**INTRODUCTION**

There has been an increasing policy and research interest in the relationship between the HIV epidemic and the rise in non-communicable diseases (NCDs) in sub-Saharan Africa. While HIV-infected individuals have a higher risk of cardiovascular disease (CVD)\(^1\), a probably far more important driver of the epidemiological transition from acute infectious diseases to chronic NCDs in sub-Saharan Africa is the massive scale-up of antiretroviral therapy (ART). ART’s success indirectly increases the burden of CVD, since individuals who would have otherwise died from HIV now survive into old age\(^2,3\). In addition, there has been a growing concern that ART has side effects that increase patients’ risk of developing CVD\(^4\).

Another possible reason for the increased risk of CVD in ART patients is the well-reported gain in weight when HIV patients are initiated on ART\(^5,6\). Severe wasting is part of the natural history of HIV infection. As past and, albeit to a lesser extent, current treatment guidelines recommend ART only for those HIV-infected patients who are related advanced, and because a large proportion of HIV-infected individuals enroll in care late\(^7\) (i.e., when they are already eligible for ART), many HIV-infected individuals are likely to have lost significant amounts of weight by the time they are initiated on ART. By greatly extending the life expectancy of these patients, ART increases the proportion of individuals in the population who have lost weight due to HIV. It is unknown how rapidly and to what degree these ART patients regain the weight they lost, or indeed, if their weight on ART eventually exceeds their weight at the time of infection.

**OBJECTIVES**

The aim of this study is two-fold:

1. To determine the association between the ART scale-up and BMI and BP at the population-level
2. To evaluate the secular trend in BMI and blood pressure (BP) in the HIV-uninfected population.

**METHODS**

We conducted two anthropometric surveys, one before ART scale-up in 2004, and one in 2010 when an estimated 25% of HIV-infected individuals in the surveillance area were on ART (Fig. 1). The two anthropometric surveys were conducted in the Africa Centre for Population Health’s HIV surveillance area, which is located in rural KwaZulu-Natal. We selected a random sample of 30 subareas within the surveillance area for the survey in 2004. The same 30 areas were chosen for the 2010 survey. All eligible individuals in these areas were contacted for both surveys. Eligibility criteria for participation in the study were: 1) being a resident household member in one of the sampled subareas, and 2) being aged between 25 and 49 years for females and 25 and 54 years for males. Data from the anthropometric surveys was matched with HIV surveillance data.

**RESULTS**

3,000 individuals were contacted for the 2004 survey, of which 2,252 (75.1%) agreed to a height and weight measurement and 2,266 (75.5%) to a BP measurement. For the 2010 survey, 4,608 were contacted, 2,088 (45.3%) agreed to a height and weight measurement and 2,584 (55.3%) to a BP measurement. 276 individuals participated in both surveys.

### Table 1. BMI and blood pressure among males

<table>
<thead>
<tr>
<th>Survey Year</th>
<th>2004</th>
<th>2010</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>1,505</td>
<td>1,491</td>
<td>0.002</td>
</tr>
<tr>
<td>Mean BMI (kg/m(^2))</td>
<td>24.2 (23.4–25.7)</td>
<td>23.0 (22.2–23.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Weight loss (kg)</td>
<td>20.2 (17.2–23.6)</td>
<td>12.4 (10.7–18.4)</td>
<td>0.048</td>
</tr>
<tr>
<td>Overweight (%)</td>
<td>0.07</td>
<td>0.03</td>
<td>0.053</td>
</tr>
<tr>
<td>Obese (%)</td>
<td>0.05</td>
<td>0.02</td>
<td>0.030</td>
</tr>
<tr>
<td>Mean diastolic BP (mmHg)</td>
<td>79.6 (79.0–80.2)</td>
<td>81.4 (80.8–82.7)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

While there have been fears that the ART scale-up would contribute to the rise in cardiovascular disease in sub-Saharan Africa, by increasing obesity, we found that mean BMI, systolic BP, and the proportion of the population who is overweight and obeze has decreased in the first six years of ART scale-up in this rural community in KwaZulu-Natal with high levels of exposure to HIV. This population-level decline in BMI is likely due to ART improving the survival of those with substantial HIV-related weight loss, and the decline in BMI in HIV-uninfected men. For individuals who were overweight prior to HIV infection, the health benefits of ART could be maximized if chronic ART services are accompanied by appropriate lifestyle and nutrition counseling to achieve and maintain a healthy BMI.

**REFERENCES**


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