

# People living with HIV/AIDS in the Kibera informal Settlement in Nairobi City, Kenya: Is there any gender difference in Factors related to antiretroviral Therapy?

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## Abstract:

**Objective:** To identify gender differences in behavioural factors and treatment related factors of ARV therapy as a predictor to treatment adherence.

**Design:** Cross-sectional study.

**Methods:** A quantitative study using a standardized PLWHA questionnaire was conducted in the Kibera informal settlement in the capital, Nairobi, Kenya. Data were collected by community health volunteers during home visits in cooperation with ART health facilities.

**Results:** The observed sample consisted of a total of 272 persons living with HIV/AIDS in the Kibera informal settle-

ments, of which 64.3% were women and 35.7% were men. We found a significantly higher rate of the behavioural risk factors cigarette smoking and alcohol drinking in men compared to women. There was no significant difference in the factors of patients' medical history between men and women. A significant difference was found in the source of ARV treatment therapy, travelling costs to ARV treatment facilities, loss of income due to visiting an ARV treatment facility and extra costs related to ARV treatment between the men and women in our study group. Another significant difference was observed in disclosure related factors - the HIV status of the current sexual partner, and the current sexual partner being on ARV therapy and disclosing this information to the current sexual partner.

**Conclusion:** Alcohol drinking and smoking cigarettes were the most common behavioural risk factors and were more prevalent in men. Women significantly dominated in treatment related factors of ARV therapy.

## Introduction

We refer to the epidemiological situation of HIV in Kenya as a generalised epidemic, which means that the virus is present in all population groups and geographical areas of the country. The prevalence of HIV/AIDS in Kenya has decreased over the past 30 years, but is still relatively high compared to other countries in the world. In terms of HIV/AIDS incidence, we therefore rank Kenya among the countries with the highest incidence. According to UNAIDS data, it is estimated that in 2020 there were more than 1.6 million infected (of which 910,000 were women), with the number of new cases being 78,000, representing 1.62 cases per 1,000 inhabitants of the country. In 2020, the prevalence of HIV/AIDS among adults in Kenya was at 4.9% [1].

The prevalence of HIV/AIDS varies by region of the country. For some areas, such as Nyanza province and the coastal region, higher prevalence values of the disease are typical. Urban areas, especially the capital Nairobi, are well above the national average. Nairobi is an area with a large contribution to the burden of HIV/AIDS on the public health population. As the capital of the country, it hosts a highly mobile incoming and outgoing population due to internal migration [2]. Another reason is that the population groups such as single mothers, orphans living on the street, sex workers, men who have sex with men and injecting drug users, who are at a significantly higher risk of contracting

HIV/AIDS, are most concentrated in the main city of the country. Reasons are the rapid urbanisation of the Nairobi metropolis, the level of poverty, the ever-growing informal settlements, the language barrier, stigma and discrimination in the community [3]. Approximately 60% of the population of Nairobi are slum dwellers. Kibera is the largest informal settlement in terms of area and population. Nongovernmental organisations have provided estimations of a population of 600,000 – 800,000 thousand living in an area of approximately 2.5 square kilometres [4].

The Kibera informal settlement is administratively organised into 13 villages, which are characterized by ethnic and tribal specificities. Accurately quantifying the occurrence of HIV/AIDS in Kibera is quite difficult due to the constant movement of the population. However, it is estimated that the value of the predicted prevalence of HIV/AIDS is in the range of 14-21%, which is several times higher than the prevalence in Nairobi city (5.8%) and the country level (4.7%) [1].

Kenya has made progress in improving access to ARV therapy for people living with HIV/AIDS. The government, in collaboration with international partners, has expanded ARV therapy programs to ensure that those in need have access to life-saving treatment free of charge [5]. The timely and consistent treatment of ARV is critical to achieving optimal health outcomes for people with HIV. However, there are several known barriers to accessing and adhering to

ARV treatment for HIV/AIDS. These barriers may vary depending on individual, social and systemic factors, and one of these is gender differences. Gender can increase personal vulnerability to HIV depending on gender-related social and cultural norms, and it can influence a person's ability to access information about preventive measures, care and treatment. Standing on the WHO and UNAIDS strategy to achieve the Sustainable Development Goals (SDGs), it is essential to focus strategies using a gender perspective to integrate them into development programs, interventions and policies affecting the care and treatment of people affected by HIV and AIDS.

In some countries with available HIV/AIDS treatment, women are less likely to access it than men, due in part to cultural norms that prioritise men's treatment [6]. According to the International Community of Women Living with HIV/AIDS [7] and some previous research [14], gender inequality within families means a barrier to women's access to information and treatment. In terms of this, gender inequality is an important factor related to effective care and treatment. Among the available studies conducted in Asia, Latin America and some African countries, only few have specifically captured gender-related factors [6].

Based on this, we conducted a study to identify gender differences in behavioural factors and treatment-related factors of ARV therapy as a predictor of treatment adherence.

## Methods

The study group consisted of people living with HIV/AIDS in the Kibera informal settlement. Data collection was coordinated by the Kenyan Regional Ministry of Health - Nairobi County, Langata Subcounty. Its regional scope also includes the area of the Kibera informal settlement. All health facilities (governmental, private, faith-based facilities and NGOs) that provide antiretroviral therapy as part of their services provided a list of registered patients living in Kibera. There was no misuse of personal data. Subsequently, community health volunteers coordinated by the Kenyan Regional Ministry of Health conducted data collection as part of their work activities during routine home visits. Data collection took place in the PLWHA's home en-

vironment, where confidentiality, privacy and comfort for the study participants were guaranteed. In this way, their anonymity was ensured, and unwanted disclosure of their HIV status and whether the patient was on ARV treatment was avoided. Community health volunteers were trained for data collection by the local Kenyan partner of the Faculty of Health Care and Social Work, Trnava University in Trnava, the community based organization Amani Kibera under the supervision of sub-county medical officer for health, Dr. Asma Adwah. Data collection took place from March to April 2021. The inclusion criteria for the study participants selection were their willingness to cooperate, the presence of the HIV/AIDS disease, an age of 18 years and above and their place of residence being Kibera. The participation of a minimum of 200 persons living with HIV/AIDS in Kibera was required to achieve a representative sample so that the findings of the study could be generalized to the entire population of PLWHA. A total of 272 persons living with HIV/AIDS in Kibera participated in the study.

The data needed to fulfil the objectives were obtained using a standardized PLWHA questionnaire. The questionnaire consisted of 7 sections: socio-demographic characteristics, risk behaviour, personal history and treatment-related factors, disclosure of HIV status and stigma, family and social support, non-adherence to treatment and reasons for re-integration into the ARV therapeutic regimen. Questionnaires are well-established in the research community and used worldwide. Questionnaire data collection was carried out electronically using the Google Forms tool.

The obtained data were evaluated using descriptive statistics methods. To determine the influence of the independent categorical variable (gender) on the dependent categorical variables, a chi-square test was used, as well as Fisher's test with a frequency lower than 5. R-project, version 3.4.2017, was used to process the data analysis with the level of statistical significance  $p < 0.05$ .

## Results

The observed sample consisted of a total of 272 persons living with HIV/AIDS in the Kibera informal settlements, of which 64.3% were

**Table 1** Socio-demographic characteristics of the observed group of PLWHA, Kibera, 2021, n=272.

<b>Age</b>	
Average	39.53 ± 10.18 years
Range	18-70 years
18-25 years	17 (6.3%)
26-50 years	216 (79.4%)
≥51 years	39 (14.3%)
<b>Sex</b>	
Female	175 (64.3%)
Male	97 (35.7%)
<b>Religion</b>	
Roman Catholic	43 (15.8%)
Protestant/Pentecostal	198 (72.8%)
Muslim	17 (6.3%)
Other	10 (3.7%)
None	4 (1.5%)
<b>Education level</b>	
None	5 (1.8%)
Primary	149 (54.8%)
Secondary	117 (43.0%)
Higher education	1 (0.4%)
<b>Marital status</b>	
Single	47 (17.3%)
Married/living together	110 (40.4%)
Separated/divorced	66 (24.3%)
Widowed	49 (18.0%)
<b>Children</b>	
Do not have children	24 (8.8%)
Not living with them	43 (15.8%)
Living with them	205 (75.4%)
1-2 children	44 (21.5%)
3-5 children	112 (54.6%)
6 and more children	49 (23.9%)
<b>Monthly income</b>	
Less than 3,000 KES	89 (32.7%)
3,000- 5,000 KES	92 (33.8%)
5,000- 10,000 KES	77 (28.3%)
More than 10,000 KES	14 (5.2%)
<b>Occupation</b>	
Employed	169 (62.1%)
Unemployed	103 (37.9%)
Retired	0 (0%)
<b>Health insurance</b>	
Yes	35 (12.9%)
No	237 (87.1%)

women and 35.7% were men. The mean age of PLWHA in the observed group was 39.5 ± 10.2 years. The youngest study participant was 18 years old and the oldest was 70 years old.

The most frequently represented religions were the Protestant/Pentecostal religion (72.8%) and the Catholic religion (15.8%). Primary education was reported by most PLWHA in the observed group, around 54.8%. Higher professional education was reported by one study participant.

In the observed group of PLWHA, 40.4% of the respondents were married or in a permanent relationship. There were 8.8% childless study participants, 15.8% stated that they do not live with their children and 75.4% of respondents live in the same household with them. Most study participants (54.6%) had 3 to 5 children.

When monitoring the amount of monthly income, we observed that most PLWHA in the observed group had an income of between 3,000 and 5,000 Kenyan shillings, namely 33.8% and 32.7% reported a monthly income of less than 3,000 Kenyan shillings. At the same time, 62.1% of the study participants were employed. 12.9% of PLWHA in the observed group had health insurance, and 87.1% were without health insurance (Table 1).

In the observed group of PLWHA in the Kibera informal settlement, we followed the occurrence of behavioural risk factors and observed whether there is a significant difference by gender. Behavioural risk factors are strongly associated with ARV therapy adherence. Alcohol drinking (11.8%) and starting fistfights (11.0%) were the most common behavioural risk factors in our study group.

Using the chi-square test, we found significant differences in cigarette smoking between women and men ( $p < 0.05$ ), while there was a significantly higher rate of smoking among men (12.4%) compared to women (0.6%).

There were also significant differences in alcohol drinking between women and men ( $p < 0.05$ ), and there was a significantly higher rate of drinking in men (24.7%) compared to women (4.6%) (Table 2).

Adherence to antiretroviral therapy is strongly correlated with the suppression of human immunodeficiency virus, reduced rates of drug resistance, increased survival and improved

**Table 2** Behavioural risk factors in the observed group of PLWHA, Kibera, 2021, n=272.

	Total (n=272) n (%)	Women (n=175) n (%)	Men (n=97) n (%)	p-value; X
<b>Smoking cigarettes</b>	13 (4.8)	1 (0.6)	12 (12.4)	<0.05; 19.093
<b>Alcohol drinking</b>	32 (11.8)	8 (4.6)	24 (24.7)	<0.05; 18.262
<b>Substance addiction</b>	9 (3.3)	5 (2.9)	4 (4.1)	NS 0.313
<b>Betting to earn some money</b>	6 (2.2)	3 (1.7)	3 (3.1)	NS 0.458
<b>Starting a fistfight</b>	30 (11.0)	19 (10.9)	11 (11.3)	NS 0.015

quality of life. After CD4 lymphocyte count, antiretroviral adherence is the second strongest predictor of progression to AIDS and death. Another goal of this paper is to quantify the treatment-related factors and observed difference in women and men. To fulfil this goal, we observed factors of medical history of PLWHA in the Kibera informal settlement and factors of ARV treatment itself.

We observed a lack of food in the past 14 days, the nutritional status, if they were too sick to work in the past 3 months, their functional status, tuberculosis treatment, the number of years since the first HIV detection, the mode of HIV diagnosis and the mode of HIV transmission in our study group of PLWHA in the Kibera informal settlement. There was no significant difference in these patients' medical history between women and men (Table 3).

When observing the ARV treatment-related factors, we found statistically significant differences in the source of the ARV treatment, traveling costs for a visit to an ARV treatment facility, a loss of income due to visiting an ARV treatment facility and extra costs as results of taking ARV treatment in women and men.

There was a significant difference in the usual health facility as a source of ARV treatment in our study group of PLWHA in the Kibera informal settlement. Most of the women (44.0%) preferred government dispensaries, while most of the men preferred NGOs (54.6) ( $p < 0.05$ ).

Another significant difference was observed in the traveling costs to visit an ARV treatment facility. Men in our study group reported a high-

er rate of travelling costs (86.6%) compared to women (76.6%) ( $p < 0.05$ ).

We found a significant difference in the loss of income due to visiting an ARV treatment facility in our study group of PLWHA between women and men. A higher rate of income loss was reported by men (79.4%) compared to women (62.9%) ( $p < 0.05$ ).

A significantly higher rate of extra costs as a result of taking ARV treatment was observed in women in our study group (37.7%) compared to men (20.6%) ( $p < 0.05$ ) (Table 4).

Adherence to ARV treatment varies according to the population context, individual factors, treatment factors and, above all, the environment of the patients.

We investigated if there were significant differences of disclosure related factors in PLWHA in the Kibera informal settlement in women and men. These factors strongly correlate to ARV therapy adherence.

We found a significant difference in knowing the HIV status of the current sexual partner in the women and men in our study group. Most women (42.9%) reported a positive HIV status and most men reported a positive HIV status (64.9%) ( $p < 0.05$ ).

There was a significant difference in knowing if the current sexual partner was on ARV treatment by gender in our study group of PLWHA in the Kibera informal settlement. Most women (38.3%) reported being unsure of whether they were on ARV therapy (38.3%), while most men reported their current sexual partner was on ARV treatment (57.7%) ( $p < 0.05$ ).

**Table 3** Medical history of patients in the observed group of PLWHA, Kibera, 2021, n=272.

	Total (n=272) n (%)	Women (n=175) n (%)	Men (n=97) n (%)	p-value; X
<b>Lack of food in past 14 days</b>	236 (86.8)	151 (86.3)	85 (87.6)	NS 0.098
<b>Nutritional status</b>				
Green	249 (91.5)	158 (90.3)	91 (93.8)	NS 1.974
Yellow	11 (4.0)	7 (4.0)	4 (4.1)	
Red	12 (4.4)	10 (5.7)	2 (2.1)	
<b>Too sick to work in past 3 months</b>	122 (44.9)	79 (45.1)	43 (44.3)	NS 0.017
<b>Functional status</b>				
Working	243 (89.3)	157 (89.7)	86 (88.7)	NS 0.073
Ambulant or bed lid	29 (10.7)	18 (10.3)	11 (11.3)	
<b>Tuberculosis treatment</b>				
Current	4 (1.5)	1 (0.6)	3 (3.1)	NS 5.975
In the past	137 (50.4)	96 (54.9)	41 (42.3)	
Never	131 (48.1)	78 (44.5)	53 (54.6)	
<b>Number of years since first HIV detection</b>				
<1 year	6 (2.2)	3 (1.7)	3 (3.1)	NS 1.317
1-3 years	49 (18.0)	33 (18.9)	16 (16.5)	
3-7 years	45 (16.5)	31 (17.7)	14 (14.4)	
>7 years	172 (63.2)	108 (61.7)	64 (66.0)	
<b>Mode of HIV diagnosis</b>				
Couple HIV counselling and testing	62 (22.8)	18 (10.3)	44 (45.4)	---
Prevention of mother to child transmission testing	70 (25.7)	70 (40.0)	0 (0.00)	
Diagnosis testing	112 (41.2)	73 (41.7)	39 (40.2)	
Community based screening	28 (10.3)	14 (8.00)	14 (14.4)	
<b>Mode of HIV transmission</b>				
From husband/wife	149 (54.8)	105 (60.0)	44 (45.4)	---
Having sex with HIV positive man	55 (20.2)	55 (31.4)	0 (0.0)	
Having sex with HIV positive woman	46 (16.9)	0 (0.0)	46 (47.4)	
Mother to child transmission	13 (4.8)	10 (5.7)	3 (3.1)	
Blood transfusion	7 (2.6)	5 (2.9)	2 (2.1)	
Shared needles	2 (0.7)	0 (0.0)	2 (2.1)	



**Table 4** Treatment factors in the observed group of PLWHA, Kibera, 2021, n=272.

	Total (n=272) n (%)	Women (n=175) n (%)	Men (n=97) n (%)	p-value; X
<b>Currently on ARV treatment</b>	272 (100.0)	175 (100.0)	97 (100.0)	----; ----
<b>Total no. of tablets/day</b>				
1-2 tablets/day	255 (93.8)	159 (90.9)	96 (99.0)	NS 5.368
3 tablets/day	14 (5.2)	13 (7.4)	1 (1.0)	
More than 3 tablets/day	3 (1.1)	3 (1.7)	0 (0.00)	
<b>Frequency of taking tablets/day</b>				
Once- twice/day	271 (99.6)	174 (99.4)	97 (100.0)	NS 0.185
Three times and more	1 (0.4)	1 (0.6)	0 (0.0)	
<b>Source of ARV treatment</b>				
Government dispensary	101 (37.1)	77 (44.0)	24 (24.7)	<0.05; 11.215
Government sub-county hospital	43 (15.8)	27 (15.4)	16 (16.5)	
Private clinic	1 (0.4)	1 (0.6)	0 (0.00)	
Faith-based health facility	10 (3.7)	6 (3.4)	4 (4.1)	
NGO	117 (43.0)	64 (36.6)	53 (54.6)	
<b>Distance to ARV treatment facility</b>				
Less than 10 minutes	11 (4.0)	11 (6.2)	0 (0.0)	NS 5.803
10-30 minutes	161 (59.2)	96 (54.9)	65 (67.0)	
More than 30 minutes	100 (36.8)	68 (38.9)	32 (33.0)	
<b>Traveling costs for a visit to ARV treatment facility</b>				
No	54 (19.9)	41 (23.4)	13 (13.4)	<0.05; 3.943
Yes	218 (80.1)	134 (76.6)	84 (86.6)	
average	117.16± 60.87 KES			
median	100 KES			
mode	100 KES			
range	30- 350 KES			
<b>Loss of income due to visiting an ARV treatment facility</b>				
No	85 (31.2)	65 (37.1)	20 (20.6)	<0.05; 7.932
Yes	187 (68.8)	110 (62.9)	77 (79.4)	
average	345.08± 217.05 KES			
median	300 KES			
mode	300 KES			
range	30- 3000 KES			
<b>Extra cost as a result of taking ARV treatment</b>				
No	186 (68.4)	109 (62.3)	77 (79.4)	<0.05; 8.436
Yes	86 (31.6)	66 (37.7)	20 (20.6)	

**Table 5** Disclosure related factors in the observed group of PLWHA, Kibera, 2021, n=272.

	<b>Total (n=272) n (%)</b>	<b>Women (n=175) n (%)</b>	<b>Men (n=97) n (%)</b>	<b>p-value; X</b>
<b>Current sexual partner HIV status</b>				
Positive	138 (50.7)	75 (42.9)	63 (64.9)	<0.05; 19.130
Negative	36 (13.2)	21 (12.0)	15 (15.5)	
Unsure	83 (30.5)	65 (37.1)	18 (18.6)	
No partner	15 (5.5)	14 (8.0)	1 (1.0)	
<b>Current sexual partner is (was) on ARV treatment</b>				
Yes	118 (43.4)	62 (35.4)	56 (57.7)	<0.05; 17.299
No	50 (18.4)	32 (18.3)	18 (18.6)	
Unsure	89 (32.7)	67 (38.3)	22 (22.7)	
No partner	15 (5.5)	14 (8.0)	1 (1.0)	
<b>Disclose to a current sexual partner</b>				
Yes	183 (67.3)	102 (58.3)	81 (83.5)	<0.05; 19.037
No	74 (27.2)	59 (33.7)	15 (15.5)	
No partner	15 (5.5)	14 (8.0)	1 (1.0)	
<b>People in community know my HIV status even though I did not tell them</b>				
Yes	51 (18.8)	31 (17.7)	20 (20.6)	NS 0.346
No	221 (81.2)	144 (82.3)	77 (79.4)	
<b>Have you ever been treated differently due to your HIV positive status?</b>				
Yes	27 (9.9)	17 (9.7)	10 (10.3)	NS 0.025
No	245 (90.1)	158 (90.3)	87 (89.7)	

Another significant difference was observed in the disclosing of this information to a current sexual partner. The men in our study group reported a higher rate of HIV status disclosure (83.5%) compared to women (58.3%) ( $p < 0.05$ ) (Table 5).

## Discussion

HIV/AIDS has continued to be a leading public health problem globally. Particularly, low income countries such as those in sub-Saharan Africa are challenged with this widespread virus and the socio-economic crises brought about by it. Globally, in the previous era, many efforts were made to fight against the worldwide HIV epidemic. The rate of new infections and HIV/AIDS related morbidity and mortality declined significantly. Scaled-up accessibility of ARV treatment has saved around

2.5 million lives from HIV-related deaths in low income countries since 1995 [8].

The level of adherence to ARV can vary based on the population context, and it is affected by individual, service, and therapy-related factors, such as substance abuse, psychiatric problems, the inability to disclose HIV status, a lack of psychosocial support, stigma, drug side effects, pill burden, poor quality service delivery and unexplained treatment costs [9]. With a better understanding of the reasons for treatment adherence and defaulting, interventions can be designed that improve treatment retention and ultimately, patient outcomes. The aim of this study was to identify gender differences in behavioural factors and treatment-related factors of ARV therapy as a predictor of treatment adherence in Kibera, because such knowledge is absent.



Behavioural risk factors can affect the antiretroviral therapy adherence of people living with HIV/AIDS. Alcohol drinking (11.8%) and starting fistfights (11.0%) were the most common behavioural risk factors in our study group. When comparing if there were differences in behavioural risk factors between women and men, we found a significantly higher rate of alcohol drinking and cigarette smoking in men. In a quantitative study evaluating the prevalence of behavioural risk factors related to ARV adherence, the most common factors were a positive history of drug abuse (74.8%) and a positive history of injection drug use (68.8%). All the observed behavioural risk factors increased non-adherence to ARV therapy [10].

We examined the medical histories of the patients in our study group. Research evaluating determinants of adherence to clinic appointments for people living with HIV in South Africa found that with patients coinfecting with tuberculosis, only 17.4% attained good ARV therapy adherence. It is vital to reinforce public health interventions that would enhance sustained adherence to clinic appointments and mitigate its impact on ARV treatment adherence and patient outcome [11].

With people living with HIV/AIDS in Kibera, we found significant differences in the source of ARV treatment therapy, travelling costs to ARV treatment facilities, loss of income due to visiting an ARV treatment facility and extra costs related to ARV treatment between the men and women in our study group. A study measuring the ARV therapy adherence of HIV-positive patients found that higher travelling costs and a distance of reaching ARV therapy centre being more than 40 km were strongly associated with poor treatment adherence [12].

A study evaluating the influence of social support characteristics in people living with HIV/AIDS in Zambia with a study design similar to ours brought similar results. Community-related factors such as disclosing one's HIV status to a sexual partner and a sexual partner being on ARV therapy are significantly associated with full treatment adherence [13].

There are some limits in our study. The quantification of ARV treatment adherence in the study sample should be performed. Additionally, recall bias may occur in our study since we assume that study participants do not accurately

remember a past event or experience, or leave out details when reporting about ARV treatment related factors.

## Conclusion

The study findings show that alcohol consumption and smoking were the most common behavioural risk factors with a higher rate in men compared to women. These behavioural risk factors limit their social and economic situation and support from their families; they ultimately affect their ability to successfully adhere to ARV treatment.

Women significantly dominated in treatment related factors of ARV therapy, such as travelling costs to the ARV treatment facility, extra costs related to ARV treatment and loss of income due to visiting an ARV treatment facility. This acquired knowledge is an important predictor of adherence to ARV treatment based on gender differences. In countries with low income, the man is usually the head of the family, and the woman cannot go for ARV treatment without his permission. In addition, the man is the one who gives her money for travel costs and additional expenses related to ARV treatment. The woman will also be limited when it comes to travelling to distant health centres due to her demanding domestic duties. Consequently, the health of these women is likely to be affected by the inability to attend scheduled facility visits and limited time for rest.

Keeping people living with HIV/AIDS in the informal settlement on ARV treatment is extremely important for the successful outcome of antiretroviral treatment. It requires work with the patient, their family, the community and also at the level of the healthcare delivery system in health facilities. Interventions to strengthen the assessment of adherence and integration, making treatment facilities available and strengthening the family environment, friends, communities and social organisations appear to be effective steps in the Kibera informal settlement.

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### Ethical approval of the research

This study received ethics approval from the Ministry of Health, Nairobi County, Langata sub-county. All data have been de-identified and were not attributable to individual patients.

### Conflict of interest

There is no conflict of interest.

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