Background:

There are several plausible mechanisms from ART to household welfare, and the direction of net effects is unclear:

1. Patients incur costs when utilizing ART (e.g., for travel, even where ART is free of charge).
2. Patients recover health and employment on ART.

This study examines the impact of ART on one aspect of household welfare—household food security.

ART may impact household food security in several ways (+/-):

1. Individuals who recover on ART may work more and contribute more to household finances which may be spent on food (+).
2. Individuals who recover on ART may regain stamina and contribute more towards household agricultural production (+).
3. Individuals on ART may recover appetite faster than stamina putting pressure on limited household resources (-).
4. The costs of being on ART, which are high relative to income in this population, may put significant pressure on household resources and that initially outweigh financial benefits of recovery (-).

Methods:

Data: Longitudinal health, demographic, and economic data collected from 2004-2012 by the Africa Centre for Population Health.

Sample: 2300 members of the Africa Centre’s Demographic Surveillance Area in rural KwaZulu-Natal, South Africa

Analysis: Regression discontinuity design using earliest CD4 count around the 200 threshold as an instrument for ART initiation.

Model: \( Y_i = \alpha + \beta_0 \cdot \text{Exposure}_i + X_i \gamma + T_i \delta + \epsilon_i \)

- \( \text{Exposure}_i \) is early ART the instrumented by initial CD4 < 200
- \( X_i \) represents a vector of individual-specific controls for age at first visit and sex
- \( T_i \) is a vector of survey year fixed-effects
- \( \epsilon_i \) is an individual specific error term

Note: All standard errors are at the household level & model is run on a bandwidth of 100 CD4 count around CD4 of 200

Outcomes:

1. Probability of an adult in the household missing any food for financial reasons in the last month
2. Probability of an adult in the household missing a meal for financial reasons in the last month
3. Probability of a child in the household missing a meal for financial reasons in the last month

Results:

1. ART causes a significant increase in the probability of food insecurity in the year following ART initiation, which diminishes to 0 between 1 and 3 years after ART initiation.
2. In the first year after initiation, ART initiation yields a significant increase in:
   a. The probability of an adult in the household missing any food by 5.5 percentage point (0.055, 95% CI = [0.0190, 0.0904])
   b. The probability of an adult in the household missing a meal by 6.5 percentage points (0.065, 95% CI = [0.0156, 0.1147])
   c. The probability of a child in the household missing a meal by 4.6 percentage points (0.046, 95% CI = [0.0036, 0.0892])
3. Upper bounds on these causal estimates are an approximately 5 fold increase in household food insecurity due to ART initiation

Conclusions:

1. ART initially places a significant burden on household food security.
2. This negative effect of ART on household food security dissipates over time (between 1 and 3 years post-initiation)
3. Findings provide evidence for the hypotheses that
   a. The financial burden of utilizing ART, which are high relative to income in this community, initially outweigh the longer-term beneficial ART effects on employment and income.
   b. Individuals recover appetite at a faster rate than economic benefits, putting pressure on limited household food supply.

Policy Recommendation:

Temporary and cost-effective food or financial support programs should be considered to alleviate the short-term loss in food security following ART initiation, especially in the context of the expanding ART rollout and treatment-as-prevention strategies.

References:


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