implementation, respectively. This surge in therapy enrollment suggests a positive impact of the UTT program on HIV care, leading to improved client treatment outcomes. These findings underscore the effectiveness of UTT in facilitating timely access to treatment and enhancing retention rates among HIV-positive individuals (Suryana, 2021).

Ethiopia is reported to be the first African country to implement the 6-month differentiated models of ART delivery to enhance access and coverage of ART. By the year 2021, at least 50% of PLHIV were on the fast track through the appointment spacing model, and a study to evaluate the factors associated with advantages and gaps in the model was carried out. Results from the perspectives of both clients and healthcare workers as participants showed increased efficiencies in time and cost savings from the reduced clinic visits for the clients. Service providers reported reduced workloads and less congested clinics from appointment spacing leaving more time to focus on non-enrollment clients and handling issues related to drug shortages (Mantell et al., 2023).

A comprehensive study evaluating the implementation of the World Health Organization's UTT policy was conducted across HIV clinics in all forty-seven counties of Kenya. UTT implementation was defined as the initiation of ART within 90 days of results confirmation, with a focus on achieving 12-month retention and viral load suppression. Findings from a 5-year cohort study revealed a substantial increase in UTT adoption, rising from 15% in 2015 to 52% in 2018. However, individuals initiating therapy after the three-month threshold exhibited poorer retention rates and higher viremia levels compared to those who started earlier. While the study

demonstrated progress in UTT policy utilization, the observed challenges including suboptimal retention rates and a lack of correlation with viral suppression underscore the need for holistic approaches. Integrating additional strategies alongside UTT implementation is essential to optimize positive outcomes and enhance the effectiveness of the intervention (Kimanga et al., 2022).

The literature review highlights different studies assessing the value of the UTT strategy in improving HIV care outcomes. They have emphasized that implementation has led to improved ART enrollment and retention rates, the importance of personal factors, such as social support, in immediate ART initiation, higher retention rates, client time and cost savings, and demonstrated systemic healthcare efficiencies including reduced healthcare provider workloads, while signaling the program's success in facilitating timely treatment. While TasP enhances the quality of life, it also presents challenges with increased treatment failure, and mortality challenges, suboptimal retention and viral suppression challenges, and untimely treatment linkage, hence highlighting the need for additional strategies to address these. These studies underscore the complexity of implementing UTT, revealing both successes and areas needing improvement to optimize HIV care outcomes, hence the need to assess these practical and methodological approaches here in Kenya. Drawing from above discussion, we proposed the following hypothesis.

H<sub>0</sub>: There is no significant relationship between UTT and health benefits.

Where,

$$y = \beta_0 + \beta_1 X_1 + e$$

y= Health Benefits;

$\beta_0$ = Constant,

$\beta_1$ = beta coefficient,

X<sub>1</sub>= Universal Test and Treat

e= error term

### Theory of Change

Theory of change entails proper planning and documenting the lessons learned and refining them to develop a better theory over time and continuously test these theories. Theory-based evaluation explains the logic behind programmed success or failure, and its supporters assert that it generates information unattainable through ordinary processes (Bogart et al., 2022). Processes vary over time and context, hence the need to recognize how the process takes place, and the underlying assumptions for the desired outcome to be realized. In the context of HIV management, these processes have greatly evolved. The identification of HIV-positive persons has changed from mass testing to eligibility screening and targeted testing through partner notification of family members, sexual contacts, and injecting drug users. Antiretroviral treatment has evolved from an individual's readiness, willingness, or availability of ARVs to same-day treatment of HIV-positive diagnosis. Cluster of Differentiation 4 (CD4) testing which looks at the functioning of the immune system changed to viral load testing which is also a laboratory examination that checks the load of HIV and monitors the response to antiretroviral therapy.

For change to occur, the processes must meet goals, by linking the activities with outcomes on how and the reasons the wanted change is to be realized by painting the big picture. Multidisciplinary approaches involving doctors, pharmacists, researchers, manufacturers, and suppliers continue to develop more potent and cheaper life-saving ARVs. For change to occur, data and information use are needed through the integration of M&E processes in activities from M&E planning, quality data collection and reporting using standardized indicators, centralized reporting systems with timelines, and regular supervision in partnership with local governments and communities. Further, the supply chain has advanced regulation and licensing by the WHO of local pharmaceutical companies to produce the drugs and increase access through funding collaborations and partnerships.

In this case, HIV projects acknowledge that communities are the focus of the success of the outcomes, while stakeholders and networks are key to ensuring equitable access to effective HIV care, respect for human rights, health education, political accountability, strengthening of health systems and adopting a person-centered approach for all.

### Conceptual framework

This study was based on this perceived conceptual framework:

The success of HIV programs is anchored on the ability to enroll and maintain clients on long-term life-saving drugs (Kimanga et al., 2022). Key components of the framework include immediate ART initiation which is

critical for rapid viral load suppression, which reduces disease progression and transmission risks. Appointment management means the involvement of clients in scheduling and spacing appointments which ensures a continuous and reliable supply of ART, reducing missed doses and supporting consistent care. Adherence and psychosocial support provide peer support to address mental and emotional challenges and enhance adherence to ART regimens, which is essential for maintaining viral suppression and improving quality of life. Resource allocation supports adequate resources, including sufficient staffing and a steady supply of ART commodities which are necessary to support patients effectively and ensure the sustainability of HIV programs.

These interventions collectively lead to critical patient outcomes leading to early and sustained viral suppression which is essential for preventing disease progression and transmission. Increased retention in care is a result of efficient appointment management and follow-up practices to ensure that patients remain engaged in care, reducing attrition rates and enhancing treatment continuity. Improved quality of life is attained through comprehensive psychosocial support improves the overall well-being of patients, contributing to better long-term health outcomes. Lastly, broader treatment coverage ensures that resources are available to support prompt initiation and ongoing care for all patients increasing the reach and effectiveness of HIV programs. Therefore, this conceptual framework suggests that these patient outcomes are interlinked and collectively contribute to the effective management of HIV, ultimately supporting public health goals by enhancing the well-being of people living with HIV and preventing the spread of the virus. These key elements of the conceptual framework provide a cohesive narrative that clearly explains the interconnected relationships between the independent variables (UTT strategies) and the dependent variables (patient health benefits), while also highlighting the overall impact on public health

### III. Methodology

#### Data and Sampling Strategy

This study applied the realism research paradigm because it encourages researchers to use multiple approaches to collect and analyze qualitative and quantitative data in one research study (Wambugu et al., 2015). A cross-sectional descriptive survey was designed to determine the relationship between the variables as it allows for the concurrent gathering of information, analysis, and interpretation of both forms of data, which were integrated into the interpretation of the outcome. A targeted population of 500 healthcare workers within clinics in Nairobi County and a sample size determination was used to draw a sample size of 226 (Yamane, 1967). A proportionate sampling technique was applied as it has more statistical accuracy.

Quantitative data were collected using a questionnaire and the instrument contained a Likert Scale containing the following categories: 5. Strongly agree, 4. Agree, 3. Neutral, 2. Disagree and 1. Strongly disagree. Qualitative data was acquired through a purposive sampling of facility support staff using 6 Focus Group Discussions (FGDs). Peer-mentors category of staff is key as “expert patients” and facilitates psychosocial support group sessions that provide real-life experiences in HIV care, hence deemed appropriate respondents for qualitative data.

The researcher pilot-tested the tools before data collection, as it identified the relevant study factors and evaluated the acceptability of instruments using 10% of the study sample. Validity in quantitative data was ensured by seeking views from experts in HIV programming to ensure that they sufficiently answered the research questions from the questionnaire. In qualitative data, it was ensured through construct validity. Triangulation was applied by using facilitators from different health facilities. Cronbach’s Alpha (1951) reliability coefficient was applied through the average correlations’ items of the instrument, those with 0.7 showed high consistency and were considered. Reliability in qualitative data used verbatim quotations from the focus group discussion guides (Kothari, 2004).

Descriptive analysis was performed to generate frequencies and percentages for the mean as a measure of central tendency. The measure of variability was performed using standard deviation. correlation analysis tested the direction and strength of the relationship regression analysis was performed to examine the significance of the influence of the independent variable on the dependent variables at a  $p$ -value  $\leq 0.05$  level of significance. Qualitative data was analyzed through these verbatim quotations from the recorded data from the FGD guides.

### IV. Data Analysis

#### Interval Measurement Scale as a Likert Scale

The Likert scale questions were applied where a group of statements were grouped to measure a single variable (Brown, 2011). The Likert scale was analyzed as an interval measurement scale using 5-point Likert-type

items. The items were weighted and interpreted with ranges between the lowest score of Strongly Disagree at 12 to the highest Strongly Agree at 60.

### Universal Test and Treat Results

The objective was examined using these indicators: immediate ART start, appointment management, resources for test-and-treat, adherence and psychosocial support, and commodity management. Respondents involved gave their sentiments on their level of agreement or disagreement with the statements on a scale of 1 to 5 strongly disagree to strongly agree respectively, as shown in Table 3.

**Table 1:** Universal Test and Treat and Health Benefits

| Category          | Interval Score | n   | Percentage (%) |
|-------------------|----------------|-----|----------------|
| Strongly Disagree | 12-21          | 0   | 0.0            |
| Disagree          | 22-31          | 0   | 0.0            |
| Neutral           | 32-41          | 11  | 5.4            |
| Agree             | 42-51          | 170 | 83.7           |
| Strongly Agree    | 52-61          | 22  | 10.8           |
| Total             |                | 203 | 100.0          |

**Source(s):** Developed by authors

These results indicated the majority 170 (84%) agreed, 22 (11%) strongly agreed, 11 (5%) respondents had an unbiased observation, while none 0 (0%), neither strongly disagreed nor disagreed with the statements put through. This supports studies conducted to support the role of early initiation of ART leading to better treatment outcomes signifying viability and likely success of “test-and-treat” towards the eradication of the HIV disease (Nicol et al., 2023).

**Table 2:** Descriptive Statistics for Universal Test and Treat Services

| N Statistic | Range Statistic | Minimum Statistic | Maximum Statistic | Mean Statistic | S.E   | Std. Deviation Statistic |
|-------------|-----------------|-------------------|-------------------|----------------|-------|--------------------------|
| 203         | 22              | 37                | 59                | 47.50          | 0.284 | 4.044                    |

**Source(s):** Developed by authors

Results on N statistics indicated that all the data was available. The range statistic (22) was the difference between the maximum (59) and minimum (37) perception score on test-and-treat. The mean statistic (47.50) was the mean perception of the respondents and lies in the fourth category (42-51), where most of the respondents agreed with statements put across regarding test-and-treat services, the mean standard error (0.284) was very low, meaning that the mean of the sample was very close to the population mean the standard deviation statistic (4.044) was very small meaning all the scores were grouping around the man. These outcomes align with prior studies that showed that immediate ART start has significantly reduced HIV infection compared to deferred treatment (Suryana, 2021).

**Table 3:** One-way ANOVA Analysis

| Factor         | Sum of Squares | df  | Mean Square | F     | Sig. |
|----------------|----------------|-----|-------------|-------|------|
| Between Groups | 959.10         | 2   | 479.55      | 24.39 | .000 |
| Within Groups  | 3931.89        | 200 | 19.66       |       |      |
| Total          | 4890.995       | 202 |             |       |      |

**Source(s):** Developed by authors

analysis of variance was applied as presented above and it was established that the F-significance value of 0.000 was less than 0.05 ( $p\text{-value}=0.000 < 0.05$ ). The F-calculated (24.393) was significantly larger than the critical value of F (3.89). Therefore, fail to reject the null hypothesis that there was a significant relationship between test-and-treat services and patient outcomes. The findings of the current study

indicate that immediate ART start has shown a significantly reduced HIV infection compared to deferred treatment (Korenromp et al., 2024).

**Table 4:** Descriptives for Test-and-Treat Services

|                | N   | M      | SD      | SE     | 95% CI for Mean |             | Min.  | Max.  |
|----------------|-----|--------|---------|--------|-----------------|-------------|-------|-------|
|                |     |        |         |        | Lower Bound     | Upper Bound |       |       |
| Neutral        | 11  | 43.18  | 4.06984 | 1.2271 | 40.448          | 45.916      | 39.00 | 51.00 |
| Agree          | 170 | 47.60  | 4.45012 | 0.3413 | 46.926          | 48.274      | 35.00 | 60.00 |
| Strongly Agree | 22  | 53.55  | 4.46923 | 0.9528 | 51.564          | 55.527      | 46.00 | 60.00 |
| Total          | 203 | 48.005 | 4.92066 | 0.3454 | 47.324          | 48.686      | 35.00 | 60.00 |

**Source(s):** Developed by authors

Results indicated that comparison in the means between strongly agree (53.55), agree (47.60), and neutral (43.18) showed that those strongly agreeing performed better than the last two groups. Further, in the Post Hoc analysis of the comparison of the performance between the three groups, there was no significant difference ( $p=0.000<0.05$ ).

**Table 5:** Post Hoc Tests for Multiple Comparisons using Tukey HSD for Universal Test and Treat Services

| Category       |                | Mean Difference (I-J) | Std. Error | Sig.  | 95% CI      |             |
|----------------|----------------|-----------------------|------------|-------|-------------|-------------|
|                |                |                       |            |       | Lower Bound | Upper Bound |
| Neutral        | Agree          | -4.41818*             | 1.37944    | 0.004 | -7.6755     | -1.1609     |
|                | Strongly Agree | -10.36364*            | 1.63733    | 0.000 | -14.2298    | -6.4974     |
| Agree          | Neutral        | 4.41818*              | 1.37944    | 0.004 | 1.1609      | 7.6755      |
|                | Strongly Agree | -5.94545*             | 1.00462    | 0.000 | -8.3177     | -3.5733     |
| Strongly Agree | Neutral        | 10.36364*             | 1.63733    | 0.000 | 6.4974      | 14.2298     |
|                | Agree          | 5.94545*              | 1.00462    | 0.000 | 3.5733      | 8.3177      |

The mean difference is significant at the 0.05 level. **Source(s):** Developed by authors

Results from Table 5 showed there was no significant difference between the neutral category of respondents who strongly agreed ( $p=0.004<H0.05$ ) and those who agreed ( $p=0.000<0.05$ ). Also, there was no significant difference between respondents in the strongly agree category who had a neutral opinion ( $p=0.000<0.05$ ) and those who agreed ( $p=0.000<0.05$ ). Therefore, there was no significant difference between responses with a neutral opinion, agreed, or strongly agreed that test-and-treat services play a major role in the positive outcomes of clients immediately started on ART rather than delayed treatment (Nicol et al., 2023).

**Table 6:** Correlation Model on Test and Treat and Health Benefits

| Variables       |                     | UTT  | Health Benefits |
|-----------------|---------------------|------|-----------------|
| UTT             | Pearson Correlation | 1    | .526            |
|                 | Sig. (2-Tailed)     |      | .000            |
|                 | n                   | 203  | 203             |
| Health Benefits | Person Correlation  | .526 | 1               |
|                 | Sig. (2-Tailed)     | .000 |                 |
|                 | n                   | 203  | 203             |

Correlation is significant at the 0.05 level (2-tailed). **Source(s):** Developed by authors

The results revealed a moderate positive correlation of 0.525, indicating a significant relationship with a ( $p$ -value of 0.000), less than the test level of significance of 0.05.

**Table 7:** Regression Analysis of Universal Test and Treat Services and Health Benefits

| Model Summary |                   |          |                   |                            |
|---------------|-------------------|----------|-------------------|----------------------------|
| Model         | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1             | .526 <sup>a</sup> | .277     | .273              | .19578                     |

Source(s): Developed by authors

The R-value (0.526) confirmed a moderate positive correlation. The R Square (0.277) explained 27.7% of patient health benefits. The remaining 72.3% was explained by other factors not accounted for in the model.

**Table 8:** Goodness-of-Fit ANOVA

| ANOVA |                |          |             |         |         |                    |
|-------|----------------|----------|-------------|---------|---------|--------------------|
| Model | Sum of Squares | df       | Mean Square | F       | Sig.    |                    |
| 1     | Regression     | 1352.477 | 1           | 1352.48 | 76.8251 | 0.000 <sup>b</sup> |
|       | Residual       | 3538.518 | 201         | 17.605  |         |                    |
|       | Total          | 4890.995 | 202         |         |         |                    |

Source(s): Developed by authors

The summary  $F(1,202) = 76.825, p=0.000 \leq 0.05$  as explained as the constant coefficient (17.605) represented the expected value of health benefits when all predictor variables were zero. The calculated F-value (76.825) was higher than the critical F-value (3.89), meaning that the regression model effectively explained the statistically significant relationship between the two variables and the goodness of fit of the model ( $p\text{-value} = 0.000$ ).

**Table 9:** Regression Coefficients

| Beta Coefficients       |                             |            |                           |       |      |
|-------------------------|-----------------------------|------------|---------------------------|-------|------|
| Model                   | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig. |
|                         | B                           | Std. Error | Beta                      |       |      |
| 1 (Constant)            | 17.61                       | 3.48       |                           | 5.06  | .0   |
| Test-and-treat Services | .64                         | .073       | .526                      | 8.765 | .0   |

Source(s): Developed by authors

The results from Table 9 explained the constant coefficient (17.605) represented the expected value of health benefits when all predictor variables were zero. The beta coefficient (0.526) denoted the change in one unit in test-and-treat uptake, will increase health benefits by 52.6%. The  $t$ -value (8.765) suggested that the coefficient for test-and-treat holds statistical significance ( $p\text{-value} = 0.000 \leq 0.05$ ), therefore, the null hypothesis was rejected meaning that test-and-treat services had a significant relationship with health benefits in HIV projects in the County.

Additionally, the findings concur with observations that job sharing and delegation of services to lower cadre staff enables the expansion of services and program sustainability (Buh et al., 2023). Similarly, it increased services to fulfill funders' targets compromised clients' services, and strained the staff which was in line with the current research that focused on test-and-treat which led to an influx of clients and strained public health systems. The current study also found that data collected regarding the success of test-and-treat being informed by clients' motivation and access was in line with the findings on the social and mental factors that drive HIV testing and therapy which indicated that motivation and were informed by the ability to access medical services and the constructive worth placed on the services (Chachu & Maboe, 2024)

The research collected qualitative information from focus group discussions to cater to the need for triangulation of the information collected from the respondents. A respondent had the following opinion that was captured by the researcher; These are mixed kinds of reactions, and it largely depends on how much a client has been prepared.

It is also a challenge if the patient is not counseled well. In terms of disclosure, it is quite a challenge for minors but for adults, the biggest challenge is usually disclosure because they may not know how their partners will perceive the news. However, the uptake is positive as there are great milestones achieved especially with the same-day ART initiation, considering that patients used to take up to six months to start treatment. Change is not easy. Once patients get used to a regimen, they get in some form of comfort especially those that work for them and the ease of use. Some patients are normally reluctant, have concerns and questions, and want to know why. The concerns are usually regarding the side effects. In the era of technology, some literate clients will require time to Google about the regimens even after counseling by healthcare workers. All in all, the aim is to provide patients with drugs that have better efficacy.

There is a system to handle clients who decline antiretroviral drugs. The system starts with client preparation and supports them through the journey. It is not an event; it is an ongoing process. Once treatment is disrupted or clients decline for one reason or another, follow-up is done but this is tailor-made by each facility, for example, calling them, sending them messages, and sometimes doing home visits.

## **V. Discussion**

The study revealed strong support for the test-and-treat approach among respondents, with a significant majority (95%) agreeing or strongly agreeing that it positively influences health benefits. The statistical analysis further supports this perception, showing a moderate positive correlation between test-and-treat services and improved health benefits. This correlation suggests that as the adoption of test-and-treat strategies increases, so does the likelihood of positive health outcomes for patients.

The low standard error and small standard deviation indicate a high level of consistency in respondents' views, implying a representative sample to the broader population. The ANOVA results, with a significantly large F-calculated value, confirm the model's robustness in explaining the relationship between the two variables. Qualitative data add depth to these findings, highlighting that despite initial reservations about same-day ART initiation, there has been substantial progress in preparing patients for immediate treatment. The acceptance of simplified drug regimens, such as one-pill-a-day, underscores the practicality and patient-centered nature of the test-and-treat approach.

## **VI. Conclusion**

The findings of the study underscore the effectiveness of the UTT approach in improving patient health benefits. The significant positive correlation between the adoption of these services and patient outcomes suggests that this strategy is a crucial element in the management of HIV. The strong agreement among respondents and the statistical evidence support the conclusion that increasing the utilization of test-and-treat services leads to better health outcomes for HIV patients. The model's good fit further validates the relationship, indicating that the test-and-treat approach explains a substantial portion of the variance in patient outcomes. The minimal mean standard error signifies that the sample mean closely aligns with the population mean, implying the sample's representativeness and supporting the conclusion that immediate ART initiation significantly reduces HIV infections in contrast to deferred treatment. Consequently, the alternative hypothesis asserting a substantial relationship between the two variables was accepted. This underscores that the accomplishment of test-and-treat strategies is guided by clients' motivation, accessibility, and the beneficial value placed on health services.

### **Implications and contribution of study**

In practice, the positive correlation between test-and-treat services and patient outcomes suggests that healthcare providers should continue to prioritize and expand the implementation of these strategies. Training programs for healthcare workers should focus on enhancing the delivery of same-day ART initiation and the management of simplified drug regimens to maximize patient adherence and outcomes.

On policy, policymakers should consider integrating test-and-treat strategies into national HIV management protocols. Given the evidence of their effectiveness, there is a strong case for allocating more resources to support the widespread adoption of these services. Policies that promote early ART initiation and streamline treatment regimens could significantly enhance the quality of care.

Lastly, on methodology, the study's use of both quantitative and qualitative methods provided a comprehensive understanding of the impact of test-and-treat services. Future research could build on this approach by incorporating longitudinal studies to track the long-term outcomes of patients who begin treatment under the test-and-treat strategy. Additionally, expanding the sample size and including more diverse populations could provide further insights into the generalizability of the findings.

To bridge the gap between theory and practice, it is essential to align strategic frameworks with real-world applications. The positive correlation between test-and-treat services and increased health benefits underscores the need for practical interventions that translate theoretical knowledge into effective healthcare delivery. Informed by evidence-based strategies consistent implementation of the approach, and can be achieved through comprehensive training programs.

From a policy perspective, integrating test-and-treat strategies into national HIV management protocols is crucial. This theoretical evidence supports the effectiveness of these strategies, and by embedding them into practice, policymakers can ensure that healthcare systems are equipped to deliver optimal care. Allocating resources to support the widespread adoption of these services will facilitate the practical application of theoretical insights, ultimately leading to improved health outcomes. By fostering a seamless connection between theory and practice, healthcare systems can more effectively combat HIV and enhance the quality of care for patients.

Based on the positive feedback provided by service providers, healthcare systems should scale up the implementation of treatment strategies to ensure that more patients benefit from early ART initiation as they are more likely to attain viral load suppression. Simplified system processes including appointment management, and support to adhere to treatment plans create a reduced workload for healthcare providers while improving patient benefits from the efficient service delivery system. Conducting comparative analyses among healthcare workers in different regions or settings is essential to identify variations in perceptions, influencing factors, and the effectiveness of interventions. Such analyses will provide insights into regional disparities and help tailor interventions to diverse contexts. Long-term studies to evaluate the sustained impact of test-and-treat services on patient benefits over several years can help explore its effectiveness across different demographics and regions to assess the generalizability of the findings.

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## **Competing interest statement**

The authors declare that they have no competing interests. This research was conducted in the absence of any commercial or financial relationships among authors and they do not have any potential conflict of interest.

## **Author (s) Contribution Statement**

All authors contributed to the conception of model, idea, and research design. They supported the acquisition of data, research design, estimation of methodology, and interpretation of results; drafting the manuscript in a scientific academic structure and Manuscript revision, and read, and approved the submitted version. Jacinta Mutie (the candidate) performed significant work while revising or providing the response to reviewers' comments.

## **Ethical consideration**

The researcher obtained a research permit from the National Commission for Science, Technology, and Innovation (NACOSTI) and the Kenyatta National Hospital and University of Nairobi Ethical Review Committee (KNH-UoN ERC). Respondents were assured of utmost confidentiality and their responses were used for the study; no personal information was recorded in the data collection instruments. The research findings were shared with willing participants. See attached Copies.

## **Data availability statement**

The authors confirm that the data supporting the findings of this study are available within the article.

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