Universal HIV “Test and Treat” Linked to Lower Transmission in Botswana

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An intensive program to provide universal HIV testing and treatment along with other prevention methods appears to have driven about a 30% reduction in new infections in the various communities in Botswana that were included in a recent major study. Researchers also found that the program was associated with an impressive rise in viral suppression rates.

This pair-matched, community-randomized study, called the Ya Tsie trial, or the Botswana Combination Prevention Project, is one of three similar research endeavors just reported in The New England Journal of Medicine. All examined the effects of widespread HIV testing and treatment on local transmission rates in an array of sub-Saharan African communities. Findings from the other two studies, PopArt and SEARCH, were previously presented at the 2019 Conference on Retroviruses and Opportunistic Infections (CROI) in Seattle and at the International AIDS Conference in Amsterdam (AIDS 2018), respectively.

As reported in The New York Times, the three studies reached similar conclusions: that the test-and-treat strategy reduced HIV transmissions by 30%—not quite the dramatic reduction that modeling by the Joint United Nations Programme on HIV/AIDS (UNAIDS) predicted when the global agency first established its so-called 90-90-90 targets five years ago.

In 2014, UNAIDS called upon nations to get 90% of their HIV population diagnosed, 90% of that group on antiretrovirals (ARVs) and 90% of that group virally suppressed, accomplishing this by 2020. Achieving this target—a few nations already have, while others, including various sub-Saharan African nations, appear poised to do so by 2020—would set a nation on the path to eliminating HIV as a public health threat by 2030.

Or so the modeling suggested. These three studies offered a chance to test those theories in the field. The window of opportunity closed during the course of these studies, though, given the fact that in mid-2015 the global START trial proved that treating HIV earlier in the course of infection offers various health benefits compared with delaying treatment. This led nations around the world to drop policies that limited treatment to those whose CD4 cells had declined to certain thresholds and to recommend universal treatment regardless of CD4 count. Consequently, these studies effectively lost their control groups—those who did not have access to universal treatment.

In the Botswana test-and-treat trial, researchers studied 30 rural or peri-urban communities that had an average population of 6,000. The study authors matched 15 pairs of communities according to their population size, age makeup, health services and geographic locations. Then they randomized the pairs so that one community in each pair received the intensified test-and-treat intervention, which included other HIV prevention methods, while the other received the national standard of care for the virus.

“Using approaches that are feasible in most settings, we achieved levels of HIV diagnosis, treatment and viral suppression that are among the highest levels reported globally,” the study’s senior author, Shahin Lockman, MD,an associate professor in the department of immunology and infectious diseases at Harvard T.H. Chan School of Public Health, said in a press release. “We also believe that our approaches and findings are highly relevant for other countries.”

As of 2017, an estimated 23% of adults in Botswana were living with HIV. It is estimated that 1.3% of citizens 15 to 49 years old contracted the virus that year.

The intervention included universal HIV testing and counseling, support for accessing medical care for the virus, expanded and faster access to antiretroviral treatment and stepped-up access to voluntary medical male circumcision (VMMC). VMMC directly reduces the risk of female-to-male transmission of HIV by about 60% and in recent years has been associated with lower rates of the virus among women as well.

Botswana’s national HIV treatment guidelines shifted during the study period; these policies applied to those in the control communities and eventually to everyone in the study once universal treatment became the standard. Until June 2016, those with a CD4 count of 350 or lower, those with Stage III or IV of HIV disease or those who were pregnant or breast feeding were eligible to receive treatment for the virus. Botswana adopted a universal treatment policy in June 2016.

The study’s policy regarding who in the intervention group qualified for expanded access to ARVs also evolved during the study. Until August 2016, expanded ARVs were provided to those with a CD4 count greater than 350 who had a viral load of at least 10,000. Then, between August 2015 and May 2016, treatment was provided to all those with a CD4 count of 500 or less and to those with a CD4 count above that threshold if they had a viral load of at least 10,000. Finally, the universal treatment guidelines that started nationwide in June 2016 eliminated any difference in the ARV treatment policy between the intervention and control communities.

The study was run by researchers from Harvard’s public health school and the Botswana-Harvard AIDS Institute Partnership. It was supported by the U.S. President’s Emergency Plan for AIDS Relief through the Centers for Disease Control and Prevention, the National Institutes of Health and other funders.

Originally intended to run for 36 months, the study ultimately shortened its follow-up period to 29 months as a result of budget constraints. All told, the investigators studied the communities between 2013 and 2018.

A total of 16,610 community members, or 81% of eligible household members, were enrolled in the study. Twenty-nine percent tested positive for HIV at the outset. Of the 8,974 HIV-negative members, including 4,487 per study group, 95% were retested for the virus during a median 29 months of follow-up.

Fifty-seven members of the intervention group and 90 participants in the control group contracted HIV during the follow-up period. This translated to an annual infection rate in the adult population of 0.59% and 0.92%, respectively. This meant that the intervention was associated with an estimated 31% reduction in the annual HIV infection rate. However, this reduction was not quite statistically significant, meaning it may have been driven by chance.

At the end of the trial, the HIV-positive members of six communities, three locations from each study group, were surveyed to determine who had a viral load of 400 or less. They found that during the study, the proportion of the HIV population in the intervention group that had a fully suppressed virus increased from 70% to 88%; meanwhile, the viral suppression rate in the standard-of-care communities rose from 75% to 83%.

That 88% viral suppression rate in the intervention group is among the highest reported in any community around the world.

A surprisingly low proportion of men in the communities underwent circumcision. During the study, the proportion of men who were circumcised increased by 10 percentage points in the intervention group and by 2 percentage points in the standard-of-care group. Consequently, the investigators concluded that VMMC was not likely a major driver of the lower HIV acquisition rate in the intervention communities compared with the control communities.

Instead, the significant factors behind the apparent benefit of the intervention on HIV incidence included testing campaigns in homes and mobile venues as well as support for linkage to medical care for the virus.

“Universal HIV testing and treatment can contribute substantially toward improving health and reducing the rate of new HIV infections in the community,” said Lockman.

To read a press release about the study, click here.

To read the study abstract, click here.
