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Predictors of Isoniazid Preventive Therapy Completion Among HIV-Infected Patients Receiving Differentiated and non-Differentiated HIV Care in Rural Uganda

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Abstract

Rates of IPT completion remain low in programmatic settings in sub-Saharan Africa. Differentiated HIV care, a patient-centered adaptive care model scaling-up throughout sub-Saharan Africa, may improve IPT completion by addressing joint barriers to IPT and HIV treatment. However, the impact of differentiated care on IPT completion remains unknown. In a cross-sectional study of people living with HIV (PLWH) on antiretroviral therapy (ART) in care in 5 communities in rural Uganda we sought to: (1) compare IPT completion between PLWH on ART receiving HIV care via a differentiated care model versus a standard HIV care model delivered in the same health center, (2) assess individual, interpersonal, and structural predictors of IPT completion by survey interviews of patients enrolled in each care model, and (3) investigate the mechanisms underlying potential differences in IPT between care models via multivariable regression modeling. A total of 103/144 (72%) of HIV-positive patients who received differentiated care and 85/161 (53%) who received standard care completed IPT ($p<0.01$). Adjusting for age, gender and geographic community, patients receiving differentiated care had higher odds of completing IPT (aOR: 2.6, 95% CI: 1.5–4.5, $p<0.01$). Predictors of IPT completion varied by care model, and differentiated care modified the positive association between treatment completion and the belief in the efficacy of IPT and the negative association with side-effects. Patients receiving care via a multi-component differentiated care model had almost triple the odds of IPT completion compared to standard care. The model's impact on health beliefs, social support, and perceived side-effects to IPT may underlie this positive association. Integrating IPT

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for tuberculosis into differentiated HIV care models may harness operational synergies, reduce barriers to care, and substantially improve IPT completion rates among PLWH.

Keywords

Isoniazid Preventive Therapy; TB prevention; East Africa; HIV; Differentiated Care

BACKGROUND

Tuberculosis (TB) is the leading infectious killer worldwide, with an estimated 10.4 million new cases and 1.3 million deaths in 2016 (World Health Organization, 2017). People living with HIV (PLWH) are especially vulnerable to tuberculosis, with the risk of TB disease 20–37 times greater than seen in HIV-uninfected persons (World Health Organization, 2009). Isoniazid preventive therapy (IPT) decreases TB incidence by up to 60% (Briggs, Emerson, Modi, Taylor, & Date, 2015) and reduces mortality in PLWHA (Badje et al., 2017). Nevertheless, despite substantial evidence for its efficacy, implementation of IPT globally remains low (Alsdurf, Hill, Matteelli, Getahun, & Menzies, 2016; Getahun et al., 2010)· In settings where IPT is available, treatment completion in programmatic settings is often suboptimal, ranging from 36% to 89% (Ayele, van Mourik, & Bonten, 2016; Little et al., 2018; Makoni et al., 2015; Mugisha et al., 2006; Takarinda, Choto, Harries, Mutasa-Apollo, & Chakanyuka-Musanhu, 2017; Thindwa et al., 2018).

Differentiated HIV care models are scaling up throughout Africa, and these models may improve IPT treatment completion. Differentiated care models adapt HIV care to the patient's needs, such as refilling stable patients' anti-retroviral therapy quarterly instead of monthly. We and others have shown that these models can improve HIV viral suppression and decongest clinics (Grimsrud, Lesosky, Kalombo, Bekker, & Myer, 2016; Kwarisiima et al., 2017; Mody et al., 2018), but it remains unclear whether they can concurrently improve treatment of co-morbid health conditions, such as latent TB. Additionally, an updated understanding of IPT completion and barriers to adherence is crucial to guide successful integration of IPT into new differentiated HIV care delivery models. Data from the pre-differentiated care eras identify health beliefs, socioeconomic factors, and distance and costs related to traveling to clinic as key barriers to IPT (Adams, Talbot, Odato, Blunt, & Steingart, 2014; Makanjuola, Taddese, & Booth, 2014; Munseri, Talbot, Mtei, & Fordham von Reyn, 2008; Namuwenge et al., 2012). However, it is unclear whether these barriers to IPT completion also apply to patients receiving HIV care and IPT via differentiated care models.

Direct comparisons of IPT completion rates among patients receiving differentiated versus standard care are needed. We previously reported data on IPT completion rates and individual-level predictors of completion in a differentiated care setting in rural Uganda (Tram et al., 2017). However, that analysis did not directly compare IPT completion rates to a non-differentiated care model, nor did it assess health beliefs or structural predictors of IPT completion. Herein we report a direct comparison among patients receiving ART and HIV care in five government-sponsored clinics via differentiated care and standard of care

seeking to: (1) evaluate IPT completion rates; (2) assess individual, interpersonal, and structural predictors of IPT completion; and (3) investigate the mechanisms underlying potential differences in IPT completion by care model.

METHODS

Comparing IPT completion between differentiated and non-differentiated care models

We conducted a cross-sectional study of adult HIV-patients on ART who started IPT in 5 communities in Eastern Uganda between January and April 2016. All participants were receiving IPT as part of an IPT feasibility study. The patient population consisted of a convenience sample of (1) 'stable' patients participating in the SEARCH HIV test and treat trial () who all received HIV care via a differentiated care model and (2) a convenience sample of 'stable' patients receiving HIV standard of care (non-differentiated care) at the same 5 government-sponsored clinics in Eastern Uganda, but who were living in communities in the clinic catchment area but not included in the SEARCH trial. In both HIV care models, a 'stable' patient was defined as on ART and virally suppressed.

Components of the SEARCH differentiated care model have been previously described (Havlir et al., in press; Kwarisiima et al., 2017; Shade et al., 2018). Briefly it is a patient-centered, multicomponent HIV care model designed to reduce structural barriers and to improve patient-clinician relationships. The model includes a patient-centered and welcoming environment, quarterly clinic visits and ART refills for 'stable' patients, and nurse-conducted visits with physician referral of complex cases. The patients not enrolled in SEARCH received routine non-differentiated HIV care in the same health center as the SEARCH patients, but in a different section of the health center. In the non-differentiated routine HIV care model, clinic visits and ART refills were monthly and clinic staff and care providers did not receive training in patient-centered care. IPT screening, initiation, and management was conducted per the Ministry of Health (MOH) guidelines (Uganda Ministry of Health, 2014) in both differentiated and non-differentiated care models. Per the Uganda MOH criteria all persons living with HIV are eligible for IPT if they do not have symptoms suggestive of active TB or contraindications to IPT. All patients received the WHO symptom screen prior to IPT initiation and picked up IPT refills monthly. ART and IPT refills were synchronized among those receiving standard of care, whereas patients receiving differentiated care could chose to come monthly for IPT and quarterly for ART, or they could choose to pick up both ART and IPT monthly.

Our primary outcome was completion of 6 months of IPT, which we defined as documentation in IPT treatment registers as receipt of 6 months of isoniazid. We used multivariable logistic regression to assess the odds of treatment completion with our key exposure variable being differentiated care. We adjusted our outcomes for age, gender and community of residence—variables available for our entire study population.

Assessing Barriers to IPT completion and Differences in Predictors by Care Delivery Model

A sub-sample of patients who received IPT as part of the IPT feasibility study were invited to complete a survey on barriers to IPT completion from December 2016 to March 2017. To

maximize diversity of this sample we selected a stratified random sample of patients who participated in the IPT pilot study. Strata consisted of clinics (5 strata), SEARCH vs. non-SEARCH participants (2 strata), and IPT completers vs. non-completers (2 strata). We recruited 223 patients to enroll a goal 200 patients in the survey. Surveys were administered in the local language of the participant by trained research assistants. The participants were interviewed at the clinic or other convenient location based on their preference. A small reimbursement was provided to participants who traveled to the clinic to be interviewed.

Our survey design was informed by the socio-ecological model (SEM) (McLeroy, Bibeau, Steckler, & Glanz, 1988) and qualitative data on IPT adherence (Makanjuola et al., 2014). The social-ecological model has been used widely to understand and promote health behaviors and emphasizes that multiple levels of interdependent personal and environmental factors influence people's behaviors. Variables assessed include: (1) *Individual-level* variables including age, health beliefs, side effects, and household wealth (relative wealth was derived using a principal component analysis of household assets) (Vyas & Kumaranayake, 2006); (2) *Interpersonal-level* factors including social support and relationships with health care providers; (3) *Institutional/Health System-level* including distance to clinic, wait time, provider satisfaction- adapted from the Hojat scale (Hojat et al., 2011); and (4) *Community-level* factors including TB stigma, which we assessed using a 12 question TB stigma scale (Van Rie et al., 2008) HIV-specific variables were extracted from the patient clinic records. We included the most recent CD4 count within 2014–2016.

To assess predictors of IPT completion, we first assessed unadjusted measures of association between our exposures of interest and IPT completion. As this was an exploratory analysis we dichotomized questions with Likert item responses using natural cut-offs within our sample as indicated. We calculated unadjusted odds ratios using logistic regression. Given the stratified sampling design, we also performed a test of homogeneity for differentiated vs. non-differentiated care to assess for homogeneity across strata. In cases where there was heterogeneity ($p<0.20$), we present the stratified results.

To obtain the final multivariate model we first examined the correlation of all variables in a correlation matrix. If a variable had an r-value of >0.4 and was in the same level of analysis, e.g. community level, then we used a causal model to select which variable was included in the multivariate analysis. We included all variables with a p-value of <0.2 in our initial model and used backward selection ($p<0.1$), to arrive at the final model. Standard errors were adjusted for clustering by community. We presented the results stratified by differentiated care status, because of possible effect modification of health beliefs by participation in differentiated care.

To understand the potential mechanisms by which differentiated care may be affecting IPT completion we explored differences and similarities in the multi-variate predictors stratified by care models, using the lens of the SEM.

ETHICS

This study was approved by institutional review boards at Makerere University, the Uganda National Council for Science and Technology (Kampala, Uganda), and the Committee on Human Research, University of California, San Francisco (USA). Participants provided written informed consent for study participation.

RESULTS

IPT Treatment Completion by Care-Delivery Model

Of the 305 patients started on IPT 72% were women and the median age was 42 years (IQR: 34–50). Among the 144 patients who received differentiated care, 104 (72%) completed IPT, whereas 85 of 161 patients (53%) in the non-differentiated care model completed IPT, p<0.01. Participants in the differentiated care group had a greater odds of treatment completion compared to those receiving non-differentiated care (OR: 2.2, 95% CI: 1.4–3.6 p<=0.01), and this association remained significant when adjusting for age, gender, and community (aOR: 2.6, 95% CI: 1.5–4.5, p<0.01). Age category was also independently associated with IPT completion (*ref.* age 15–29 years; 30–44 years aOR: 3.2, 95% CI:1.3–834, p-0.02; age≥45 years aOR 3.0, 95% CI: 1.1–8.0, p=0.02), though gender was not (*ref.* male; aOR: 1.1, 95% CI: 0.6–2.1).

Barriers and Predictors of IPT Completion

Of the 305 patients started on IPT, 223 were selected for recruitment for the nested survey on barriers to IPT completion. Of those 223, 81% (180/223) completed the survey and 19% (43/223) could not be found during the recruitment period. Patients who completed the survey compared to those who did not, did not differ with respect to age (p=0.4), gender (p=1.0), or HIV care-model (p=0.8). Of the 180 patients who completed the survey 52% (94/180) were in the non-differentiated care model and 48% (86/180) were in the differentiated care model. The demographics of participants completing the survey were: median age of 43 (IQR 36–51), 72% (131/180) female, and had a median CD4 of 513 (IQR 389–651).

Social-Ecological Model (SEM) Grouped Correlates of IPT completion

Individual-level Influences (Table 1)

Demographic and Economic Factors.: A comparison of demographic and economic variables of IPT non-completers vs. completers, respectively, revealed 2 variables with significant bivariate associations with IPT non-completion: younger median age (41 vs. 43, p=0.05) and, for patients receiving differentiated care, lowest household wealth tertile (56% vs. 32%, p=0.05).

Side Effects.: Patients reporting side effects had a lower odds of IPT completion (OR=0.4, 95%CI: 0.2–0.7), p<0.01). There was a dose-response effect between the number of side effects and the odds of IPT completion.

Health Beliefs.: The majority of participants had favorable views about the efficacy of IPT and viewed TB as a serious disease: 80% of participants endorsed the statement “IPT could prevent people from becoming sick with TB” and 96% agreed with the description of TB as a “very serious” disease.

-Interaction Between Health Beliefs and HIV-Care Delivery Model—Receipt of differentiated care modified the association between certain health beliefs and IPT completion. Among patients receiving differentiated care, those who believed in the efficacy of IPT as evidenced by the statement “Isoniazid therapy can prevent me from becoming sick with TB” had increased odds of completing IPT (OR=3.2, 95%CI: 1.0–10.2; p=0.05), whereas this association was not seen among patients receiving standard care. Likewise, we detected a negative association between the belief “Isoniazid is dangerous to my health” and IPT completion among patients receiving differentiated care (OR 0.2, 95% CI: 0.1–0.6, p<0.01), but not among those who were receiving standard HIV care.

Interpersonal/Network Influences (Table 2A)—Some measures of social support were associated with IPT completion. Feeling comfortable taking IPT in front of friends was also positively correlated with IPT completion (OR 2.1, 95%CI: 1.1–4.1, p=0.02). HIV disclosure was positively correlated with IPT completion only among patients receiving differentiated care and only if the disclosure was to friends (OR 3.1, 95% CI: 1.2–7.9, p=0.02).

Community level (Table 2B)—Though the majority of IPT completers and non-completers agreed with the statements “if someone sees you taking IPT they will think you have TB” and “if someone sees you taking IPT they will think you have HIV”, there were no associations with these sentiments and IPT completion. The composite patient-perspective TB stigma score was high, but did not differ between IPT completers and non-completers (mean 33.8 ±7.6 vs. 33.7±7.2, p=0.7).

Institutional/Health System (Table 2C)—We did not detect a significant association between IPT completion and median cost to travel to clinic. IPT completers had shorter wait times, but this trend did not meet statistical significance (p=0.09). However, wait times differed between patients receiving differentiated care (median: 30 min; IQR: 10–60) and those who did not (median: 60 min, IQR: 20–120), p=0.01.

Multivariate Independent Predictors of IPT Completion, Stratified by Care Delivery Model (Table 3).

Differentiated Care.: In the model restricted to differentiated care participants, significant facilitators of IPT completion included: strong belief that IPT prevented TB (aOR: 8.5, 95% CI: 3.3–21.9, p<0.01), feeling comfortable taking IPT in front of a friend (aOR= 7.6, 95%CI: 2.9–20.2, p=0.01). Barriers included taking traditional medicines to prevent TB (aOR: 0.3, 95%CI: 0.1–0.7, p-0.03) and not talking to friends or family about IPT (aOR 0.1, 95%CI: 0.03–0.7, p=0.01). Side effects and age were no longer significant in multivariable models among patients receiving differentiated care.

Standard Care.: Among patients not receiving differentiated care, the only barriers in multivariate models were experiencing side-effects (aOR 0.3, p=0.1–0.9, p=0.03) and not talking to anyone about IPT (aOR 0.2, 95%CI: 0.03–0.7, p=0.03).

DISCUSSION

In this cross-sectional study of HIV patients on ART in five government-sponsored clinics in rural Uganda, the odds of IPT completion were 2.6-fold higher in patients receiving HIV care via the SEARCH multi-component differentiated care model compared to those receiving standard (non-differentiated) HIV care at the same health centers. These data suggest that differentiated care models may improve IPT completion. Given that IPT expansion is an urgent global priority, and intense focus is building on integration of HIV and TB care, this association warrants further study. Additionally, we found that the association between IPT completion and health-beliefs, side-effects, and measures of social support differed by health care model. These differences highlight possible mechanisms that may underlie the positive association between IPT completion and the SEARCH differentiated care model.

The finding that differentiated care was associated with higher rates of IPT completion may be due to several possible factors. A strong health belief in the efficacy of IPT was associated with IPT completion in the differentiated care model, but not the non-differentiated care model. One interpretation of this finding is that the SEARCH differentiated care model improved a health care workers' abilities to influence a patient's beliefs about IPT by improving the patient-provider relationship, as well as health care worker knowledge about IPT. This is consistent with findings from a qualitative meta-analysis on IPT adherence, where authors identified HCW knowledge and the patient-provider relationship as key factors connecting health beliefs and IPT completion (Makanjuola et al., 2014). The SEARCH differentiated care model addresses gaps in patient-provider knowledge and trust via extensive HCW trainings on creating a friendly clinic environment, providing supportive interactions with patients, and counseling patients on medications and adverse effects. Additionally, in this model, HCWs participate in regular collaborative meetings where they discuss successes and challenges with difficult patient interactions and medical management of side-effects and adherence. Patient-centered care, such as in this differentiated care model, can be taught (Sevin, Moore, Shepherd, Jacobs, & Hupke, 2009; Zelnick et al., 2018) and may be a crucial intervention to improve IPT completion.

Isoniazid side-effects have long been associated with IPT non-completion (Ayele et al., 2016; Little et al., 2018; Munseri et al., 2008; Namuwenge et al., 2012; Takarinda et al., 2017), however, our data suggest that a differentiated care model may diminish this association. In the non-differentiated care model, the odds of IPT treatment completion was 60% lower in those patients experiencing side effects than those without side effects. However, this association was not significant in the differentiated care model. We hypothesize that the lack of association between side-effects and treatment completion among patients in the SEARCH differentiated care model was due to (1) provider knowledge and an increased ability to manage side-effects and support patients to complete

INH despite adverse reactions and (2) better provider communication and the ability to manage patient's expectations about IPT efficacy and side-effects. HCW knowledge and provider-communication have previously been associated with IPT completion in programmatic settings in sub-Saharan Africa (Jacobson, Niccolai, Mtungwa, Moll, & Shenoi, 2017; Makanjuola et al., 2014), and may be important modifiable targets to decrease the negative effect of side-effects on provider and patient-initiated IPT discontinuation.

Social support can be another avenue to facilitate IPT adherence, and interpersonal factors were significant in both the differentiated and non-differentiated care models. In this study, patients who engaged family members or friends in their decision to take IPT had a higher odds of completing it, and these findings are consistent with previous research identifying family and other social support-related factors as important themes that influence IPT adherence (Makanjuola et al., 2014). It is useful to consider the importance of social support, and models of care such as community-based adherence clubs and group visits may also enhance the role of social support in improving IPT uptake and treatment completion (Grimsrud et al., 2016; Nachega et al., 2016).

Contrary to studies on IPT completion among PLWH not on ART, we did not find a significant association between IPT completion and structural and economic factors such as transport cost and wait time. This may be because distance and transport cost are barriers already overcome or internalized by patients actively engaged in HIV care, who are coming regularly to clinic for ART refills. Alternatively, the lack of association may also be due to insufficient power. Additionally, while previous studies have shown that TB stigma contributes to delays in TB diagnosis and treatment (Courtwright & Turner, 2010), we did not find an association between mean TB stigma scores and IPT completion. Explanations for this may be that the stigma scale was not validated in sub-Saharan Africa nor for PLWHA receiving TB prevention therapy or we were insufficiently powered to detect this difference. However, we did see some differences in variables that could be seen as possible proxies for HIV and TB stigma. For example, people who were comfortable taking IPT in front of friends had 3-fold greater odds of completing IPT.

Our study has several limitations. The sample size was small and contained a majority of women and patients older than 40. Though this limits generalizability, women and patients >40 years old mirror the population of patients well-retained in HIV care in rural sub-Saharan Africa. Convenience sampling and lack of randomization by HIV care model also limits our ability to assess causality. Additionally, our study only assessed one type of differentiated care-model, namely the multi-component SEARCH model (Kwarisiima et al., 2017). Generalizability to other differentiated care models is thus limited. However, our findings warrant testing in larger study populations and in other differentiated care models. Desirability bias have affected some survey responses, especially regarding satisfaction with healthcare workers. However, we expect this bias to be non-differential between SEARCH and non-SEARCH patients. Lastly, there may have been differential rates of recording of treatment completion in the differentiated care versus non-differentiated care models; however, this is unlikely to explain such a large difference in IPT completion (72% vs. 53%), and extensive efforts were made to remind clinical officers and nurses to record treatment outcomes.

As countries move forward with plans to implement and scale-up both IPT and differentiated HIV care, it is critical to identify the effect of different HIV care delivery models on other diseases and health interventions, including TB preventive therapy. The SEARCH multi-component differentiated care model not only has a high rate of retention in HIV care and viral suppression(Kwarisiima et al., 2017), but may also improve IPT completion. Our findings suggest that differentiated care models may be one way to address sub-optimal IPT completion rates.

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Table 1:

Unadjusted individual-level predictors of completion of Isoniazid Preventive Therapy (IPT)

	Did not complete IPT N=55		Completed IPT N=125		
	n/N	% or median/mean	n/N	% or median/mean	OR (95% Cl), p-value
Individual Level Predictors					
DEMOGRAPHICS					
Median Age (IQR)	**55**	**41 (32–47)**	**125**	**43 (37–51)**	**1.0 (1.0–1.1) p=0.04**
Female	40/55	73%	91/125	73%	1.0 (1.0–2.0), p=1.0
Education					
None	15/54	28%	23/121	19%	*ref*
Primary	28/54	52%	76/121	63%	1.7 (0.8–3.9) p=0.15
Secondary and above	11/54	20%	22/121	18%	1.3 (0.5–3.5) p=0.59
Marital Status					
Not married	12/54	22%	16/121	13%	*ref*
Married	32/54	59%	77/121	64%	1.8 (0.8–4.2) p=0.18
Widowed	10/54	19%	28/121	23%	2.1 (0.7–5.9) p=0.16
Lowest Wealth Tertile *	20/53	37%	43/121	36%	0.9 (0.5–1.8) p=0.78
Differentiated Care	**14/25**	**56%**	**18/55**	**32%**	**0.3 (0.1–1.0), p=0.05**
Non-Differentiated Care	6/28	21%	25/66	38%	2.2 (0.8–6.2), p=0.13
PERCEIVED SIDE EFFECTS					
Paitent reported any side effects while taking IPT	**33/55**	**60%**	**45/125**	**36%**	**0.4 (0.2–0.7), p<0.01**
# of side effects reported					
0 side effects	**22/55**	40%	**80/125**	64%	ref
1 side effect	**15/55**	**27%**	**31/125**	**25%**	**0.6 (0.3–1.2), p=0.15**
>=2 side effects	**18/55**	**33%**	**14/125**	**11%**	**0.2 (0.1–0.5), p=0.05**
HEALTH BELIEFS					
Knowledge and belief in efficacy of IPT Isoniazid therapy can prevent me from					
becoming sick from TB (strongly agree) *	38/51	75%	102/124	82%	1.6 (0.7–3.5) p=0.25
Differentiated Care	**18/26**	**69%**	**51/58**	**88%**	**3.2 (1.0–10.2), p=0.05**
Non-Differentiated Care	20/25	80%	51/66	77%	0.9 (0.3–2.6) p=0.78
Isoniazid is dangerous to my health *	**20/50**	**40%**	**24/118**	**20%**	**0.4 (0.2–0.8) p<0.01**
Differentiated Care	**12/24**	**50%**	**10/55**	**18%**	**0.2 (0.1–0.6) p<0.01**
Non-Differentiated Care	8/26	31%	14/63	22%	0.6 (0.2–1.8) p=0.34
Did you take any traditional medicines to prevent becoming sick with TB ? (yes or no)	**6/55**	11%	**3/125**	2%	0.2 (0.1–0.8), p=0.03
Knowledge and beliefs of tuberculosis How serious of a disease is tuberculosis? (very serious vs. serious or not very serious)	51/54	94%	119/124	96%	1.4 (0.3–6.1) p=0.65

* test for homogeneity <0.2

OR=odds ratio, CI=confidence interval

Table 2:

Unadjusted bivariate interpersonal, community, and institutional-level predictors of completion of Isoniazid Preventive Therapy (IPT)

	Did not complete IPT N=55		Completed IPT N=125		
	n/N	% or median/mean	n/N	%or median/mean	OR (95% Cl), p-value
A. Interpersonal/network -*Dyadic relationships, family support, interactions with HCW*					
Social Support					
In general, how satisfied are you with the overall support you get from your friends and family members?					
Very Satisfied (compared to not satisfied and satisfied)	14/55	25%	50/125	40%	2.0 (1.0–4.0) p=0.06
Who did you talk to about your decision to take IPT?					
Friend	7/55	13%	12/125	10%	0.7 (0.3–2.0), p=0.53
Spouse (if married)	**7/35**	22%	**31/77**	40%	2.4 (0.9–6.3) p=0.07
Parent	5/55	90%	14/125	11%	1.3 (0.4–3.7) p=0.67
No one	**19/55**	**35%**	**17/125**	**14%**	**0.2 (0.1–0.6) p<0.01**
Did you feel comfortable taking IPT in front of:					
Spouse (if married)	15/32	47%	37/77	48%	1.0 (0.5–2.4), p=0.91
Friends	**26/55**	**47%**	**82/125**	**66%**	**2.1 (1.1–4.1) p=0.02**
Who did you talk to about taking IPT?					
Spouse (if married)	7/32	13%	31/77	42%	4.8 (0.9–24.7), p=0.06
Friend	7/55	13%	12/125	10%	0.7 (0.3–2.0),p=0.53
Parent	5/55	9%	14/125	11%	1.3 (0.4–3.7), p=0.42
No One	**19/55**	**35%**	**17/125**	**14%**	**0.3 (0.1–0.6) p<0.01**
Who knows about your HIV status?					
Spouse	26/32	58%	62/77	58%	1.0 (0.5–1.9) p=0.98
Parent	32/55	58%	71/125	57%	0.9 (0.5–1.8), p=0.86
Friend *	28/55	51%	79/125	63%	1.7 (0.9–3.l), p=0.12
Differentiated Care	**10/30**	**37%**	**38/64**	**64%**	**3.1 (1.2–7.9), p=0.02**
Non-Differentiated Care	26/44	64%	33/50	32%	0.9 (0.4–2.3), p=0.84
B. Community Level					
If someone sees you taking IPTthey will think you have TB (agree vs. disagree)	26/54	48%	53/120	44%	0.9 (0.4–1.6) p=0.63
If someone sees you taking IPTthey will think you have HIV (agree vs. disagree)	37/53	70%	75/123	61%	0.7 (0.3–1.3) p=0.27
Mean (SD)TB stigma score	49	33.8 (7.6)	111	33.2 (7.2)	1.0 (0.93–1.0) p=0.42
High Stigma (TB stigma score >=39, top 25th percentile)	14/49	29%	27/111	24%	0.8 (0.4–1.7) p=0.57
C. **Institutional Level**					
Median cost to travel to clinic (Ugandan Shillings)	55	2250 (2874)	125	1777 (1967)	1.0 (1.0–1.0), p=0.17
Median clinic wait time.	55	60 (20–120)	125	30 (10–119)	1.0 (1.0–1.0), p=0.32
Patent satisfaction Scales					
I am satisfied with the HCW who has been taking care of me (strongly agree)	**46/55**	**84%**	**117/125**	**94%**	**2.9 (1.0–7.9) p=0.04**

	Did not complete IPT N=55		Completed IPT N=125		
	n/N	% or median/mean	n/N	%or median/mean	OR (95% Cl), p-value
I am confident of my HCW knowledge and skills	49/55	90%	115/125	92%	1.4 (0.5–4.1) p=0.50
My HCW spent enough time with me	47/55	85%	110/125	88%	1.2 (0.5–3.2) p=0.64
Knowledge- Did your HCW counsel you on the purpose	**52/55**	95%	**125/125**	100%	

* test for homogeneity <0.2

OR=odds ratio, CI=confidence interval

Table 3:

Multivariate model of predictors of Isoniazid Preventive Therapy (IPT) completion among HIV-infected patients engaged in care, stratified by care model. Analysis includes participants who completed sub-survey on predictors of IPT

	OR (95% CI), p-value	aOR (95% CI), p-value *	aOR (95% CI), p-value *
Domain in Socioecologic Model		**Differentiated Care N=78** **	**Non-Differentiated Care N=94**
INDIVDUAL			
Age (year)	1.0 (1.0–1.1) p=0.04	1.1 (1.0–1.2), p=0.05	1.0 (1.0–1.1), p=0.22
Any Side Effects	0.4 (0.2–0.7), p<0.01	0.8 (0.3–2.0), p=0.64	0.3 (0.1–0.9), p=0.04
Health Beliefs- Knowledge and belief in efficacy of IPT			
Isoniazid therapy can prevent me from becoming sick from TB (strongly agree)			
Differentiated Care	3.2 (1.0–10.2), p=0.05	8.5 (3.3–21.9), p<0.01	
Took traditional medications to prevent TB	0.2 (0.1–0.8), p=0.03	0.3 (0.1–0.7), p=0.03	
Lowest Wealth Tertile	0.3 (0.1–1.0), p=0.05	0.1 (0.0–0.5), p<0.01	
INTERPERSONAL/SOCIAL SUPPORT			
Did you feel comfortable taking IPT in front of a friend (s)?			
Friends	2.1 (1.1–4.1) p=0.02	7.6 (2.9–20.2), p=0.01	
Who did you talk to about taking IPT?			
No one (friends, family)	0.3 (0.1–0.6), p<0.01	0.1 (0.03–0.7), p=0.01	0.2 (0.1–0.9), p=0.03

IPT= Isoniazid Preventive Therapy; OR=Odds Ratio; aOR=adjusted odds ratio; CI=confidence Interval

* adjusted for clustering by community

* Multivariate model exclude observations with missing data (Health Belief: IPT prevents from getting sick n=2, wealth tertile==6)