

Delivering antiretroviral therapy by courier pharmacy is associated with improved outcomes

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Introduction

Adherence to antiretroviral therapy (ART) is a key determinant of outcomes in patients on ART. One intervention that may improve adherence is delivering antiretroviral therapy by courier. We evaluated the effectiveness of this strategy in a large southern African private-sector ART program.

Methods

We conducted a retrospective cohort study of adult (≥ 19 years) patients on on-going ART through a private sector managed care HIV program in South Africa (Aid for AIDS). First line ART regimens consisted of a non-nucleoside reverse transcriptase inhibitor (NNRTI) in combination with two nucleoside reverse transcriptase inhibitors (NRTI). The criteria to commence on-going ART was either a CD4+ cell count < 350 cells/ μL on two occasions or the onset of an AIDS-defining illness. Defaulting was defined as no ART claimed for 6 months or more.

Patients were divided into groups depending on how ART was dispensed: (1) collect pharmacy (control), (2) courier pharmacy, and (3) switched pharmacy (from control to courier pharmacy). We looked at two outcomes: (a) the risk of dying, using multiple Cox proportional-hazard regression, adjusted for age at starting ART, sex, baseline CD4 count and viral load, NNRTI (efavirenz or nevirapine), and year of starting ART; and (a) the trends in CD4 counts and viral load suppression rates over time using Wilcoxon rank sum test.

Results

We included 40,939 patients with 106,461 years of follow-up in this analysis: 19,202 collect pharmacy, 14,620 courier pharmacy, and 7,117 switched pharmacy. Baseline characteristics were similar between the three groups: median CD4 count 150 (67 to 230), median baseline \log_{10} viral load 4.9 (4.1 to 5.4), age 38 years, 60% female, and median time on ART 1.8 years (IQR: 0.9 to 3.4) – see table 1.

Comparing courier pharmacy with control groups, the adjusted hazard ratio of death was 0.92 (95% CI 0.88 to 0.99), median CD4 counts were significantly higher (390 versus 363 at 2 years and 483 versus 414 at 4 years), and viral suppression rates were significantly higher (81% versus 71% at 2 years and 82% versus 69% at 4 years).

In the switched pharmacy group, CD4 counts and viral load suppression rates improved significantly after switching from collect to courier pharmacy.

| Categories | Collect pharmacy (control) | Courier pharmacy | Switched pharmacy (collect to courier) | |
|--|----------------------------|---------------------|--|------------|
| Cohort size (n) | 19 202 | 14 620 | 7 117 | |
| Time on antiretroviral (years) | 31 983 | 34 220 | 40 257 | |
| Baseline CD4 count (cells/ μL) | Median (IQR) | 150 (65 to 235) | 151 (68 to 229) | |
| | n (missing) | 18158 (1044) | 14333 (287) | 7005 (112) |
| Baseline viral load (\log_{10} copies/ml) | Median (IQR) | 4.85 (3.94 to 5.41) | 4.83 (4.04 to 5.38) | |
| | n (missing) | 17343 (1859) | 13691 (929) | 6811 (306) |
| Age at starting ART (years) | Median (IQR) | 37.6 (32.9 to 43.5) | 39.1 (33.7 to 45.4) | |
| Sex (% female) | | 59.1 | 60.0 | 63.7 |

Table 1: Cohort characteristics

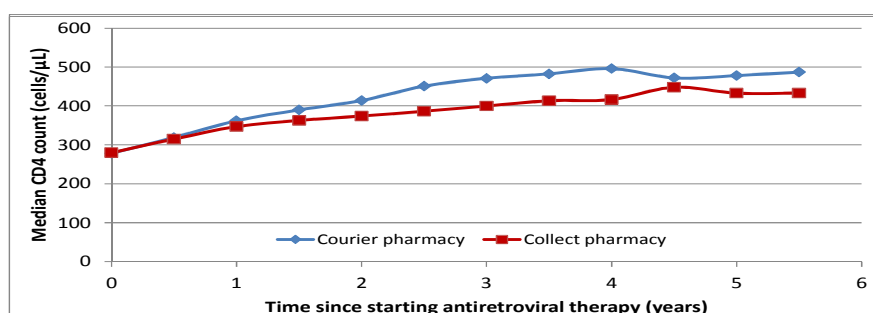


Figure 1: CD4 cell count recovery in patients who started and remained with either collect pharmacy (red) or courier pharmacy (blue) for supply of ART.

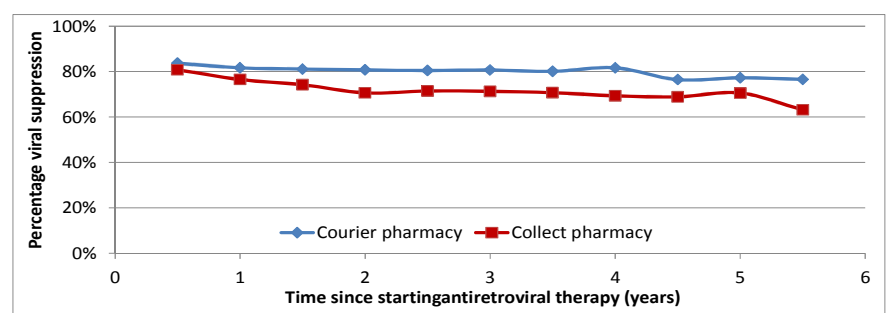


Figure 3: Viral load suppression patients who started and remained with either collect pharmacy (red) or courier pharmacy (blue) for supply of ART.

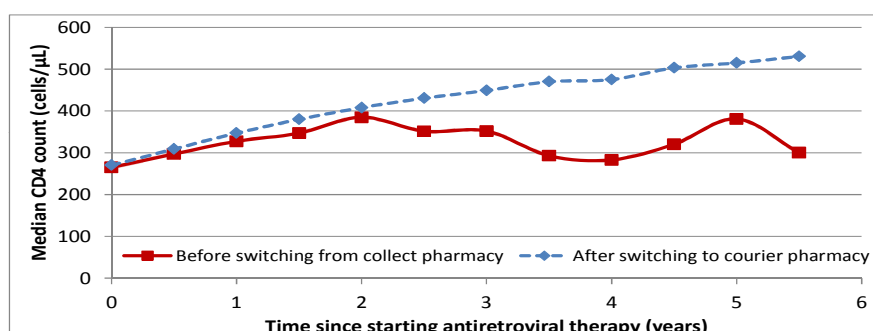


Figure 2: CD4 cell count recovery in patients who started with collect pharmacy (red) and then switched to courier pharmacy (dotted blue) for supply of ART.

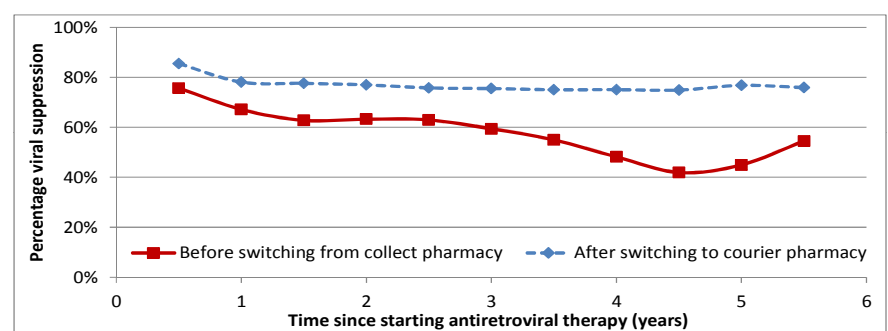


Figure 4: Viral load suppression in patients who started with collect pharmacy (red) and then switched to courier pharmacy (dotted blue) for supply of ART.

Discussion

Delivering ART by courier pharmacy was associated with significant improvements in CD4 counts, viral suppression rates, and mortality. Patients switching from collect to courier pharmacy were associated with significant improvements in CD4 counts and viral load suppression rates. This intervention should be further investigated in public sector ART programs in resource limited settings.

Acknowledgements

This work was funded by a CIDRI award, Wellcome Trust. The funders had no role in the design of the study, analysis of the data, or decision to publish.