

**THE GENDER-SPECIFIC SURVIVAL RATES AMONG
PEOPLE LIVING WITH HIV ON ANTIRETROVIRAL THERAPY
IN THE KYRGYZ REPUBLIC**

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Summary. In the Kyrgyz Republic for the entire period as of 12/31/2023, 13 289 people were living with HIV infection. Testing, treatment, and viral load suppression cascades are 70 - 79 - 90. Treatment approaches and low immune status affect the survival rate of PLHIV receiving ART. The purpose of this study is to conduct a survival analysis in HIV-infected patients on ART as well as to evaluate the efficacy of the treatment depending on gender. Data of 13 289 registered cases in the Kyrgyz Republic among patients of 18 years and older on ART was processed. An analysis of viral loads, the level of CD4 and death rates was carried out at different periods of duration of ART. The duration of ART influences survival rates positively, the latter being higher in women. Women achieve virological effectiveness at the start of ART faster than men. Virological and immunological effectiveness among women on ART is higher than among men. Timely initiated ART increases survival rates, especially among women.

Key words: antiretroviral therapy, HIV - infection.

**ПОКАЗАТЕЛИ ВЫЖИВАЕМОСТИ ПО ПРИЗНАКУ ПОЛА
СРЕДИ ЛЮДЕЙ, ЖИВУЩИХ С ВИЧ, ПОЛУЧАЮЩИХ АНТИРЕТРОВИРУСНУЮ
ТЕРАПИЮ В КЫРГЫЗСКОЙ РЕСПУБЛИКЕ**

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Резюме. В Кыргызской Республике за весь период по состоянию на 31.12.2023 с ВИЧ-инфекцией проживало 13 289 человек. Каскады тестирования, лечения и подавления вирусной нагрузки составляют 70–79–90. Целью исследования является проведение анализа выживаемости ВИЧ-инфицированных пациентов на АРТ, а также оценка эффективности лечения в зависимости от пола. Использованы данные 13 289 зарегистрированных случаев по состоянию на 31.12.2023 года среди пациентов 18 лет и старше на АРТ. Анализ вирусной нагрузки, уровня CD4 клеток и смертности проводился в разные периоды длительности АРТ. Продолжительность АРТ положительно влияет на выживаемость, причем последняя выше у женщин. Иммунологическая и вирусологическая эффективность у женщин, получающих АРТ, выше, чем у мужчин. Своевременно начатая АРТ повышает выживаемость, особенно среди женщин.

Ключевые слова: антиретровирусная терапия, ВИЧ – инфекция.

КЫРГЫЗ РЕСПУБЛИКАСЫНДАГЫ АИВ ИНФЕКЦИЯСЫ МЕНЕН ЖАШАГАН АДАМДАРДАН АНТИРЕТРОВИРУСТУК ТЕРАПИЯ АЛГАНДАРДЫН ЖЫНЫСТЫК ӨЗГӨЧӨЛҮГҮНӨ ЖАРАША ЖАШАП КЕТҮҮ КӨРСӨТКҮЧТӨРҮ

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Резюме. Кыргыз Республикасында 12/31/2023 күнгө ылайык 13 289 адам АИВ инфекциясы менен жашайт. Тестирлөө, дарылоо жана вирустук басмырлоо көрсөткүчү 70-79-90. Изилдөөнүн максаты - АРТдагы АИВ менен жашап кетүү көрсөткүчтөрүн анализдөө жана жынысына жараша дарылоонун натыйжалуулугун эсептөө. Кыргыз Республикасынын АРТ алган 18 жаштан жогорку 13 289 кишинин маалыматы колдонулду. Вирустук басмырлоо, CD4 клеткаларынын деңгээли жана өлүм көрсөткүчтөрүнүн анализи АРТ процессинин ар башка мөөнөттөрүндө жүргүзүлдү. АРТ мөөнөтү жашап кетүү көрсөткүчүнө жакшы таасир этет, өзгөчө аялдарда. АРТ алгандардын ичинен аялдарда иммундук жана вирустук эффективдүүлүк эркектерге караганда жогору. Убагында башталган АРТ жашап кетүү көрсөткүчүн жакшыртат, өзгөчө аялдарда.

Негизги сөздөр: аниретровирустук терапия, АИВ инфекциясы.

Introduction. According to WHO, an estimated 39.0 million people were living with HIV at the end of 2022. In 2022, 630,000 people died from HIV-related causes and 1.3 million people acquired HIV. Of the total, 17.4 million were men over 15 years of age. There is no cure for HIV infection. However, with access to effective HIV prevention, diagnosis, treatment, and care, including for opportunistic infections, HIV infection has become a manageable chronic health condition, enabling people living with HIV to lead long and healthy lives.

WHO, the Global Fund, and UNAIDS all have global HIV strategies that are aligned with the SDG target 3.3 of ending the HIV epidemic by 2030. By 2025, 95% of all people living with HIV (PLHIV) should have a diagnosis, 95% of those should be taking lifesaving antiretroviral treatment (ART) and 95% of PLHIV on treatment should achieve a suppressed viral load for the benefit of the person's health and for reducing onward HIV transmission [1].

According to the Republican Center for the Control of Hemocontact Viral Hepatitis B, C and HIV infection in the Kyrgyz Republic, the cascade of testing, treatment and suppression of viral activity is 81 - 70 - 91. Of the total number of PLHIV on antiretroviral therapy, the majority - 3417 people are men, 2821 people are women. In the category of people 18 years of age and older, 43.6% of all male PLHIV diagnosed with HIV receive antiretroviral therapy; among all women, 60.56% receive ART [2].

A little-studied analysis of statistical data among PLHIV in the Kyrgyz Republic, taking into account differences in different age categories and duration of use of antiretroviral drugs, will allow us to conclude

the epidemiological situation, clinical manifestations of HIV infection, level of adherence to ART, as well as to assess its virological and immunological effectiveness.

Objective: conducting an analysis of the effectiveness of ART to assess the survival rate of HIV-infected people on ART among men and women.

Methods and materials used. According to the Republican Center for Control of Bloodborne Viral Hepatitis B, C, and HIV Infection in the Kyrgyz Republic, as of 01/01/2024, 12,495 people living with HIV were registered among citizens of the Kyrgyz Republic, out of a total of 13,289 people living with HIV infection. Men make up the majority - 59.3% (7140 people), women - 34.4% (4148 people), and children - 6.3% (755 people). Among all identified cases, 79% (6208 people) receive antiretroviral therapy.

The criteria for inclusion in the study were the age of patients 18 years and older, taking antiretroviral therapy for the last 15 years or more, 10-15 years, 5-10 years, 3-5 years, 1-3 years and started antiretroviral therapy in 2023. The exclusion criteria were people who were not taking antiretroviral therapy, as well as people who died of AIDS without antiretroviral therapy. An analysis of viral suppression and an assessment of the level of CD4+ T cells was carried out at different periods of duration of receiving antiretroviral drugs (15 or more years, 10-15 years, 5-10 years, 3-5 years, 1-3 years and among those who started antiretroviral therapy in 2023).

Statistical methods were used to calculate the reliability of the results using the EpiInfo program version 7.2.6.0., IBM SPSS statistics - determination of p-value indicator ($p \leq 0.05$), CI, Kaplan - Meyer curve, and odds ratio ($CI = c/d/a/b$).

Results. When considering the influence of ART duration and gender on virological effectiveness (Figure 1), it was noticed that women reach suppressed viral loads (<50 copies/ml) faster than men at the beginning of ART ($CI\ 1.0-1.6$; $p < 0.05$).

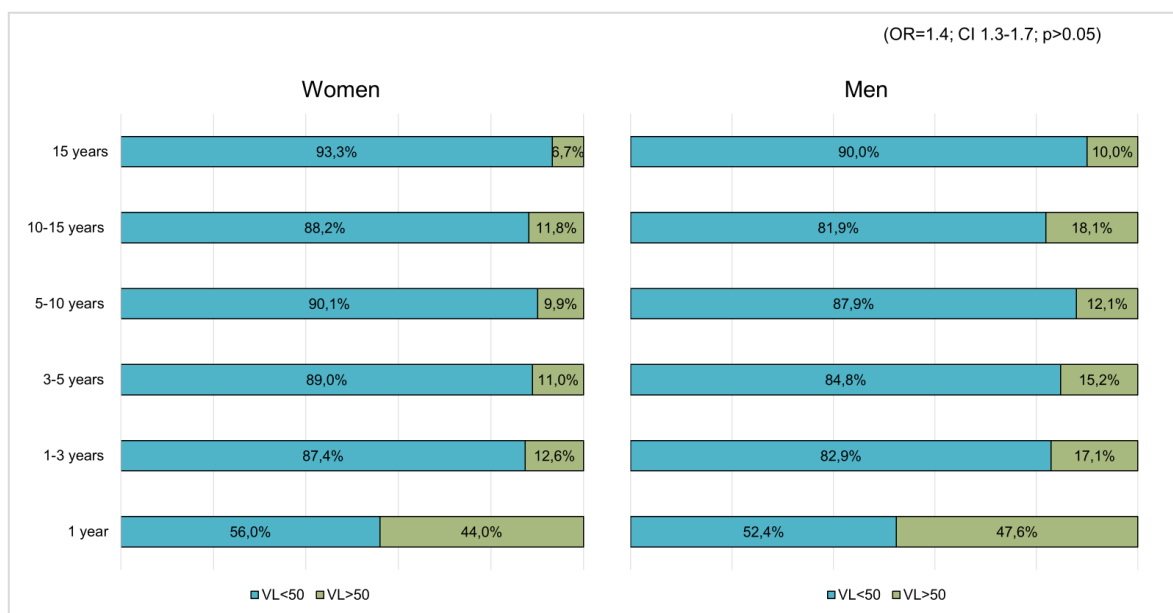


Figure 1. Virological effectiveness of ART.

Generally, men reach low viral loads less often than women ($CI\ 1.3-1.7$; $p < 0.05$). The number of people with viral suppression increases with the duration of ART.

An analysis of immunological effectiveness showed the following results (Figure 2). Among patients, who started ART in 2023, a larger

proportion of men achieved high CD4 T-cell levels – 56.2% (520), among women 48.3% (327) ($CI\ 1.4-2.5$, $p < 0.05$). The remaining categories showcased CD4 T-cell levels of 350 cells/ μL increasing with the duration of ART, as well as higher immune cell counts among women rather than men ($CI=0.8$; $CI\ 0.7-0.9$; $p < 0.05$).

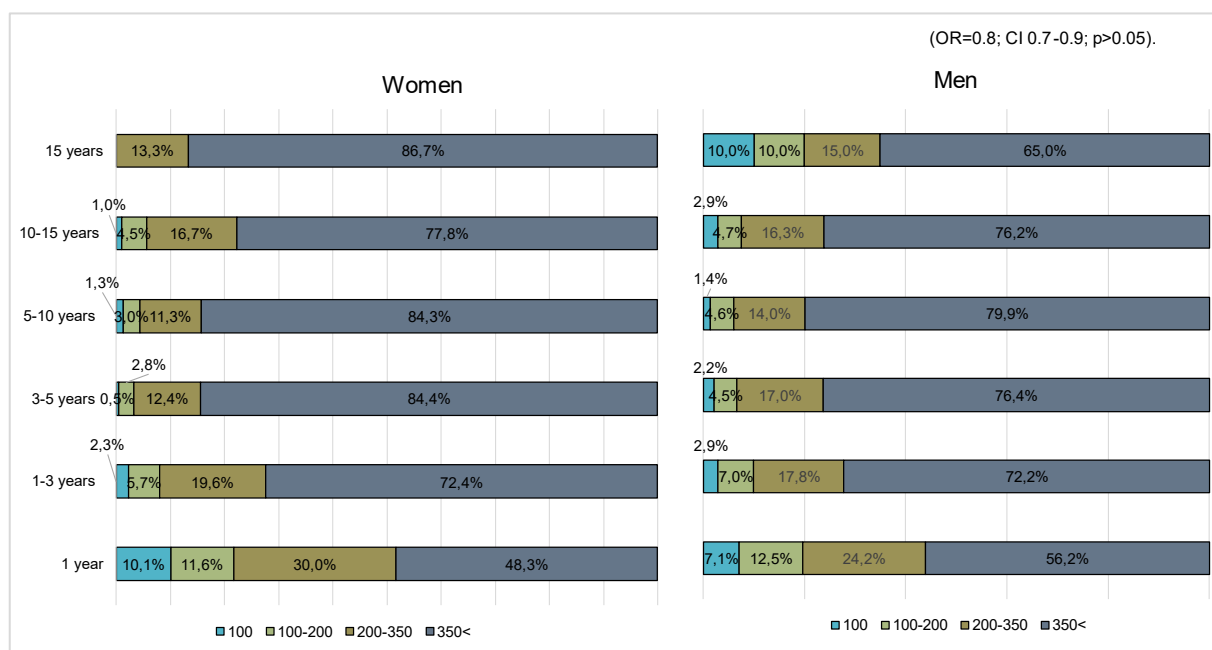


Figure 2. Immunological effectiveness of ART.

The mortality rate among PLHIV on antiretroviral therapy is 21% (1899). Among PLHIV not receiving antiretroviral therapy more died, accounting for 39% (1369) (CI 0.50 - 0.56; $p<0.05$).

The mortality rate among PLHIV taking ART is 18% lower than among PLHIV who were not taking ART, and this fact supports the fact about the impact of antiretroviral therapy on survival among PLHIV (Figure 3).

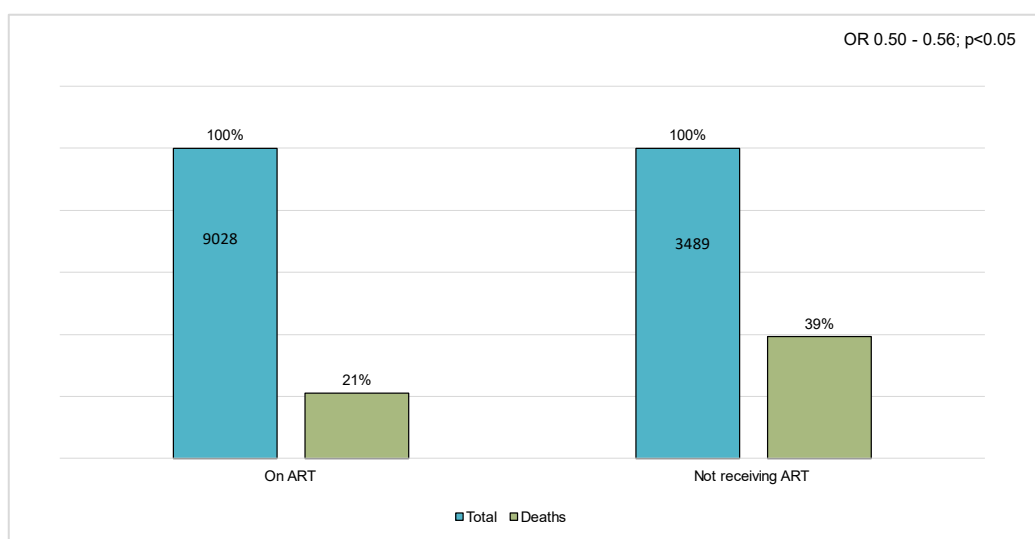


Figure 3. Mortality rates among PLHIV in the Kyrgyz Republic.

When evaluating the antiretroviral therapy coverage among men and women with HIV, three groups were analyzed: individuals receiving ART,

those diagnosed but not enrolled in treatment, and those who were diagnosed but deceased later on (Figure 4).

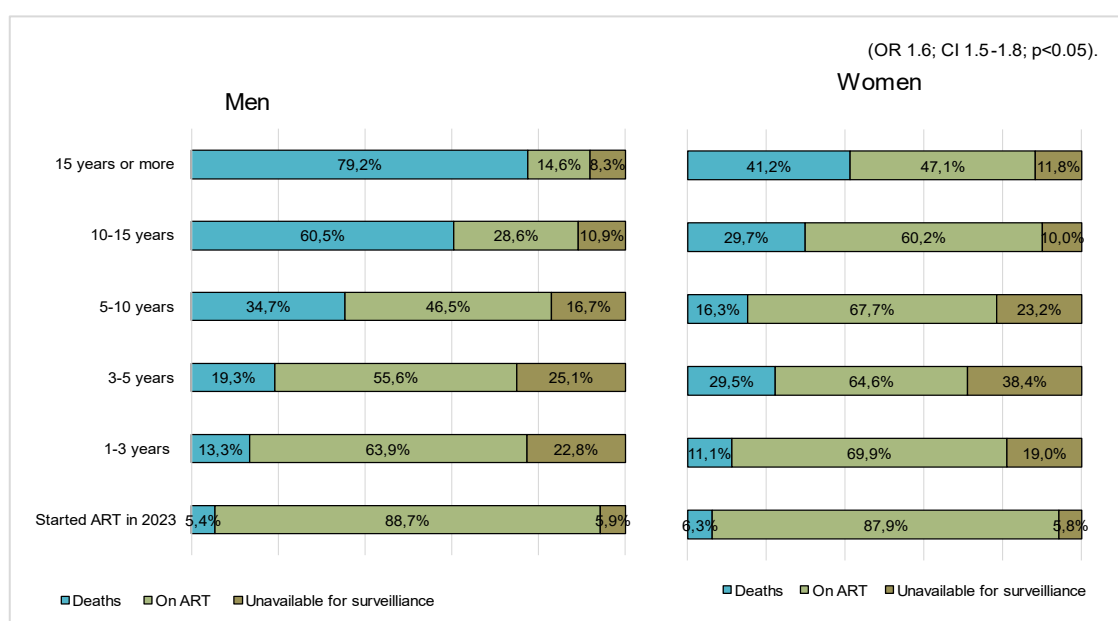


Figure 4. Comparative characteristics of PLHIV.

It is evident that after getting diagnosed with HIV women continue antiretroviral therapy more often in comparison to men (CI 1.6 - 1.9, $p<0.05$).

Accordingly, death rates prevail among male patients. (CI 1.6 - 2.0, $p<0.05$). Overall, death rates gradually grow, while the number of living patients on ART declines over time.

Concerning the timing of ART initiation (Figure 5), the following data was found. Overall, the number of surviving patients is higher among people, who started ART on time, after getting diagnosed. The belated initiation of ART correlates with a larger number of deaths. The least amount of surviving PLHIV is in the group of patients who never began the treatment.

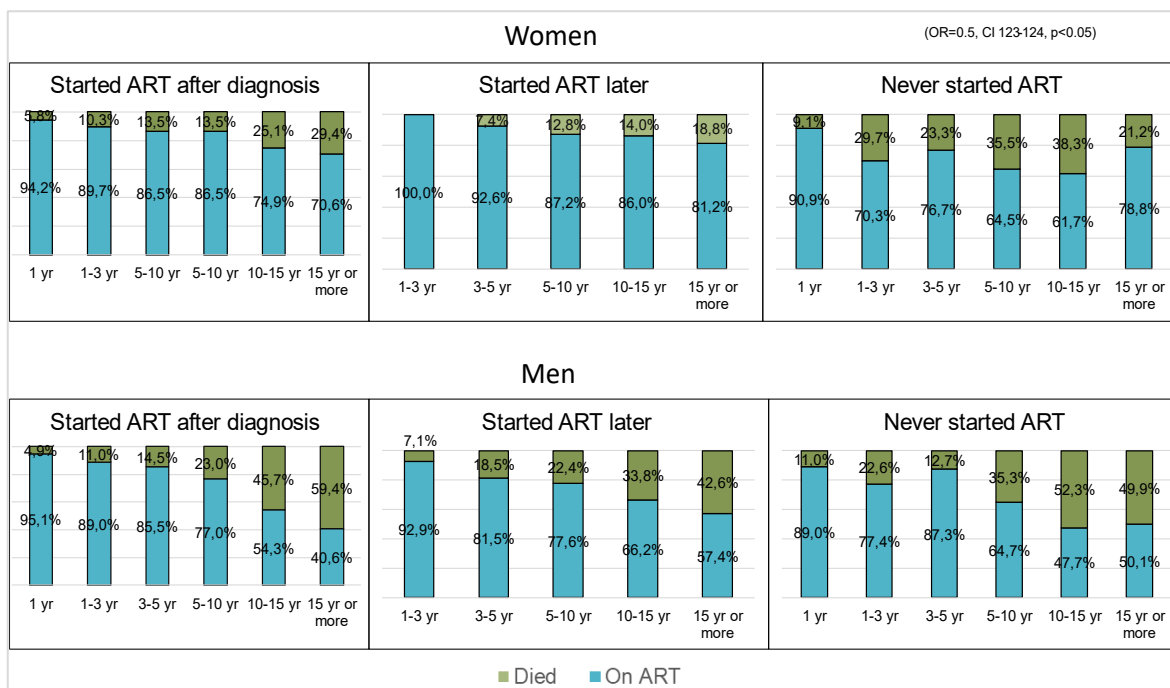


Figure 5. The number of dead and surviving patients based on ART initiation.

In general, 87.7% (2668) of women and 82.7% (3456) of men who were assigned to ART after finding out their HIV status survived (CI 1.3 - 1.7, p<0.05). That

number is lower among the group of patients who began the treatment later (CI 2.4 - 4.0, p<0.05). PLHIV not on ART survived less often (CI 1.4 - 1.9, p<0.05) (Figure 6).

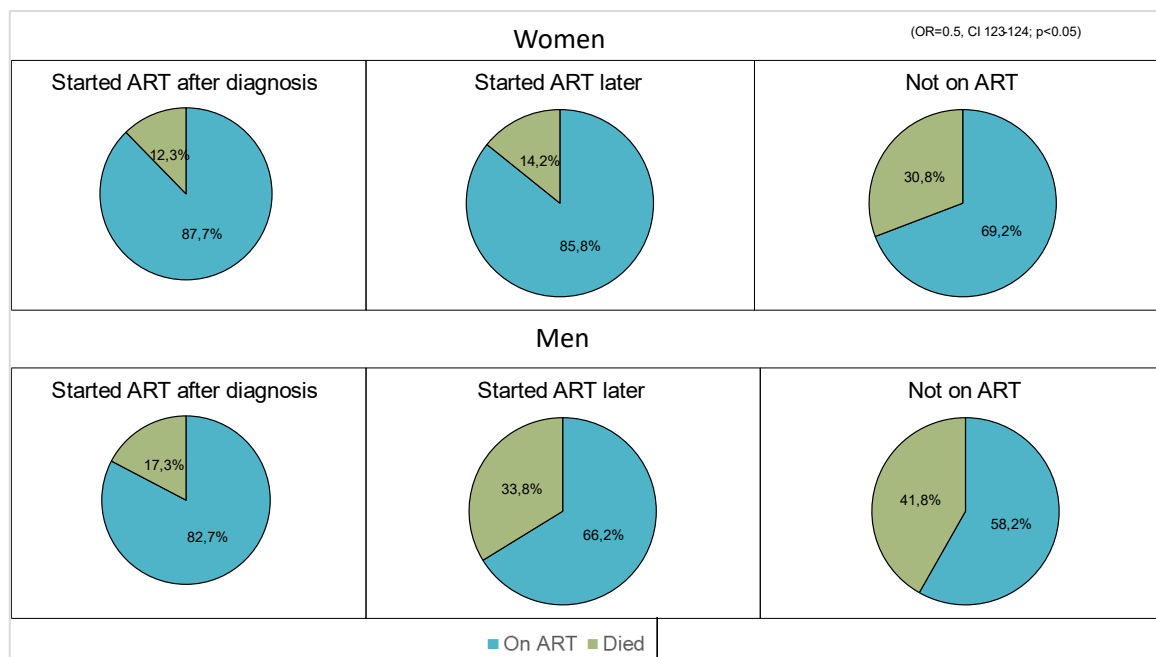


Figure 6. The number of dead and surviving patients based on ART initiation, summary.

The survival rates were analysed within the Kaplan-Meier survival estimator curve. It indicates that survival probability declines depending on the time spent on ART among men and women. It is clear, however, that women have a survival probability (70%) 10 years or more after HIV

diagnosis. At this point, men have approximately a 62% chance of surviving. In 10-15 years or more, women are 55% likely to survive, while at this point, among men the survival probability drops down to 30%. (Figure 7).

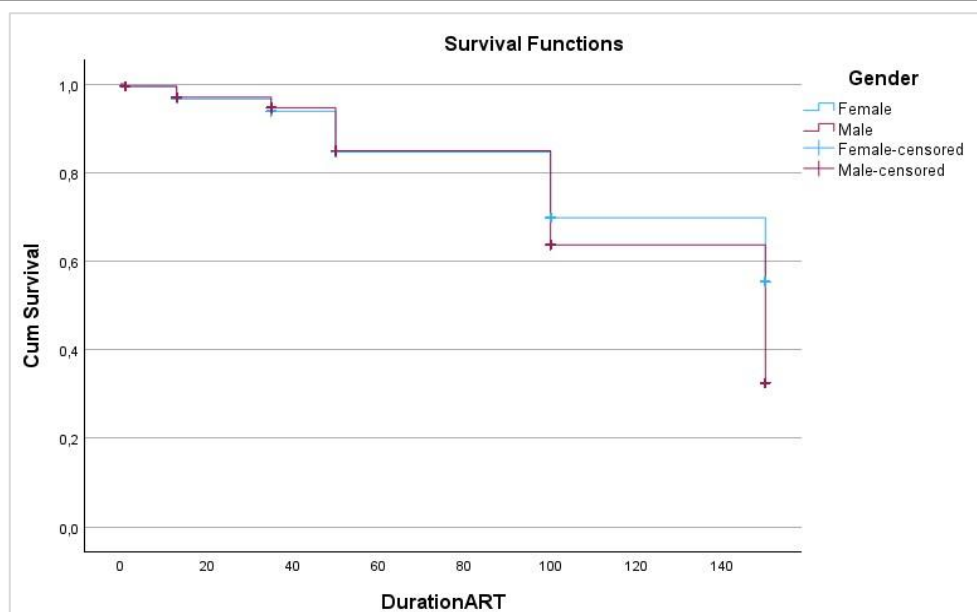


Figure 7. Kaplan – Meier survival estimator curve among PLHIV on ART.

Discussion. Antiretroviral therapy (ART) has been shown to reduce mortality among the infected and efforts are being made to make it more affordable within low- and middle-income countries. The results showed that in recent years, due to the appropriate treatment, the survival rate of HIV patients has increased [3]. The highest risk factor of death was for people with low CD4+ T cell count, lack of antiretroviral therapy, low level of education, male gender, and people who inject drugs. These people need more attention to get tested for HIV- related indexes and to receive proper treatment [4]. Mortality and LTFU are high among ART-receiving HIV-2-infected individuals and higher in men than in women. There is a critical need to determine the causes of poor retention further and implement sex-specific solutions that improve outcomes in HIV-2 ART programs [5].

Timely initiation of ART appears to be a crucial factor in improving survival rates, particularly among women. This underscores the importance of early diagnosis and prompt treatment initiation in enhancing the prognosis for HIV-infected individuals, especially men. It indicates the estimation of the survival benefit, suggesting that timely ART initiation could be a key strategy in reducing gender disparities in HIV treatment outcomes. Early initiation of ART could have benefits beyond suppressing viral load and restoring CD4+ T cell counts. In addition, it could boost the innate immunity necessary to control disease progression, as well as being highly effective and safe [6,7].

A total of 3,357 people living with HIV died, of which 1,082 died at the AIDS stage. The share of women from the total number of deaths among persons 18 years of age and older is 25.3% (833 people), men – 74.69% (2459 people). Among men on antiretroviral therapy, the proportion of deaths

was 25.18%, while among women it was 17.21%. (CI 1.6; CI 1.5-1.8; $p < 0.05$). 9.9% of HIV-infected people had results of “probably recent infection”, and 90.1% had results of “probably old infection”. Among those newly diagnosed and those with recent infection (9.9%), advanced stages of HIV infection are observed. In 97% of cases, ART was prescribed among men with “recent infection” and 92.6% with “long-standing infection” [8].

Further efforts to develop tailored intervention strategies for different types of engagement behaviors, monitor early engagement to identify higher-risk patients, and better understand the determinants of these heterogeneous behaviors can help improve care delivery and survival in this population [9].

There is a dearth of psycho-social support interventions to improve adherence and retention in ART amongst adolescents and young adults living with HIV. Future research and programming should seek to address psychosocial support interventions or approaches specifically designed to address the needs of young PLHIV [10].

This study, while robust, has certain limitations that should be acknowledged. The study's observational nature may be subject to confounding factors that were not fully controlled. Additionally, the study did not explore the underlying mechanisms driving the observed gender differences, which could be an area for future research. Further studies should also examine the socio-economic and cultural factors that might influence ART adherence and effectiveness differently among men and women.

Conclusions:

1. The survival rate among women on ART is higher than among men (CI 1.5-1.8; $p < 0.05$).

2. Virological (CI 1.3-1.7; $p<0.05$) and immunological (CI 0.7-0.9; $p<0.05$) effectiveness among women is higher than among men

3. Timely initiated ART increases survival rates, especially among women (CI 123-124, $p<0.05$)

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