



## **Uptake of Isoniazid Preventive Therapy (IPT) and Its Associated Factors among People Living with HIV (PLWHIV) in Kajiado County, Kenya**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author ELT conceived the original idea, carried out the experiment and wrote the manuscript. Authors JNW and HK helped to supervise the project and writing of the manuscript. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Isoniazid Preventive Therapy (IPT) involves use of isoniazid by People Living with HIV (PLWHIV) who have latent TB for a period not less than six months to prevent active TB infection. Despite the critical role of IPT in reducing HIV/TB co-infection related morbidity and deaths, not much has been done to examine why its full implementation has not been achieved and the probable solution. The objective of this study was to determine uptake of isoniazid preventive therapy and its associated factors among people living with HIV in Kajiado County, Kenya. Analytical Cross-sectional study was carried out in purposely selected four Hospitals. Two hundred and seventy two (272) study participants were recruited through systematic sampling with 100% response rate. Data were collected using structured questionnaires. Cross tabulation, bivariate and multivariate analysis was carried out to identify factors influencing IPT uptake. The study found out that IPT uptake was at 72%. Logistic regression analysis, established the existence of a significant positive association

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( $p$ -value=0.000,  $\beta_{ii}$ =1.729) between patient knowledge among PLHIV and IPT uptake. A correlation analysis outcome shows the existence of a significant positive relationship ( $r$ =0.332, sig. =0.000) between patients knowledge and having ever used IPT at 0.01 level in a two tailed. The 72% of IPT uptake was sufficient. Patient knowledge factors had the highest influence on IPT amongst PLWHIV. The role of health care givers and health centers as IPT information disseminators and IPT knowledge source respectively, was invaluable in this study.

**Keywords:** Associated factors; HIV; Kajiado; isoniazid-uptake tuberculocis; Kenya.

## 1. INTRODUCTION

HIV/TB co-infection is a very important kind of infection due to its synergistic nature [1]. It's reported that TB causes approximately one-third of HIV/AIDS related deaths in PLWHIV [2]. In 2017, around 10 million people worldwide had active TB infection, upto 9% of them were among PLWHIV and Africa continent contributed up to 72% [3]. Kenya has been ranked among the 22 high TB burden countries in the globe and top 5 in sub-Saharan Africa with TB incidence of 233/100000 [4], over third of TB cases occurring among PLHIV [5]. Reducing TB burden among PLWHIV requires: Identifying TB early; providing pre-emptive and preventive treatment for TB; providing optimal treatment for both HIV and TB and timely initiation of ART in PLWHIV [6]. Despite available evidence in IPT reducing the risk of developing active TB among PLHIV, IPT implementation still remain very low ;only around 940,269 PLHIV were started in any form TB preventive therapy in 22 TB/HIV high burden countries [7]. In 2012 Kenya adopted the World Health Organization (WHO) 6 month's recommendation to enroll all eligible PLWHIV to IPT, however, its implementation only started in few selected facilities under the Us Agency for International Development (USAID) plan [8]. Creation of awareness and knowledge on IPT is one of the WHO recommendation to reduce TB burden among PLHIV [9] Patient understanding of IPT importance in preventing TB will enable them to make informed decision and therefore agree to take IPT intervention [10]. PLWHIV fear of TB infection related morbidity and mortality can be perceived as one of the motivating factor to them accepting and even demanding IPT to avoid stigma and discrimination that come with TB/HIV co-infection from the community [10]. PLWHIV faces a lot of challenges related to stigma and segregation, in their occupation and when accessing essential services including treatment, such discrimination and stigma remain a stumbling block to scaling up treatment and IPT in PLHIV [11] A cohort study in Nairobi on IPT uptake, stood at 53.2% in HIV infected

children [12] and another in Riruta Health Centre, the IPT uptake was at 77% [10]. Both studies felt short of 90% national target and they majorly describe a situation in an urban set up which makes them lack generalizability and even less evidence that guides on IPT uptake improvement Few studies have been done in Kenya in trying to understand the low level of IPT uptake in the country and such study has never been done in Kajiado County. This study was set to evaluate the level of IPT uptake among people living with HIV in Kajiado County, Kenya. The outcome of this study is meant to benefit a quite number of stakeholders notably; The healthcare facilities management and healthcare professionals; undersanding of the IPT implementation gaps will enable them develop suitable strategies to ensure full implementation. The development partners and investors in the healthcare sector: to come up with intervention, results are intended to be used together with other relevant studies to inform policy making.

## 2. METHODS

### 2.1 Study Design, Area and Participants

The study adopted analytical cross-sectional study design as it allows one to compare many different variables at the same time. It was conducted from 1<sup>st</sup> June 2019 to 30<sup>th</sup> July 2019 in Kajiado County selected hospitals: Ngong sub-county Hospital, Kajiado referral hospital, Kitengela Sub-county Hospital and Loitoktok Sub-county Hospital. The hospitals had well established Antiretroviral Therapy (ART) services and a good catchment area. According to the Ministry of Health Kenya Health information statistic report 2019 Kenya population and housing census the county's population stands at 1117,540 [13].

The study participants were adult HIV-positive patients ( $\geq 18$  years) who have been on care and treatment services in the selected study hospital for at least six months preceding the study. We excluded those patients who were on TB

treatment and those who did not consent to participate in the study. The county had approximately 23850 PLHIV [14].

## 2.2 Sampling Techniques and Sample Size

The sample size determination was done in line with Fisher's formula for minimum sample size;

$$N = z^2pq/d^2$$

Where:

n = Desired sample size (population > 10,000). z = Standard normal deviation at the required confidence level (set at 1.96). p = was assumed to be 77% according study done in Riruta Health Centre where IPT uptake was 77% [9]. q = 1 – p (1-0.77) d = Level of statistical significance (usually 0.05). Total sample size was thus 272.

Purposive sampling was used in selection of study hospitals participants were assigned to each selected facility proportionate to its Comprehensive Care Centre (CCC) workload. The Facility daily appointment register was used to generate daily line list from which eligible patient was recruited using simple random sampling whereby small papers were labeled (YES/NO) and folded. The participant who picked a yes was recruited to the study.

## 2.3 Data Collection Process

The study utilized semi-structured questionnaires in collecting data with closed and open-ended items. They were administered face to face by the Research assistant. The questionnaire comprised of 3 parts namely: Socio-economic characteristics, Patient Knowledge on IPT and IPT uptake.

## 2.4 Data Analysis

Data was cleaned using MS Excel and double checked for completeness before analysis. Data generated was analyze using SPSS version 20 statistical package. Descriptive statistics were reported for all of the collected variables.

Bivariate analysis was carried out to compare PLHIV using IPT with those not using IPT regarding socio economic and demographic characteristics and other factors. Multivariate

analysis logistic regression modeling was used to determine independent factors associated with IPT use while adjusting for confounders and effects modifiers. The model was run eliminating variables with largest P value greater than 0.05. This was done until variables remaining have p value <0.05. The adjusted ratios were reported with their confidence intervals, and P values of < 0.05 were considered statistically significant.

## 3. RESULTS

### 3.1 Socio- demographic Characteristics of PLWHIV in Kajiado County

Demographics characteristics of PLHIV who took part in the study is presented in table 1. Most of the respondents were considered mature adults in an active sex bracket. Nearly a third of the respondents (61.4%) were of the female gender. (55.1%) of the respondents, the results meant there were more PLHIV amongst the married couples in Kajiado County. Table 1, shows (10%) had no education while less than (20%) had tertiary or university indicating low literacy levels among PLHIV in Kajiado County. Table 1 shows Christianity was the dominant religion in the county at (79.4%), though there were (19.1%) Muslims amongst the respondents, implying they had religious orientations despite their status. Most of the households 57% had between 2-4 children, with 21% having more than 4 children. The high birth rate indicated prevalence of high dependence ratio.

### 3.2 Social Economic Characteristics of PLHIV in Kajiado County

An examination of income sources in Table 2, shows that most of the respondents were self-employed (32.0%) or in formal employment (23.9%), which meant they were engaged in some economic activities. A majority of the respondents lived in temporary houses (83.5%). Many of the respondents accessed the hospital using public transport (50%), a further 36% went to hospital on foot. Collectively, these indicators meant most of the Kajiado residents had low income. It was established that most of the respondents had the National Health Insurance Fund (NHIF) medical cover (50.7%), while many more (40.8%) had no cover. The lack of medical cover by a many shows the high level of health risk exposure that the residents of Kajiado are coping with.

**Table 1. Demographic characteristics of PLHIV who took participated in the study in Kajiado County**

Variable	Number of PLHIV (N=272)	Percentage (%)
<b>Age (Years)</b>		
18-28	48	17.6
29-38	88	32.4
39-48	95	34.9
49-58	25	9.2
59- 68	16	5.9
<b>Gender</b>		
Male	105	38.6
Female	167	61.4
<b>Marital status</b>		
Married	150	55.1
Single	63	23.2
Separated	41	15.1
Widowed	14	5.1
Co-Habiting	4	1.5
<b>Education</b>		
None	29	10.7
Primary	80	29.4
Secondary	109	40.1
Tertiary/University	54	19.8
<b>Religion</b>		
Christian	216	79.4
Islam	52	19.1
Others	4	1.5
<b>Number of children</b>		
Less than 2	41	15.1
2-4 children	155	57.0
More than 4	57	21.0
No children	19	6.9
<b>Total</b>	<b>272</b>	<b>100.0</b>

### 3.3 Uptake of Isoniazid Preventive Therapy by PLHIV in Kajiado County

The analysis in Fig. 1 shows most of the respondents (72%) had used IPT, with only 28% indicating they had not used it. This meant there was a reasonably good level of use of IPT amongst the residence of Kajiado County.

Table 3 shows that 65.8% of the respondents used of IPT to prevent TB infection, while 23.2% used it because it was recommended by a health care worker. A majority of the respondents (85.3%) indicated that they were taking ART and IPT and most of them (47.8%) found it ok to take the two concurrently. This meant most of the respondents realised the benefit of taking the two treatments simultaneously.

**Table 2. Economic characteristics of PLHIV who participated in the study Kajiado County**

Variable	Number of PLHIV (N=272)	Percentage (%)
<b>Source of income</b>		
Formal employment	65	23.9
Retired	28	10.3
Student	40	14.7
Self employed	87	32.0
Farming	40	14.7
Others	12	5.3
<b>Type of house</b>		
Permanent	45	16.5
Temporally	227	83.5
<b>Number of rooms</b>		
Less than 2	102	37.5
2-4 rooms	131	48.2
More than 4	32	11.8
<b>How do you get to hospital</b>		
Personal means	38	14.0
Public means	136	50.0
On Foot	98	36.0
<b>Medical cover</b>		
NHIF	138	50.7
Private	23	8.5
None	111	40.8
<b>Total</b>	<b>272</b>	<b>100.0</b>

Most of the respondents (90.1%) agreed that they continued taking the medicine even if they felt bad (Table 3). Most of those surveyed (74.35) indicated that they had disclosed their HIV status to someone else with. More than half of the respondents (56.3%) were not in any treatment support, while a majority (60.7%) indicated they had no challenge going to hospital. The main challenge faced in coming to hospital was financial (15.4%). Most of the respondent (72.4%) never forget to take their medicine, while (27.6%) sometimes do forget for reasons shown in Fig. 2.

### 3.4 Knowledge of PLHIV and Use of IPT by PLHIV in Kajiado County

An analysis of knowledge of PLHIV and use of IPT was performed using cross tabulation and chi-square test and the results are displayed in Table 3. (81%) of respondents who identified IPT as TB preventive measure were also using IPT therapy, which meant most of the respondents (81%) had sufficient knowledge of IPT. (79%) of

the respondents who had information on IPT had used IPT, while most of those who had no information (57%) were likely not to have used IPT. This meant that knowledge of IPT increased the likelihood of using it. (75%) of those who had information about IPT heard about it from health care center and had used IPT. Using chi-square test, the association between; What is IPT ( $P=0.000$ ), Do you have any Information on IPT ( $P=0.000$ ), where did you get the information from ( $P=0.004$ ), role of IPT( $P=0.000$ ), side effect of IPT ( $P=0.032$ ), if clinic people discuss with you the role of IPT ( $P=0.001$ ), potential side effects of IPT ( $P=0.000$ ) had  $P \leq 0.05$  hence there existed a significant association between them and IPT uptake.

also used IPT, while most of those who were not sure of the role of IPT (50%) had not used IPT. 87% of the respondent who were of the view that IPT caused numbness had also used IPT and a majority who gave other side effects (44%) had not used IPT. Most of the patients who had fear of TB (75%) had used IPT and most of those who had no fear (33%) had not even used IPT. About (72%) of the patients who feared TB infection did so because of related TB death but they were using IPT.

About (79%) of the respondents indicated that people in the clinic discussed with them about IPT had used IPT. This meant medical personnel played an important role in communicating about IPT. Most of the respondents (76%) mentioned that the recommended duration for use of IPT was 6 months and they had used IPT.

Table 3 shows (79%) of the respondents who considered the role of IPT as preventing TB had

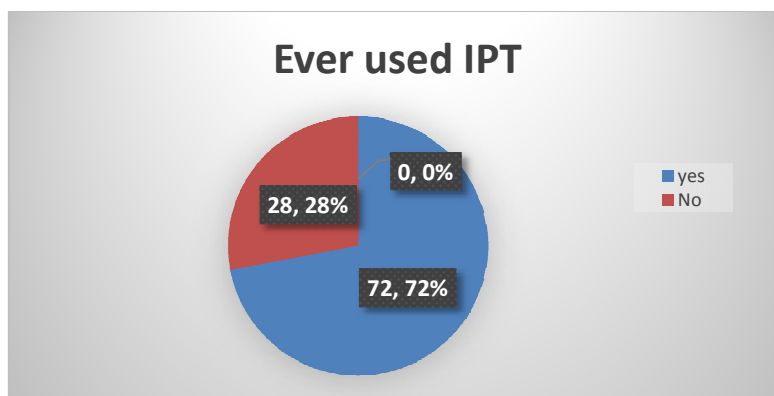


Fig. 1. Ever used IPT by PLHIV in Kajiado County

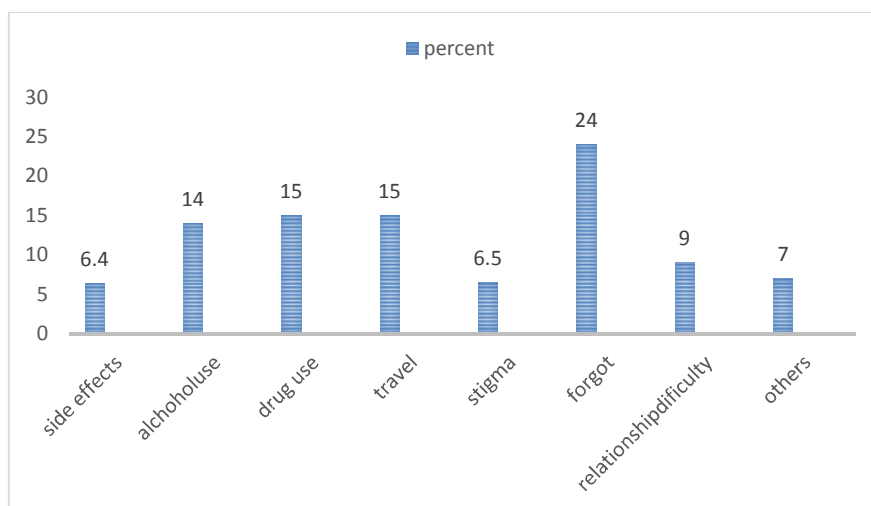


Fig. 2. Main reasons why PLHIV stopped taking isoniazid preventive therapy in Kajiado County

Table 3. Uptake of IPT by PLHIV in Kajiado County

Response	Frequency	Percent
<b>Reason for using IPT</b>		
High TB risk	14	5.1
To prevent TB infection	179	65.8
Recommended by HCW	63	23.2
Its free	13	4.8
Others	3	1.1
<b>Taking ART and IPT</b>		
Yes	232	85.3
No	40	14.7
<b>Feel of taking IPT and ART</b>		
Okay	130	47.8
Not okay	65	23.9
No effect	39	14.3
No response	38	14.0
<b>Stop taking medicine when you feel bad</b>		
Yes	27	9.9
No	245	90.1
<b>Disclosed your HIV status to anyone</b>		
Yes	202	74.3
No	52	19.1
No response	18	6.6
<b>In any treatment support group</b>		
Yes	119	43.8
No	153	56.2
<b>Challenges coming to hospital</b>		
Yes	107	39.3
No	165	60.7
<b>Kind of challenge you have coming to hospital</b>		
Financial	42	15.4
Family related	29	10.7
Work related	38	14.0
Other	13	4.8
No response	150	55.1
<b>Ever forget to take medicines</b>		
Yes	75	27.6
No	197	72.4
<b>Difficulty remembering to take your medicine</b>		
Never	203	74.6
Once	26	9.6
Sometimes	27	9.9
Usually	9	3.3
All time	7	2.6
<b>Feeling of being under pressure to take your treatment plan</b>		
Yes	47	17.3
No	225	82.7
<b>Total</b>	<b>272</b>	<b>100.0</b>

#### 4. DISCUSSION

One of the research hypotheses was sought to determine the levels of uptake among PLHIV in Kajiado. On average the uptake of IPT had achieved a penetration level of 72% (197) in Kajiado County falling short of (90%) which is the

national target although higher than the current national rate which stood at (11%), it's barely lower than a study in Nairobi which was (77%) [9] but higher than the one on children 53% [15], the differences with the rate could be attributed to difference study designs and study populations. Using mean score analysis of

**Table 4. Cross tabulation of knowledge of PLHIV and use of IPT among PLHIV in Kajiado County**

Variable	Indicator	Have you ever used isoniazid preventative therapy		DF	Chi-Square ( $\chi^2$ )	Pearson p-value
		Yes	No			
<b>What is IPT</b>	TB preventative	151(81%)	34(18%)	1	26.606	0.000
	I don't know	43(51%)	41(49%)			
<b>Do you have any Information on IPT</b>	Yes	176(79%)	46(21%)	1	26.826	0.000
	No	21(43%)	28(57%)			
<b>If Yes, Where did you get information from</b>	Healthcare	166(75%)	55(25%)	4	15.256	0.004
	peer mentor	10(63%)	6(38%)			
	social media	16(70%)	7(30%)			
	Friends	5(83%)	1(17%)			
<b>Role of IPT</b>	prevent TB	153(79%)	41(21%)	3	29.379	0.000
	treat TB	25(74%)	9(26%)			
	not sure	19(50%)	19(50%)			
<b>Side effects of IPT</b>	Nausea	98(75%)	33(25%)	5	12.214	0.032
	Vomiting	20(80%)	5(20%)			
	Numbness	28(87%)	4(13%)			
	Headache	8(67)	4(33%)			
	Dizziness	14(70%)	6(30%)			
	Other	29(56%)	23(44%)			
<b>Do you have any fear for TB</b>	Yes	141(75%)	47(25%)	1	1.645	0.129
	No	56(67%)	27(33%)			
<b>Why do you fear TB infection</b>	TB related death	148(72%)	58(28%)	2	1.170	0.718
	Stigma	36(72%)	14(28%)			
	social belief	13(81%)	3(19%)			
<b>If clinic people discuss with you IPT</b>	Yes	146(79%)	40(21%)	1	10.847	0.001
	No	51(59%)	35(41%)			
<b>Potential side effects of IPT according to clinicians</b>	Nausea	59(84%)	11(16%)	5	41.473	0.000
	Vomiting	10(56%)	8(44%)			
	Numbness	38(97%)	1(3%)			
	Headache	12(100%)	0(0%)			
	Dizziness	5(100%)	0(0%)			
	no response	73(57%)	55(43%)			
<b>Recommended duration for use of IPT</b>	3 months	24(65%)	13(35%)	2	1.170	0.557

demographic factors, the study established an average uptake of IPT. It a mean score = 70.74%. Based on economic factors, the uptake of IPT registered a mean score = 73.3%. This outcome was lower than that reported in; Tanzania of (98.9%) [16], Ethiopia of (89.5%) [17] and in Rwanda of (84%) [12]. The IPT intake in this study was however higher an uptake in Malawi which was reported at (64.3%) [18]. High IPT uptake in Rwanda can be attributed to the integration of IPT into the programmatic delivery of healthcare by the health care givers [19], delivery of IPT services in Kajiado County is not integrated to other healthcare services, this, with poor infractural development in the County can contribute to slow implementation to the required target of IPT. Next research hypothesis sought to determine between the association between patient knowledge and IPT uptake. The resulting analysis shows most of the respondents (81%) had sufficient knowledge of IPT. Resulting from the logistic regression analysis, the existence of a significant positive association (p-value=0.000,  $\beta_{ii}=1.729$ ) between patient knowledge among PLHIV and IPT uptake was established. A correlation analysis outcome shows the existence of a significant positive relationship ( $r=0.332$ , sig. =0.000) between patient knowledge and having ever used IPT at 0.01 level in a two tailed test. In concurrence with findings in Nairobi, associated high IPT Intake with having received proper health education (AOR 5.0, 95% CI 3.0-8.4) and having a good relationship with the healthcare worker (HCW) (AOR 2.0, 95% CI 1.2-3.4) [9]. In a related study, (1) linked to counseling before initiation of therapy, freedom to take INH publicly, and regular attendance at follow-up clinics to high uptake of IPT. Findings elsewhere demonstrated that low-level knowledge on TB negatively affects the health-seeking behavior of the people [10]. Proper understanding of their own health aspect by PLWHIV will enable them make informed decision concerning the importance of taking IPT therefore leading to improve IPT uptake. This study was done in one county; a nation-wide study would make the results more generalizable and comparable to literature from other parts of the world, also purposive sampling of the study facilities makes it lack generalizability with other county health facilities. Given the sensitivity of the questions asked, there were instance of low or non-response to some personal questions and the issue of recall bias can be reported from study participants. This was a cross sectional study a longitudinal survey can unearth behavior change of PLHIV toward IPT uptake.

## 5. CONCLUSION

The IPT uptake amongst PLHIV in Kajiado County was sufficient (72%) relative to results in reviewed empirical studies. IPT is accepted to reasonable levels. Patient knowledge factors had the highest influence on IPT amongst PLHIV. The role of health care givers and health centers as IPT information disseminators and IPT knowledge source respectively, was invaluable in this study it is recommended that more effort be based on dissemination of information about IPT; in health centers, through health officers, spread of word of mouth by recruited and trained volunteers. That IPT Future national strategies should be geared toward management of the factors that accelerate the spread of TB. The study recommends for a longitudinal type of study that follow up those exposed to IPT and explores on the outcome of using IPT among PLHIV.

## CONSENT AND ETHICAL APPROVAL

Approval to carry out the study was obtained from Kenyatta university ethical review board (KU/ERC/APPROVAL/VOL.1 (275)).

Permission to carry out the research was sought from the National Commission for Science and Technology, Kajiado County department of health and hospitals medical superintendents. A written informed consent was provided to all study participants. All the participants were informed that the exercise was voluntary and one could decline or withdraw at any time during the study. Confidentiality was maintained throughout the study, respondents were advice against disclosing their names. We endeavoured to present the findings just as recorded.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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