

## **Paper evaluation: Love in the Time of HIV: How beliefs about externalities impact health behavior**

### **Internal Validity:**

The paper conducted a stratified random experiment to study the effect of informing of positive externalities on people's belief in HIV treatment (ART) and people's behavior (seeking HIV tests). The result turns out that people that being informed of the positive externalities of ART tend to shift their belief toward sexual partners taking ART and tend to go for HIV testing. The result is significant in high-risk sexually active populations.

What we can learn from the paper is that messaging private benefits may be not enough, messaging information of positive externalities may have more power to shift people's attitudes and behavior. In this specific context, messaging about a reduction in HIV transmission can make people demand more health care and form positive views of other people who proactively seek treatment.

The key strength of the paper is as follows: Firstly, the paper uses randomized control trials with stratification to reduce spurious causality and bias. By randomly assigning the village to the control or treatment arm, with stratifying on population and district-clinic level, the treatment group and control group face the same clinic service and the treatment, the clinic level shocks impact both study groups equally, and control sample become balanced in number and attributes. The balance table clearly shows the low differences in the control and treatment groups. Secondly, the paper used administrative data from clinics for HIV testing instead of using self-report survey data. As the self-report survey (DHS) about the HIV testing rate in Malawi has an exaggerated figure, the administrative data can effectively reduce this self-report bias. Thirdly, during the experiment, the researcher carefully designs the content of the treatment (the education meeting), the training for educators, and the survey interviewers to avoid potential bias. For instance, the treatment and control groups face different content, but the pattern of education is designed to be as same as possible (making the participation content of both groups the same); to avoid the educator's knowledge effect, the researcher makes the teacher's give the education meeting to control group before they trained to learn about the additional learning content for the treatment group; to avoid the possible survey bias from the interviewers, the interviewers were not given any information of the treatment. Fourthly, to avoid bias in belief measurement, the research did not give a baseline survey pre-treatment that may elicit the possible belief of positive externalities of ART from the control group.

However, there are several concerns related to the experiment design of the research. Firstly, the paper did not concern the possible spillover effect of the treatment, this may underestimate the intervention effect. The research result shows that after intervention, 1 out 5 respondents in the control group believed that ART could prevent HIV transmission to any extent. As the paper did not conduct a baseline survey, we did not know if 20% of the control group may have the belief prior to treatment that ART may prevent HIV transmission. However, it is hard to deny the possibility that this 20% of people who did not receive intervention but still form belief is not due to the spillover effect, since each control strata group and treatment strata group lives in the same district, receive medication in the same clinics and have high possibilities to interact in daily life. Secondly, there may be some measurement error related to the result of increasing in HIV testing rate after treatment. As the author mentioned, HIV is a stigmatized disease, and due to reputation cost, some people tend to travel to clinics far away from their living place to seek tests. The research just collected the results of 18 clinics in the study area (Zomba Town). However, it is still possible that the people who receive intervention may travel to other towns to get HIV testing. The potential risk of sample attrition may bias downwards the effect of intervention. Thirdly, the research only studied the channel of change in attitudes towards sexual partners seeking HIV tests that increases the HIV testing rate, however, other mechanism such as peer effect and prosocial reasons can also affect people's behavior and may be the explanations for the increase in HIV tests. It is crucial to survey and study whether the increase in testing is because people see attitude change and begin to believe that HIV is less stigmatized, or just because people simply care about other's welfare, or because they are facing pressure from their sexual partner who wants to reduce the transmission risk.

Fourthly, the large standard error on the coefficient estimate of HIV testing rate of men (Table2 panel A,B) may indicate the less ability to reject the null hypothesis.

**External Validity (Apply the policy to El Salvador):**

Sex transmission is the main reason for HIV in both Malawi and El Salvador, and people in both countries lack knowledge of HIV prevention (Table1: the percentage of young people aged 15-24 having knowledge about HIV prevention is around 37% in El Salvador compared with around 42% Malawi). This may seem to create a space for information intervention. However, the two countries have a significant difference in HIV prevalence rate and the composition and attributes of people infecting HIV, implying a totally different case scenario. The findings of the paper may not directly apply to the context of El Salvador.

The first major concern is related to the low overall prevalence rate of HIV which may give a totally different attitude and risk preference level for people in El Salvador. Compared with 7.1% in Malawi as of 2022, the adults aged 15 to 49 HIV prevalence rate is only 0.5% in El Salvador. Also, the HIV prevalence rate among sex workers is merely 0.1% in El Salvador compared with 49% in Malawi (Fig.1). With only a minor population infecting HIV in El Salvador, people may have a different attitude and beliefs about sexual partners infected with HIV, and they may share a more risk averse attitude. It is likely that even if they may convert their overall attitude about people seeking ART treatment after externalities information intervention, they may still believe that these people find it hard to find new sexual partners since the majority of people do not have HIV and may will not deliberately choose minority HIV people as a partner. The information treatment of positive externalities of ART may not be that effective in changing people's attitudes because most people did not have much knowledge of even about HIV and have no interactions with this minor group, and uncertainty arises making them more prudent in action when came across this group.

The second concern is related to the different composition of people infecting HIV, which may indicate a social barrier to ART information intervention in El Salvador. Men are more likely to be infected by HIV in El Salvador: Contrary to Malawi, the male HIV prevalence rate is two times the women prevalence rate in El Salvador (Fig 1). The major group with a high risk of HIV is men who have sex with men (MSM) and transgender people, as the HIV prevalence rate in this group is 20 times higher than that of sexual workers. However, it is surprising that by 2022, the HIV testing and awareness rate is 100% in MSM and trans, whereas the ART coverage is only 64-82%, way low than the data of Malawi (UNAIDS, 2022). It is true that the HIV testing rate data may suffer from self-reporting bias and thus may be exaggerated, and it may also be true that since only 36% of young people have knowledge of preventing HIV, lack of knowledge of ART among gender minorities may be one source of low ART coverage rate (thus the information intervention of ART's externalities may be necessary), however, high HIV testing rate among gender minorities may imply that lack of information about HIV and ART may not be the main concern. Moreover, there is another possible explanation for this abnormal phenomenon: MSM and trans face a higher probability of stigma and discrimination in the form of violence in El Salvador (USAID, 2018). This may make them try to conceal their disease status as reporting HIV and seeking ART may give a signal that they have distinct sexual identity and orientation. Some researchers also demonstrate the negative relationship between participate in HIV testing and having social stigma experiences in El Salvador's sexual minorities, and the stigma may even come from health provider (Andrinopoulos et al., 2015; Jacobson et al., 2012). Therefore, though the positive externalities information intervention may change their attitudes and incentivize them, it may still not be sufficient for them to go for ART treatment, as they are facing another barrier when seeking treatment--the risk of stigma of signaling their gender identity-- that decrease their incentive to turn changing beliefs into action of seeking further treatment. Therefore, the information intervention may be not effective in this country before we lessen the social-level discrimination and violence against gender minority groups.

The third concern is about vertical transmission. From the data from UNAIDS, the vertical transmission rate in El Salvador is higher than in Malawi at 107.14%. This may be another major source of HIV infection in El Salvador other than men having sex with men. Moreover, as we can see from Fig 2, according to data from the World Bank, the ART coverage of pregnant women has been decreasing since

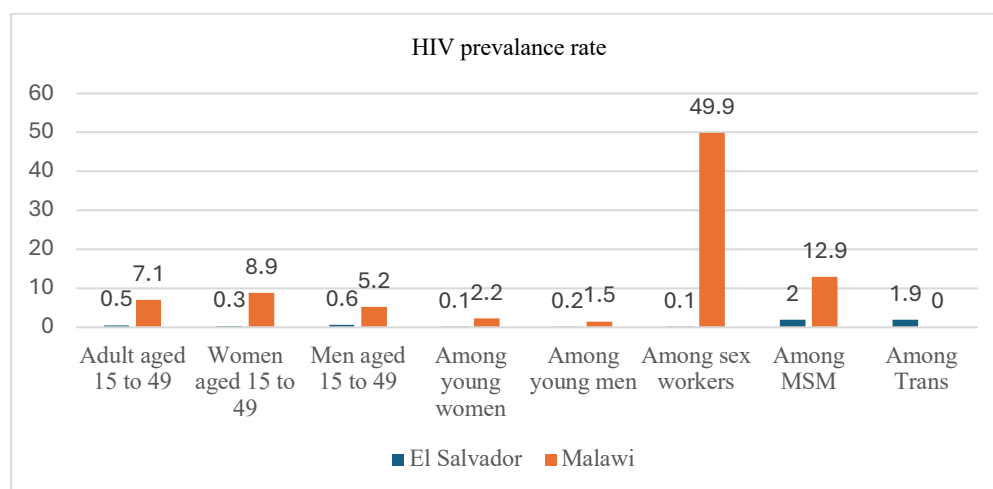
2013 reaching 60% compared with almost 100% ART coverage of pregnant women in Malawi in 2021. As most mothers care about the wellbeing of their children and have no reason to expose their children to risk deliberately, the low ART coverage may indicate that pregnant group may lack knowledge about ART that may reduce HIV transmission to their child and there is no national compulsory regulation for HIV test and ART enforcement for pregnant. The information intervention with the content of ART reduces transmission between sexual partners may not help in this case since the major players here are not sexual partners, whereas the information treatment indicating ART's positive externalities that reduce transmission from mother to fetus may help to reduce this phenomenon.

The UNAIDS data used here to support external validity may have some limitations: Since the lack of ART knowledge is the necessary context for ART information intervention, we may need to find evidence related to this, but we only have data that the rate of young people (aged 15-24) have knowledge about HIV prevention is about 30%, and we may not assume that the same lack of knowledge situation is prevalent among pregnant women and MSMs. The other data limitation is the self-reporting bias of UNAIDS survey data that may cause MSM to report a higher level of HIV testing and awareness rate, as I mentioned in the second point.

### Policy

Not to say ART, knowledge of basic prevention methods of HIV is lacking among most young people in El Salvador. Firstly, the government should try to raise awareness of HIV infection and the basic prevention method to reduce the direct transmission between men who have sex with men (by promoting the use of condoms) and vertical transmission (by interrupting maternal and infantile transmission), thus the policy of information education about HIV and prevention knowledge may help.

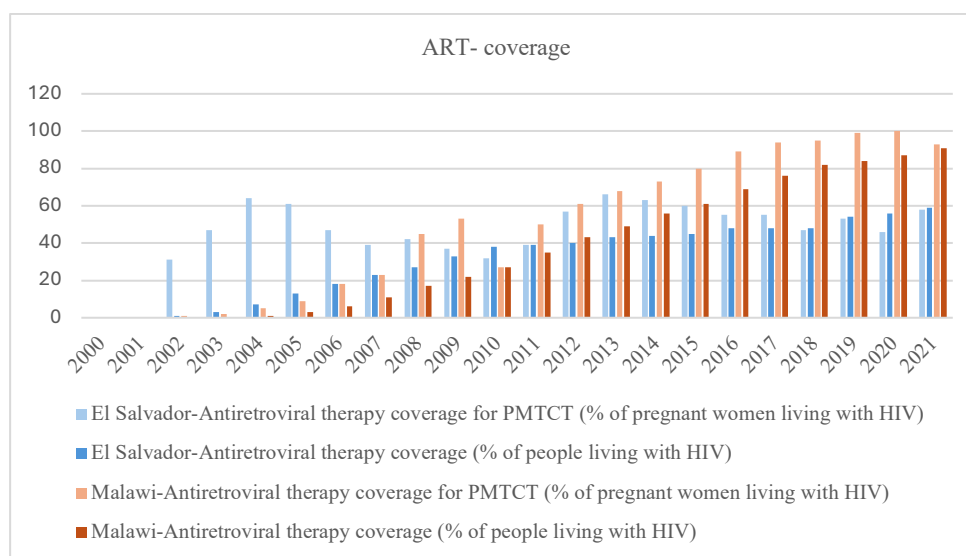
The information intervention of positive externalities of ART can apply after the first general information intervention policy and needs to focus on 1. MSM and trans groups that maybe already have knowledge about HIV but have a higher risk for infection and high barriers to health treatment 2. Pregnant women who may did not have knowledge about ART's externalities. The government should first conduct a survey to check if most gender minorities and pregnant women do not know ART can prevent HIV transmission. If so, the policy needs to be long-run (at least 2 years) regularly educating the private and public benefits of ART and regularly tracking the ART coverage rate for each area of the country for pregnant and MSM people. To make the information intervention effective, the government should simultaneously help MSMs and trans reduce social barriers to treatment: in the short term, the government should promote anonymous clinic visits for gender minorities or instruct clinic workers to protect the privacy of MSM and trans, in the long run, government should encourage gender equality and human rights to reduce violence towards MSM and trans.



**Fig1. HIV prevalence rate across population groups (%)**

|  | El Salvador | Malawi |
|--|-------------|--------|
| Knowledge about HIV prevention among young people aged 15-24 | 36.5        | 41.86  |
| Knowledge about HIV prevention among young women aged 15-24  | 31.1        | 41.1   |
| Knowledge about HIV prevention among young men aged 15-24    | 33.9        | 44.3   |

**Table1. Knowledge about HIV prevention among young people (%)**



**Fig2. ART coverage rate for HIV population and pregnant women living with HIV(%)**

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