DETERMINANTS OF ISONIAZID PREVENTIVE THERAPY UPTAKE AMONG CHILDREN LIVING WITH HIV IN NJOMBE, TANZANIA

Adelina Alfred (MD)

Master of Tropical Disease Control (MSc TDC)

Muhimbili University of Health and Allied Sciences

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By

Adelina Alfred (MD)

A Dissertation Submitted in partial Fulfilment of the Requirements

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance of thesis/dissertation entitled ***Determinants of Isoniazid Preventive Therapy uptake among children living with HIV in Njombe, Tanzania*** in fulfillment of the requirements of Master of Tropical Disease Control (MSc TDC) of Muhimbili University of Health and Allied Sciences.

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Prof. David Urassa

(Supervisor)

Date: _____

_____

Prof. Billy Ngasala

(Supervisor)

Date: _____

DECLARATION AND COPYRIGHT

I, **Adelina Alfred**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature…… Date……...….....

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DEDICATION

I dedicate this work to my lovely mother, Theonestina for unceasingly encouraging me to actualize my dreams. Thank you for constant motivation and belief in my abilities.

ABSTRACT

Introduction: Tuberculosis (TB) is among the leading causes of ill-health and deaths in all age groups worldwide. Isoniazid Preventive Therapy (IPT) is proven public health intervention which reduces the risk of developing active TB among people living with HIV. Njombe has highest prevalence of HIV in all age group in the country and is among the five regions with lowest uptake IPT. Despite evidence that IPT is safe and effective, there is limited data on its uptake and associated factors among children living with HIV (CLHIV) aged below 10 years.

Objective: Thus, this study aimed to determine IPT uptake, completion and factors associated with IPT uptake among CLHIV aged 1 to < 10 years in Njombe Town Council (TC).

Methodology: A facility based cross-sectional study with quantitative approach was conducted in Njombe from 28th May to 3rd July. The study recruited 423 pair of caregiver and children living with HIV aged 1 to < 10 years in Njombe TC using stratified random sampling technique. Data on caregiver related factors were collected using an interviewer-administered questionnaire and data abstraction form to capture information on IPT uptake and completion from child's medical file. Data were entered and analyzed using SPSS. Descriptive statistics were used to generate frequency table and figures. Pearson Chi-square, and multivariate analysis using Modified Poisson regression with robust standard errors were performed to obtain prevalence ratios with their corresponding Confidence Interval (CI); significance was set at $p < 0.05$.

Results: Most children (73.5%) were aged between 5 – 9 and half of children (53.9%) were female. Most of the caregiver were female (88.2%), median age 34 (Range,18,61) years and 68.3% were biological mothers of the children. Out of 423, 273(64.5%) children were ever on IPT (Uptake of 64.5%). Out of 273 who were initiated, 57 (20.9%) were still on medication at time of the study and the remaining 216 (79.1%) had received IPT six months prior. Out of 216, 142 (65.7%) had documented evidence of 6-month course of IPT

completion. Child factors associated with IPT uptake were children aged 5 – 9 years (adjusted Prevalence Ratio (aPR)=1.9, $p < 0.001$) and multi-month visit (aPR=1.4, $p < 0.001$). Caregiver-related factors associated with IPT uptake among their children were caregiver's medical history of TB infection (aPR=1.17, p=0.022) and caregiver who has never been on IPT (aPR= 0.57, $p < 0.001$).

Conclusion: Study has shown the sub-optimal uptake and 6-month course of IPT completion. Furthermore, the study has revealed the determinants of IPT uptake to be children aged 5-9 years, multi-months visiting schedule, history of TB infection and medical history of IPT use among their caregivers.

Recommendations: More interventions are needed to promote uptake of IPT in order to achieve its optimal benefits. More studies are required to explore on the barriers of IPT completion and system-related and Provider-related barriers that may hinder uptake among children**.**

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ABBREVIATIONS

aPR	Adjusted Prevalence Ratio
ART	Antiretroviral Therapy
CLHIV	Children Living with HIV
CTC	Care and Treatment Clinic
DHIS	District Health Information Software
DMO	District Medical Officer
DNA	Deoxyribonucleic acid
HIV	Human Immunodeficiency virus
INH	Isoniazid
IPT	Isoniazid Preventive Therapy
IRB	Institutional Review Board
LTB	Latent Tuberculosis
MOHCDGEC	Ministry of Health Community Development, Gender, Elderly and Children
MUHAS	Muhimbili University of Health and Allied Sciences
NACP	National Aids Control Programme
NBS	National Bureau of Statistics
NTLP	National Tuberculosis and Leprosy Programme
PCR	Polymerase Chain Reaction
PLHIV	People Living with HIV
SPSS	Statistical Package for Social Science

TB	Tuberculosis
WHO	World Health Organization

DEFINITION OF TERMS

Active TB disease refers to person infected with *Mycobacterium tuberculosis* and presenting with clinical signs and symptoms with or without laboratory or radiological evidence (1).

Children refers to 1 to less than 10 years' age group (2,3).

Isoniazid Preventive Therapy refers to the use Isoniazid (INH) tablets as a treatment for latent TB in order to prevent progression to active TB disease(4).

IPT uptake refers to the proportion of children living with HIV (CLHIV) aged 1 to less than 10 years who are eligible for IPT and had been initiated on the treatment during data collection period (5).

IPT completion refers to the proportion of children living with HIV aged 1 to less than 10 years who had been initiated on IPT and have documented evidence of successful completion of the 6-month course (5).

Latent TB refers to state of persistent immune response to stimulation by *Mycobacterium tuberculosis* antigens with no evidence of clinical symptoms and signs of active TB (2).

CHAPTER ONE

1.1 INTRODUCTION

1.1.1 Background

Tuberculosis (TB) is a chronic infectious disease caused by *Mycobacterium tuberculosis.* It is an airborne disease transmitted through inhalation of droplets. Factors contributing to acquiring TB infection include concentration of droplet, extent of exposure, Prevalence of TB in the community and overcrowding (6,7). Symptoms of active tuberculosis are cough with sputum and blood at times, chest pains, weakness, night sweats, fever and weight loss. Diagnosis of PTB is by detection of microorganism either by sputum smear microscopy or culture or using a DNA PCR technique. TB is curable with combination of anti-TB drugs taken in two phases, intensive and continuation phase (6,7).

TB and HIV pandemics are fueling each other. The lifetime risk of developing active TB among PLHIV is 30%-50% compared with a lifetime risk of 5%-15% in HIV-negative individuals (8). HIV infected children have high risk of TB infection, progression to severe and disseminated disease, and TB-related morbidity and mortality (1,2,9–11). The higher TB prevalence in the community, the higher risk for children to be exposed to *M. tuberculosis*, hence contribute to a higher TB burden in children living with HIV.

1.1.2 Global situation

Globally in 2016, children (aged <15 years) accounted for 6·9% of the new tuberculosis cases that were notified (12). In 2019, an estimated 15 million people fell ill with TB worldwide, where 12% of them where children aged <15 years. Approximately 205,000 children < 15 years (among them, 32,000 children living with HIV) died due to TB (13).

Tuberculosis and HIV are dual pandemics in children in sub-Saharan Africa, and TB is the leading cause of pneumonia in African children infected with HIV (14). In HIV-endemic Africa, approximately 50% of child's TB cases are HIV-infected (10,11). A retrospective cohort study done in South Africa found that approximately 8% of children with HIV

admitted to hospital for pneumonia was due *Mycobacterium tuberculosis* confirmed by culture (15)

1.1.3 Tanzanian situation

In Tanzania, there is high TB incidence primarily because of high HIV prevalence. Approximately 37% of patients with TB in Tanzania are co-infected with HIV (16)**.** A prospective cohort study done in Tanzania reported a TB incidence rate of 5.2/100 person-years among HIV-infected children under 15 years (17). In 2018, a total of 15,513 children were notified with TB, which is 14% of all cases of which 80% were children aged below 10 years (18).

1.1.4 Isoniazid Preventive Therapy strategy

Isoniazid is given to individuals with latent infection of *Mycobacterium tuberculosis* to prevent progression to active TB disease. WHO recommends that all children living with HIV who aged above 12 months and are unlikely to have active TB on symptom-based screening should receive six months of IPT as part of a comprehensive package of HIV care (2,19,20). In 2011, Tanzania started phase one of IPT provision program in health facilities providing HIV services. The provision of IPT has been incorporated in the national guideline for management of HIV and AIDS and well elaborated in the national policy for collaborative TB/HIV activities (4,16). The approved health facilities offer IPT services to PLHIV free of charge (16).

The use of IPT in PLHIV reduces the risk of developing active TB disease by at least 60% and its protective effect is expected to last for 18 months from the last dose (2,21). A systematic review of 12 randomized controlled trials found that IPT reduced the overall risk of TB by 33% among people living with HIV (22). A clinical trial done in South Africa suggested a considerable reduction in mortality and protection against active TB disease among HIV-infected children who received isoniazid for 6 months (23). Similar findings from different studies have found that the use of IPT in children is effective in preventing TB incidence and reduction in early mortality (24,25). Similar findings from a study done

in Tanzania and Zimbabwe found that IPT is effective in reducing the incidence of TB among PLHIV (26,27).

For successful prevention of active tuberculosis, WHO recommends 6-month completion of IPT (2). Globally, there is progressive increase in IPT uptake among PLHIV (12,28). In 2019, the average global coverage of IPT provision to PLHIV is 50%, ranging from 1% to 89% and six-month IPT completion ranging from 39 to 99% from different studies (13,27–32).

In Tanzania, the coverage of IPT in PLHIV is ranging from 14.6% to 17% (13,33). In addition, the average national IPT uptake in under-five children with TB contact is 22% and region with the lowest uptake is Katavi at 1% and Njombe being among the five regions with lowest uptake (18). Additionally, in Tanzania, studies have reported 65%–98% 6-month course IPT completion rate (34–39).

There is sub-optimal uptake of IPT and studies have shown provider related factor to be associated with IPT uptake among PLHIV aged >15 years. However, there is paucity of data on IPT uptake, 6-month course of IPT completion and the client-related factors associated with uptake among CLHIV aged below 15 years. Hence, this study aims to determine the IPT uptake and determinants of uptake for children living with HIV aged below 10 years. The findings will provide understanding of the IPT implementation status, thus help the TB/HIV coordinators in this region to set evidence-based strategies to improve IPT implementation appropriate for their settings. Furthermore, it will be utilized at the national level in planning and implementation of IPT among CLHIV.

1.2 Statement of the problem

Tanzania is implementing Isoniazid preventive therapy (IPT) strategy to reduce the burden of TB disease among people living with HIV (PLHIV). As it is for other sub-Saharan countries, the uptake of IPT in PLHIV is still sub-optimal (13). In the case of Tanzania, the overall uptake of IPT among PLHIV is 17%; this is below the target set by the Global End TB strategy which is to achieve > 90% by 2030 (13). The consequences of underutilization of IPT will lead to increase TB incidence, TB death as well as increase community transmission fueling to TB epidemic.

Studies have reported IPT uptake of 14.3% and 6-month completion of IPT of 76% among PLHIV aged >15 years (33,35). Among the factors that were shown to influence the uptake of IPT among PLHIV aged > 15 years included demographic and clinical characteristics such as being on ART, WHO clinical stage, nutritional status, as well as regularity in attendance to CTC (27,33).

However, there is a paucity of data on uptake and completion of 6-month IPT treatment course among PLHIV aged < 15 years. In addition, it is not known whether the same factors from young adult and adult group influence the initiation of IPT among PLHIV aged < 15 years. In addition, influence of caregivers-related factors on IPT uptake among children is not known. This is the first study examining the uptake and the caregiver-related factors influencing uptake among PLHIV<15 years. Findings of this study will provide information that can influence policy decisions toward optimization of IPT in routine healthcare settings.

1.3 Conceptual framework

This conceptual framework on the determinants of IPT uptake was adapted from Chaudoir et al., (40) on the factor affecting implementation of Health interventions and it was modified based on IPT implementation literatures (41,42). For this study, four applicable components were used to measure IPT uptake among children living with HIV. The components were based on client –related factors which are caregiver socio-demographic, knowledge, health status and child clinical factors. Since, health decision for children depend on their caregiver, thus the study considered both child and caregiver factors as one component of client-related factors.

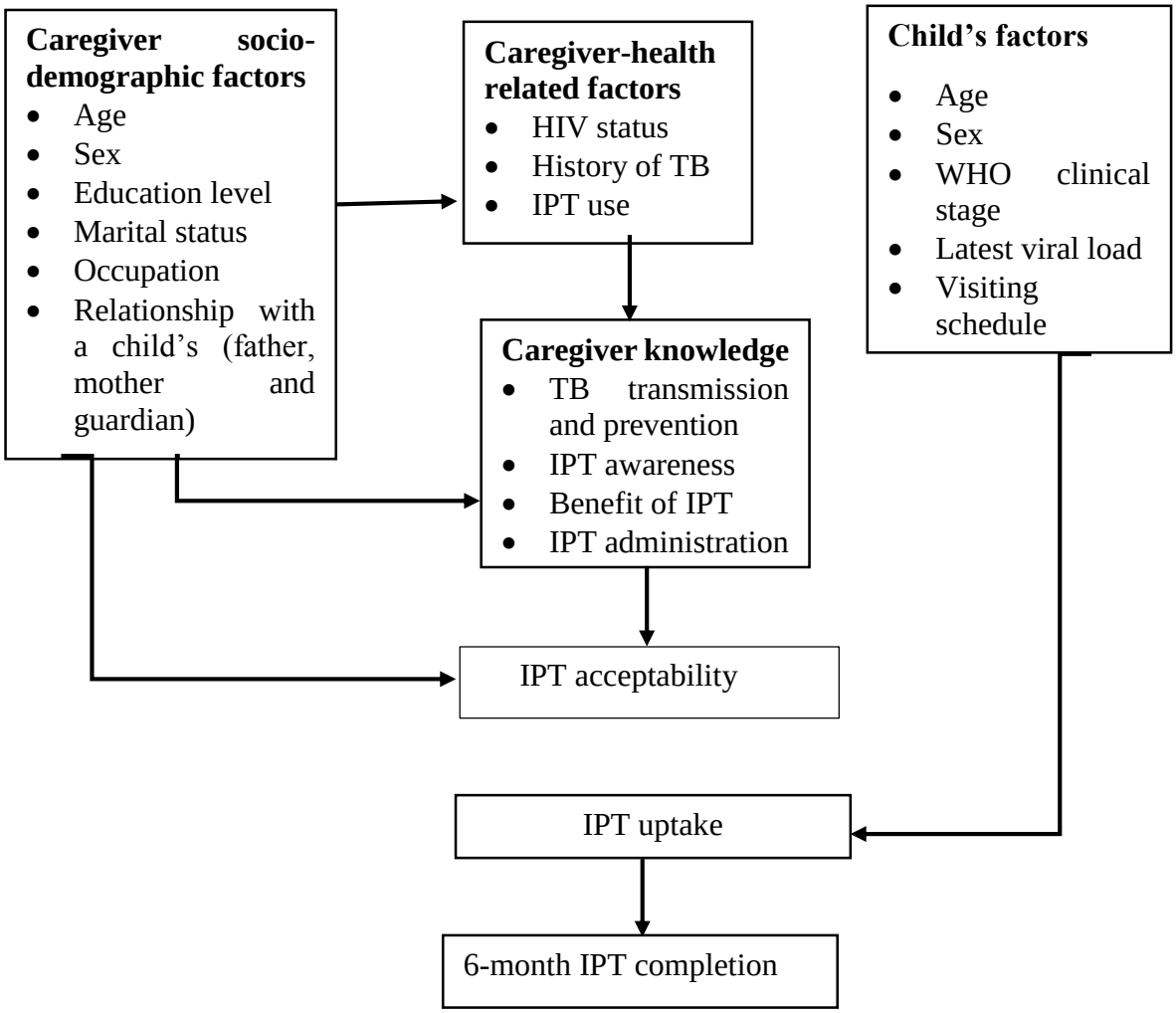


Figure 1: Conceptual framework indicating study variables

1.3.1 Conceptual framework justification

The framework indicated the primary outcome (Uptake of IPT) and secondary outcome (Documented 6-month course of IPT completion among those who were initiated on IPT). The uptake of IPT which is the primary outcome may be influenced by different independent factors.

Caregiver socio-demographic factors such as age, sex, highest education level attained, marital status and occupational may have impact on their knowledge on TB and IPT which also may influence acceptability of the intervention and hence IPT uptake among their children. Additionally, the caregiver socio-demographic may influence the acceptability of the intervention.

Caregiver health related factors such as HIV status, medical history of TB infection and history of using IPT may also have impact on their knowledge on TB and hence influence acceptability and initiation of IPT among their children.

Knowledge of the caregiver may have influence on the acceptability of the intervention.

Child-related factors such as age, sex, WHO clinical stage, viral load and visiting schedule may also influence initiation of IPT among children and hence impact the uptake.

All these factors will be studied to assess how they may influence the implementation of the IPT intervention.

1.4 Rationale

The information obtained from this study will provide an understanding of the IPT uptake, completion and factors associated with IPT uptake. Hence help the TB/HIV coordinators in this region to set evidence-based strategies to improve IPT implementation appropriate for their settings. Also, the evidence generated will be utilized at the national level to assess the progress of IPT intervention and use them in planning and implementation of IPT in CLHIV. Additionally, the study will be relevant in information generation and reference materials for further studies**.**

1.5 Research questions

What is the level of uptake of IPT among children living with HIV (CLHIV) aged 1 to less than 10 years in Njombe Town council?

i. What is the proportion of HIV-infected children who have completed 6-month treatment course of IPT among those who were initiated in Njombe Town Council?
ii. What are the child-related factors associated with IPT uptake among children living with HIV aged 1 to less than 10 years in Njombe Town Council?
iii. What are the caregiver-related factors associated with IPT uptake in CLHIV among Njombe Town council?

1.6 Research objectives

1.6.1 Broad objectives

To determine IPT uptake, completion and factors associated with uptake among children living with HIV aged 1 to less than 10 years in Njombe Town council.

1.6.2 Specific objectives

i. To determine the uptake of IPT among children living with HIV aged 1 to less than 10 years in Njombe Town council.
ii. To determine the proportion of HIV-infected children who have completed 6-month course of IPT among those initiated in Njombe Town council.
iii. To assess the child-related factors associated with IPT uptake among children living with HIV aged 1 to less than 10 years in Njombe Town council.

iv. To identify caregivers-related factors associated with the uptake of IPT among CLHIV in Njombe Town council.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview and Public Health importance of IPT

Tuberculosis is among the leading cause of morbidity and mortality in children living with HIV worldwide. Globally in 2019, 17% of HIV-positive children died of TB (13). In Tanzania, there is notable increase in the notification of new and relapse TB cases of children under the age 15 years. In 2018, a total of 10,513 children were notified with TB, which is 14% of all cases (18). HIV-infected children are at higher risk of severe disease and death due to TB compared to HIV-uninfected children, again those with latent infection are the reservoir for community transmission following reactivation, hence fueling to TB epidemic (9,43). The use of IPT has been proven to be of public health importance in reducing the incidence of TB disease among children living with HIV. Studies have reported that IPT use is effective in preventing development of TB disease and reduction of mortality (23,25).

2.2 Status of IPT uptake

Since the commencement of IPT strategy, it is still underutilized worldwide. Globally, in 2019, the average IPT provision to PLHIV is 50% with the lowest coverage of 1% in Thailand and highest coverage of 89% in Zimbabwe. The IPT provision coverage in India and South Africa is 25% and 14%, respectively (13). A study done in Ethiopia involving two teaching referral hospitals found IPT uptake is 37% among children aged less than 15 years infected with HIV (44). Two studies done in Kenya found the IPT uptake in children less than 10 years and less than 15 years of 68% and 53.2%, respectively (5,42) Studies done in Congo, South Africa and Timor-Lester reported low IPT uptake of 26.3%, 21% and 18% among children aged < 5 years in contact with adult with TB, respectively (31,45,46).

Tanzania started implementing IPT strategy in 2011. In 2019, the IPT provision in PLHIV is 17% and for children aged less than 5 years the average uptake is 22% (13,18). A retrospective study done across three regions in Tanzania found 14.38% of IPT uptake among PLHIV (33). Additionally, cross sectional study done in Tanzania among children

aged < 5 years exposed to sputum smear-positive tuberculosis reported IPT uptake of 33.3% (47). However, the country has not yet reached global target of more than 90% to achieve the End TB strategy by 2030. In additional, there is limited data on the IPT uptake specifically among CLHIV < 15 years.

2.3 IPT completion

It has be suggested that IPT completion reduces the risks of mortality among PLHIV (12,48). Several countries have reported optimal IPT completion rate. In a cross-sectional study conducted in Ethiopia reported a completion rate of 67.9% among CLHIV (44). A retrospective cohort study done in Zimbabwe among PLHIV reported the IPT completion rate of 81% (32). Two studies done in Ethiopia and Gambia among children in contact with bacteriological confirmed pulmonary tuberculosis patients reported completion of 78.7% and 77.7%, respectively (49,50). Similarly, two studies done in Kenya among CLHIV reported IPT completion rate of 82% and 88%, respectively (5,42).

In Tanzania it has been found that there is progressive increase in IPT completion rate from 42% in year 2013 to 76% in 2017 among adult > 15 years (35). A prospective cohort study done in Tanzania among HIV-infected aged >18 years reported IPT completion rate of 87% (34). Similarly, another multicenter observational study was conducted in Tanzania among PLHIV aged > 10 years reported IPT completion of 97.8% (39). Similar prospective cohort study done in among CLHIV reported completion rate of 74.2% (36). However, there is paucity of data on the 6-month completion of IPT specifically to CLHIV under 15 years in routine health facility settings.

2.4 Child-related factors

Regarding age and sex as determinants of IPT uptake, the following has been reported: A study done in Kigali studying associated characteristics in children with positive TB contact found that children over 3 years old are more likely not to be initiated on IPT than those who were below 3 years old ($p< 0.008$) (51). A similar study done in Kenya national referral hospital found a significant statistical association between children in age group 5- < 10 years and IPT uptake (5). Another retrospective cohort study done in Tanzania among PLHIV reported female sex is statistically significant associated with IPT uptake with a p-

value <0.001 (33). However, studies done in Nairobi, Uganda and India found that age and sex of the child's are not associated with IPT uptake (42,52,53).

Regarding CD4 count and WHO clinical staging, a cross-sectional study conducted in Nairobi County found that the uptake of IPT is significantly associated with higher CD4 count (42). However, a study done in Uganda, after multivariate analysis found that child's CD4 count and WHO stage are not significantly associated with IPT uptake (53). A retrospective study done in Tanzania among PLHIV aged above 15 years found that WHO clinical stage II is significantly associated with IPT initiation (p value< 0.001) (33).

Concerning patient adherence, a qualitative study done in Uganda among HCW reported poor adherence to ART at TB screening determine the provision of IPT to the child's, thereby affecting the IPT uptake (53). Another study done in Tanzania among adults living with HIV found that patient adherence is significantly associated with IPT initiation (33). However, child's characteristics associated with IPT uptake among CLHIV aged below 15 years are unknown in our settings. In additional the influence of child's visiting schedule on IPT in HIV differentiated service delivery era is not known.

2.5 Caregiver- related factors

Regarding caregiver socio-demographic, a cross-sectional study done in Kenya reported that education of caregivers is inversely related to IPT uptake among children. In this regard, it was noted that secondary education is significantly associated with low IPT uptake (P=0.047) (42).

In case of child and caregiver relationship, a cross-sectional study done in Indian found that non-initiation of IPT is more likely among child's contacts whose index case is other than the parent (52). In addition, studies done in India and Timor-Leste found that child's contact with non-parent index cases is less likely to be screened for TB (46,54). Another cross-sectional study in Ethiopia found that the likelihood of IPT initiation is twenty time more children who have parents as index compared to children who had siblings (aOR= 20.0, 95% CI (2.4, 168.1) (55)). Similar findings are observed in the cross-sectional study done in Rwanda among child's contact. The study reported that child's contacts who are not children

of index cases are more likely not to be initiated on IPT than those who are index cases' children ($p< 0.009$) (51).

Regarding caregiver-health related factors, HIV status of the caregiver is one of the determinant of IPT uptake among children. A qualitative study done in South Africa found that caregiver who is HIV-infected is most likely to accept IPT initiation in a child (56). A similar findings from a cross-sectional study done in Ethiopia found that HIV-TB co-infected patients are more likely to bring their children for screening compared to TB patients who are HIV-negative (55). However, a cross-sectional study done in Rwanda revealed that HIV- infected index is associated with no uptake of IPT in children ($p<0.038$) (51).

Another identified factor that influence IPT uptake among children is the caregiver history of IPT use. A cross-sectional study done in Kenya reported that children whose caregivers have a history of being on IPT have an increased likelihood of receiving IPT ($P<.001$) (42). Similarly, a mixed method study done in Indonesia found that the caregiver with history of TB disease or experience of TB disease in the family is motivation for IPT completion (57).

Regarding caregiver knowledge, a cross-sectional study done in India found that lack of contact- screening awareness is significantly associated with non-screening among contact children ($p<0.001$) (54). Moreover, studies done in Ethiopia and Indonesia reported that the knowledge of caregiver on TB and IPT are the key determinants of IPT initiation and adherence (55,58). Similar findings are reported from a prospective cohort study done in Southern region of Ethiopia which reported that IPT compliance in children is associated with parent/caregiver perception (59). Another qualitative study done in Ethiopia found that understanding of IPT among PLHIV is among the challenge facing IPT implementation (60). Similarly, a mixed method study done in Kenya reported that a lack of awareness of IPT among caregivers is key barrier for IPT initiation in children (5).

Conclusively, literature reveals that low uptake of IPT is still a major problem in Sub sub-Saharan Africa. Studies have tried to explain main factors that influence IPT uptake. However, these factors have been changing from place to place (influence of geographical

area) and evolved over time. This necessitates the conduction of the study in this area endemic to both HIV in order to identify the determinants uptake of IPT.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

This was a health facility based cross-sectional study design with quantitative approach.

3.2 Study area

Njombe Town Council is among the six Councils of Njombe Region in Southern Highlands. It borders Ludewa district and Ruvuma region to the south, Morogoro region to the East, Makete and Wanging'ombe districts to the West and Njombe district Council to the North. Njombe Town Council area is extending between latitude 9.10^0 and 9.45^0 and longitudes 34.25^0 and 35.27^0 east of Greenwich. Based on National Population and Housing Census of 2012, the Council population is about 130,223 of whom 69,111 are male and 61,112 are female, with projection of 135,501 for 2017. Young population aged below 15 years is 39.3% of a total population (61). The main economic activities are Agriculture, livestock development, forestation and small businesses.

The Council has 53 health facilities of which 3 are hospitals, 6 health centers and 44 dispensaries (61). There are total of 36 health facilities accredited facilities for the provision of IPT (Total of 36 health facilities (3 hospitals, 6 health centers and 28 dispensaries)(62). Njombe region has highest HIV prevalence in the country in all age group (11.4% among adults and 2.3% among children aged below 15 years) (3). Since the adoption of IPT strategy in Tanzania, all health facilities with CTC services are approved to provide IPT based on TB/HIV guidelines. However, Njombe region is among the 5 regions with low IPT uptake among children aged below 5 years with TB contact, which is 10% (18). Thus, Njombe region was purposely selected based on a high prevalence of HIV among children aged below 15 years and low IPT uptake. In addition to the above mention justification, Njombe Town council was purposely selected because is among the councils with a high rate of HIV prevalence (30.5%), and has highest number of CLHIV enrolled in CTC compared to other Councils in the region. The number of children on ART is 2732 and 2536 for the years 2019 and 2020, respectively (62)**.** Furthermore, it was selected because there is no evidence of

similar studies conducted previously in this council. This implies that children infected with HIV in Njombe Town Council are at high risk of developing active TB disease leading increase TB incidence, TB related deaths as well as community transmission.

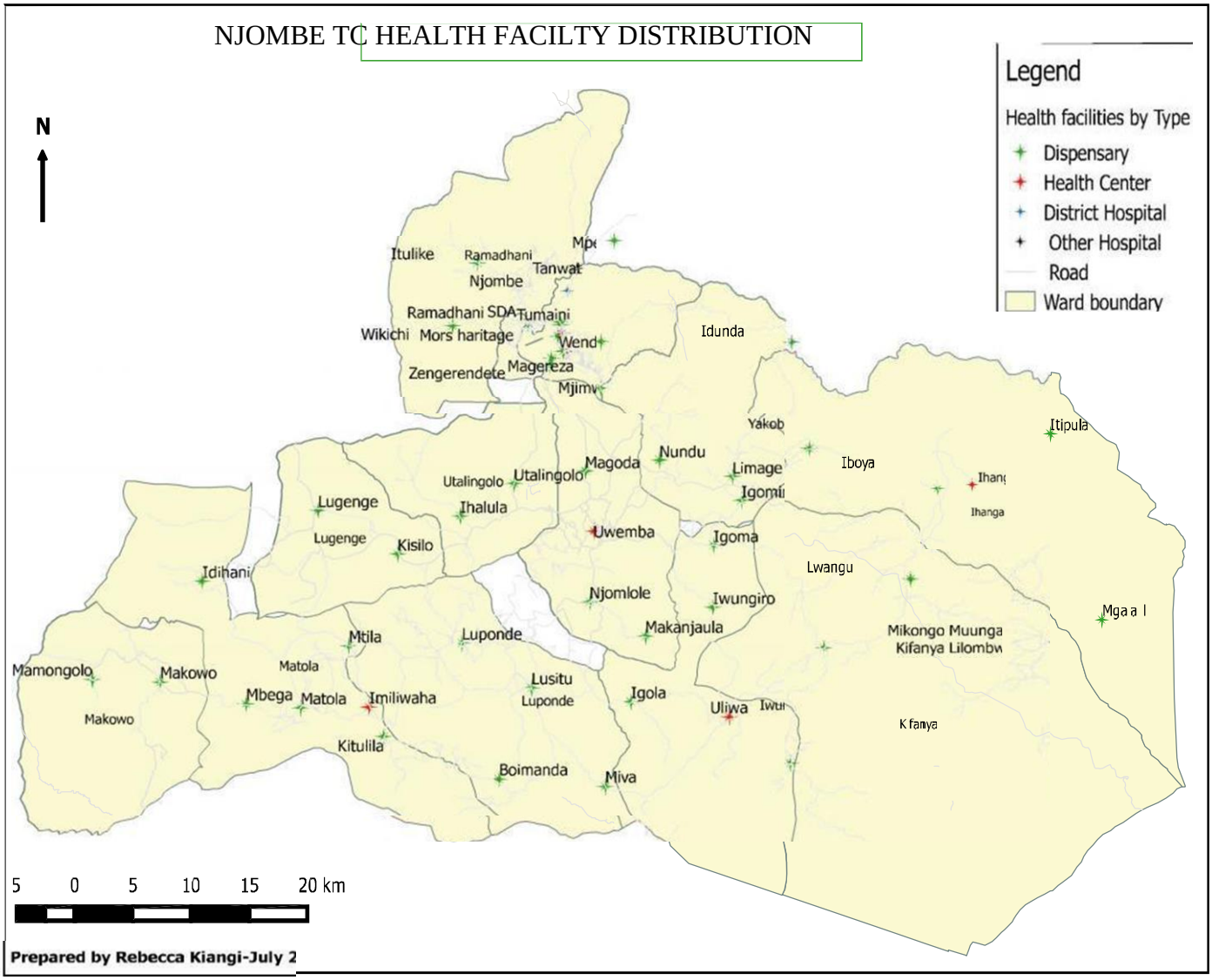


Figure 3.1: Map of Njombe Town Council showing Health Facilities

3.3 Study population

The study involved all children living with HIV aged 1 to less than 10 years who are enrolled in HIV services and attending clinics during the data collection period.

Children aged < 10 years were purposely selected because in all health facility levels, they are totally dependent on their caregivers who play a major role in their health decision. However, children aged > 10 years are followed up in a program for adolescents and young adults to empower them to take control of their health decisions.

3.4 Sample size

Minimum sample size will be calculated using proportion of 10%, the IPT uptake among under-five children in Njombe (18)

The formula for sample size calculation

$$n = \frac{Z^2 p(1-p)(DEFF)}{d^2}$$

Where: n = minimum required sample size

Z = value from the standard normal distribution corresponding to the 95% confidence level (1.96)

P = An estimate of the proportion of 10%, the IPT uptake among under-five children with household contact with bacteriological confirmed TB cases in Njombe region (18)

d=desired degree of precision (3%)

Thus,

$$n = \frac{1.96^2 0.10(1-0.10)}{0.03^2}$$

n = 381.16

Adjusting for a 10% non-response rate, = 1/90 = 1.11*381.16= 423

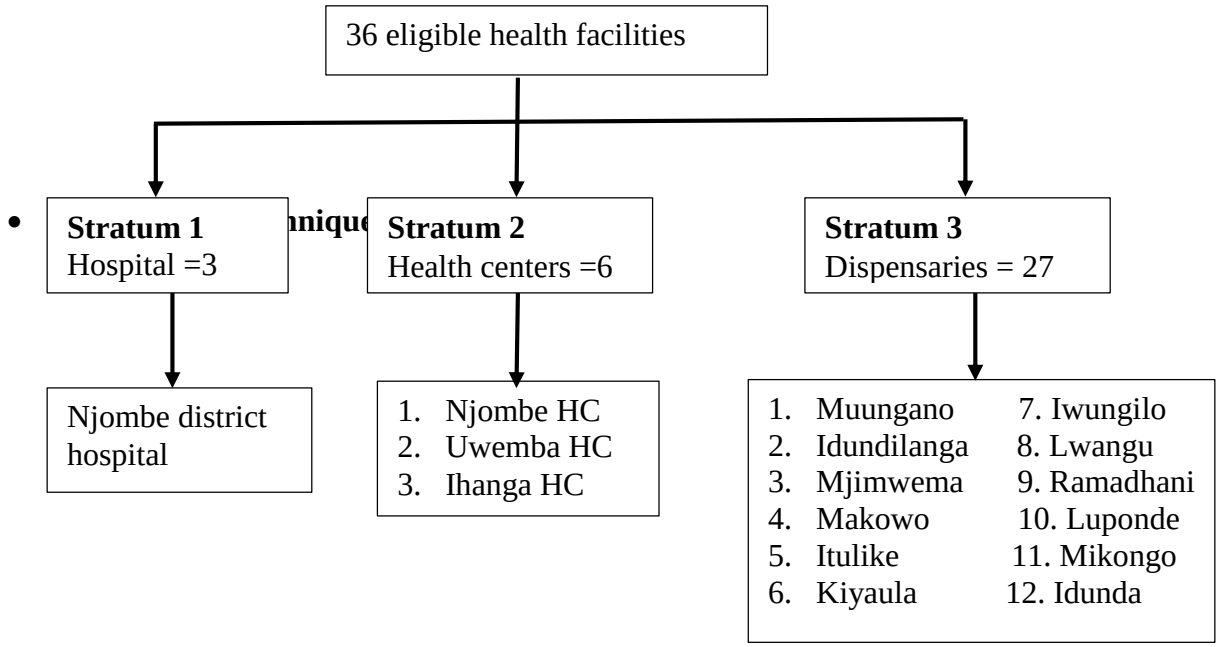
The minimum sample size required for the study was 423 pair of child/caregiver

3.5 Sampling technique

The study used a stratified random sampling**.**

The sampling frame consisted of a list of all Health facilities offering CTC services and IPT. The Council has eligible 36 health facilities offering CTC services and IPT. The facilities were stratified into three strata based on the level of facility (3 Hospitals, 6 Health centers and 27 dispensaries). To minimize selection bias, proportion to size was conducted based on the number of health facilities in each stratum. The facilities to participate in the study were selected from each stratum using simple random sampling. An identification number was assigned to each eligible health facility in each stratum, and a lottery technique was applied to select one hospital, 3 health centers and 12 dispensaries from hospital, health center and dispensary stratum, respectively. In the end, 16 health facilities were randomly selected. The following facilities were sampled: *Njombe District Hospital, Njombe health center, Uwemba health center, Muungano dispensary*, *Mjimwema dispensary, Makowo dispensary, Idundilanga dispensary, Luponde dispensary, Iwungilo dispensary, Ihanga health center, Lwanga dispensary Ramadhani dispensary, Itulike dispensary, Kiyula Dispensary, Mikongo dispensary and Idunda dispensary*.

Furthermore, the sample size was distributed among health facilities using proportion to size sampling based on the number of children enrolled in HIV care. Thereafter, all child-caregiver pairs that met the inclusion criteria were recruited in the study consecutively as they sought services to meet the required minimum sample size within provided data collection time (42).



- **nique**

Figure 3.2: Stratified random sampling of health facility chart flow.

Proportion to size sampling of participants to health facility

The sample size was distributed among health facilities using proportion to size sampling based on the number of children aged below 10 years enrolled in HIV care. The sampling fraction was calculated using the following formula:

Sample size (n)/Population size(N) = 423/522 = 0.81

Minimum required sample size (n=423) →

Health Facility	**Number (n)**
Njombe district hospital (p=104)	84
Njombe HC (p=127)	103
Uwemba HC (p=42)	34
Iwungilo (p=15)	12
Makowo (p=27)	22
Luponde (p=63)	51
Muungano (p=24)	19
Idundilanga (p=25)	20
Mjimwema (p=17)	14
Lwanga (p=16)	13
Ihanga HC (p=17)	14
Ramadhani (p=10)	8
Kiyaula (p=11)	9
Itulike (p=11)	9
Mikongo (p=7)	6
Idunda (p=6)	5
Total 522	**423**

*p refers to number of children aged 1 to less than 10 years enrolled in CTC

Figure 3.3: Proportion to size sampling of participants

Sample distribution by study site

The study included participants from 16 health facilities, 19.86% from a District hospital, 35.70% from 3 health centers and 44.44% from 12 dispensaries.

3.6 Eligibility criteria

Inclusion criteria:

Children aged 1 to less than 10 years living with HIV who are enrolled in CTC.

Exclusion criteria:

Children with active TB disease or on treatment for active TB.

Children with documented evidence of INH contraindication.

Children who sought service without parent/caregiver companion.

Caregivers who had hearing problems and history of psychiatric disorders that would interfere with their memory and judgment.

3.7 Data collection methods

3.7.1 Data collection tools

This study utilized an interviewer-administered questionnaire to capture information from the caregiver and data abstraction form to capture information child's CTC 2 file and IPT register. Based on the conceptual framework, the questionnaire had 3 sections as follows: Section 1: Socio-demographic factors; Section 2: caregiver-health related factors and Section 3: caregiver's knowledge on IPT and TB. The data abstraction form was used to capture information on child clinical characteristics, (Age, sex, WHO clinical stage, Latest viral load results and visiting schedule), IPT initiation and completion status.

3.7.2 Data collection technique

Data were collected in twofold; from child's medical file including IPT register using abstraction form and from caregivers using interviewer-administered structured questionnaire.

Five research assistants were trained for one day based on study objectives, data collection procedure, ethics and to familiarize with the questionnaire. The research assistants (RAs) recruited had diploma in nursing and with prior experience in conducting health research.

To minimize any anticipated language barriers between interviewers and participants, all RAs were fluent in Swahili and the local dialect of the study area.

With the help of Town Aids Control Coordinator, the list of health facilities meeting the inclusion criteria was identified. After stratification, 16 facilities were randomly selected as described in section 3.5. At the clinic, first the eligible child was identified through the file of those scheduled for the visit that day. Later, the eligible pairs of children and caregivers were approached and recruited consecutively as they were seeking services. The researcher sought consent. If consent was provided, the researcher would read out each question from questionnaire and document the respective response. Information on IPT status, IPT completion, reasons for non-completion and child's clinical characteristics were extracted from the 'IPT register and CTC 2 file. Thereafter, the volunteer was thanked for participation. In a situation where consent was denied, the researcher proceeded to the next client. Data collection was conducted from 28th May to 3rd of July.

3.7.3 Data Quality control

The questionnaire was developed in English and then translated to Swahili to make it convenient to the respondent and back translated to the original English version to verify the accuracy of the translation. Interviews were conducted in a language that the volunteers comprehend.

The data collection tool was pre-tested in Makambako district that involved 45 respondents. The purpose of the pre-testing was to verify whether the tool was adequate to collect the desired information as well as ensure the consistency of the questions. In the process of the pretest, problematic questions were identified and modified.

Five research assistants with a diploma in nursing and experience in research were recruited for one day of training. The training focused on the concepts of IPT, and objectives of the study and content of the data collection tool. The principal investigator did supportive supervision daily to ensure good quality data obtained. Every evening during the data collection period, the questionnaires were reviewed for completeness with each assistant upon returning the questionnaires. In case of incompleteness observed, that particular

questionnaire was not counted and a replacement interview with a different respondent was arranged on the next available day.

3.9 Study variables

3.9.1 Dependent variable

The dependent variable is the outcome variable and in this study the primary outcome was the IPT uptake and secondary outcome was the six-month completion of IPT.

IPT uptake referred to IPT initiation status categorized as initiated and not initiated and it was ascertained from CTC 2 files. IPT completion referred to documented evidence of successful completion of 6-months course of INH. It was ascertained from CTC 2 file and cross-checked from the IPT register. Categorized as complete for documented 6 months and incomplete for less than 6-month course or undocumented.

3.9.2 Independent variable

The independent variable is the predictor or explanatory variables and in this study, the independent variables were child's factors, caregiver socio-demographic factors, caregiver-health related and knowledge factors. Child related factors were captured from medical file using data abstraction form. Caregiver related factors (socio-demographic, health related and knowledge) were ascertained from respondent using interviewer-administered structured questionnaire. Respondent were assured on confidentiality during interview on sensitive information.

3.9.2.1 Child's factors

In this section, there were 5 items related the child's age, sex, WHO clinical stage, the latest viral load status and visiting schedule.

- Age referring to child's number of complete years during her/his last birthday, reported in years. Categorized as 1-4 years and 5-9 years
- Sex documented either male or female.
- WHO clinical stage refers to documented recent clinical stage categorized as stage I, II, III and IV.
- The latest viral load status recorded as suppressed if VL <1000copies/ml, not suppressed if >1000copies/ml and undocumented.

- Visiting schedule termed as in Monthly script (MS) and Multi-month script (MMS)

3.9.2.2 Parent/caregiver socio-demographic factors

- Age recorded in years;
- Sex categorized as male and female
- Marital status indicated as single, married, separated, divorced and widowed;
- Education level indicated as none, primary, secondary and college;
- Occupation indicated as farmer, business woman/man, civil servant and others
- Relationship with a child's categorized as mother, father and others

3.9.2.3 Caregiver-health related factors

This part had 3 items to measure the parent/caregiver health related factors and their association with IPT uptake.

- HIV status categorized as positive, negative and unknown
- Any history of TB disease or treatment categorized in the life timeas yes and no
- Ever been on IPT reported as yes, no or I don't know
- History of having patient with TB in the family or household reported as yes and no

3.9.2.4 Caregiver knowledge

This part comprised 11 items to measure the level of understanding related to latent and active TB and IPT among the caregiver with a focus on latent TB, TB transmission and preventive methods, IPT benefits and IPT treatment duration. A respondent was awarded a score of one for each correct response and zero for incorrect or uncertain responses. The respondents' knowledge was categorized into three levels as defined by the Bloom's cut-off classification as follows:

Table 3.1: Knowledge level category

Knowledge level	**Cut-off point**	**Scores**
Low	<60%	< 7
Moderate	60% - 80%	7 – 8
High	> 80%	9 – 11

3.10 Data management

At the end of each day of data collection, verification of data for completeness, correctness and consistency was performed. Meetings were held every morning with the research assistants to rectify data collection problems encountered in the previous day before going to the field. Then, data were coded, entered into the Statistical Package for the Social Sciences (SPSS for windows, version 22.0) and clean for errors due to inconsistent entry. A copy of the data sheet was stored in a separate drive to save as backup. Then, data collection tools recorded were filled and stored where only accessed by the PI.

3.11 Data analysis

Data entry, cleaning and analysis were done using SPSS software. Descriptive analysis was conducted to summarize the characteristics of the sample.

A primary analysis included bivariate comparisons of the proportion of children who received IPT with all factors that affected the uptake. Chi-square test was used to determine the association between child's factors, caregiver's factors and IPT uptake.

The variables, which were significant in a primary analysis at the level of 0.2 were selected for Modified Poisson regression model. Traditional levels such as 0.05 or 0.01 can fail in identifying important variables for the outcome of interest. The adjusted prevalence ratios and 95% confidence interval was used to report the magnitude of the relationship between each variable and IPT uptake status. The significance level of 0.05 was used to determine significance in both bivariate (chi square analysis) and multivariate analysis using Modified Poisson regression with robust standard error.

3.12 Ethical consideration

Ethical approval was obtained from Muhimbili University of Health and Allied Sciences (MUHAS) research and publication Committee. Letters to seek permission to conduct the study were sent to the Regional Administrative Secretary (RAS) of Njombe region and District Executive Director (DED) of Njombe Town Council.

The participants were given written informed consent before they participated in the study. This consent contained a full explanation of the method and purpose of the study, and it

provided assurance of confidentiality to study participants. The consent also included the assurance of voluntary participation (refuse to participate at any time during data collection procedure). No personal identifying information was written in the data collection tool to increase anonymity. All completed questionnaires were collected by the principal researcher and securely stored. No one apart from the researcher had access to the research materials. In addition, participants were given the contacts of the Chairperson of Muhimbili University of Health and Allied Sciences (MUHAS) research and publication Committee. Participants were free to contact him in case of any issues arising during the study.

CHAPTER FOUR

4.0 RESULTS

4.1 Baseline characteristics

The pair f caregiver and child aged 1 to less than 10 years enrolled in CTC were recruited. A total of 423 respondents were interviewed and provided complete information. Furthermore, children CTC 2 files and IPT register were reviewed to extract information on child's clinical characteristics, IPT initiation and documented evidence of 6-month completion course.

4.1.2 Demographic and clinical characteristics of children

The characteristics of children whose medical records were reviewed are shown Table 4.1. Majority of the children (73.5%) were aged between 5 to 9 years with a median age of 7 (Range, 1,9) years. Half of the children (53.9%) were female. Two third of the children (63.8%) were virally suppressed and 14.4% had no documented information on the latest viral load results. Further, 179 (42.3%), 90 (21.3%), 137 (32.4%) and 17 (4.0%) children were in WHO clinical stage 1, 2, 3, and 4, respectively. Most children (65.2%) were on monthly visiting schedule.

Table 4.1: Children characteristics (n=423)

Characteristics	Frequency (n)	Percent (%)
Age group (years)		
1 – 4	112	26.5
5 – 9	311	73.5
Median age in years	7 (1,9)	
Gender		
Female	228	53.9
Male	195	46.1
WHO clinical stage		
One	179	42.3
Two	90	21.3
Three	137	32 4
Four	17	4.0
Latest viral load results		
Suppressed	270	63.8
Not suppressed	103	21.7
Not documented	50	14.4
Visiting schedule		
Monthly	276	65.2
Multi-month script	147	34.8

4.1.3 Demographic and characteristics of caregivers

A total of 423 pair of caregiver and children were recruited and their characteristics are shown in Table 4.2. Caregiver median age was 34 (Range 18,61) years. Majority of the respondents were female (88.2%). Most of the caregivers (87.9%) had attained primary school, married (68.8%) and farmers (73.3%). More than half of the caregivers (68.3%) were the biological mothers of the children. The largest proportional of the caregiver (84.6%) were HIV positive. Out of 358 HIV-infected caregivers, 266 (74.3%) had/has history of ever been on IPT. Few caregivers (13.0%) had a medical history of TB infection and 13.7% has/had patients with TB in the family or household.

Table 4.2: Caregiver characteristics (n=423)

Variable	Category	Frequency (n)	Percent (%)
Age group (years)	<25	54	12.8
	25 - 35	194	45.9
	>35	175	41.4
Median age of caregiver in years (Range)		34 (18,61)	
Sex	Male	50	11.8
	Female	373	88.2
Current marital status	Single	50	11.8
	Married	291	68.8
	Separated	40	9.5
	Divorced	19	4.5
	Widower/widow	23	5.4
Highest level of education	No formal	8	1.9
	Primary	372	87.9
	Secondary	39	9.2
	College and above	4	0.9
Occupation	Farmer	310	73.3
	Business man/woman	107	25.3
	Civil servant	6	1.4
Relationship with a child	Mother	289	68.3
	Father	39	9.2
	Guardian	95	22.5
HIV status	Positive	358	84.6
	Negative	65	15.4
Been infected with TB	No	368	87.0
	Yes	55	13.0
Ever been on IPT	No	92	25.7
	Yes	266	74.3
Had/has TB patient	No	365	86.3
	Yes	58	13.7

4.1.4 The uptake of IPT among children living with HIV

IPT uptake in this study was extracted from child CTC 2 files by assessing if the child was ever initiated on IPT. Of 423 recruited children, 273 (64.5%, 95% CI, 59.7% – 69.10%) had been initiated on IPT. This was translated as IPT uptake of 64.5%.

4.1.5 Documented evidence of 6-month completion of IPT

Documented evidence of 6-month completion of IPT was extracted from CTC 2 file and confirmed from IPT register. Of the 273 children initiated on IPT, 57 (20.9%) were still on medication at time of the study. The remaining 216 (79.1%) had received IPT more than six

months prior to data collection period. Out of 216 who had received IPT six months prior, only 142 (65.7%; 95% CI, 58.9% - 72.0%) had documented evidence of 6-month course of IPT completion, giving IPT completion of 65.7%. The other 74 (34.3%) children who did not complete the 6-months treatment course, there was no reason documented. The six month IPT completion status of those who were initiated is summarized in figure 4.2 below.

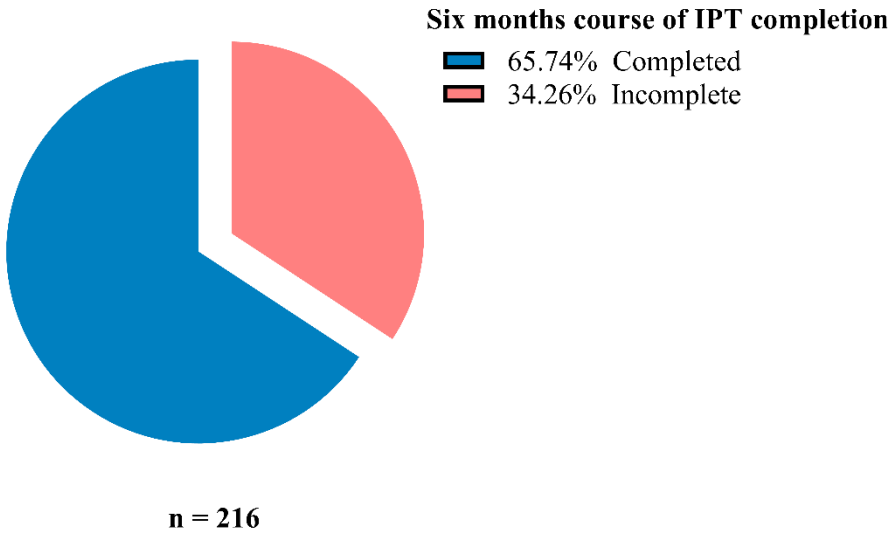


Figure 4.1: Proportion of children with documented evidence of 6-month IPT completion among those who were initiated on IPT in Njombe TC

4.2 Bivariate analysis

4.2.1 Child-related factors associated with IPT uptake

The child characteristics associated with IPT uptake are presented in Table 4.3. The results show that the increase in child age had an influence on IPT uptake, children aged between 5 to 9 years had more uptake 75.9% compared to those aged 1 to 4 years 33.0% ($p<0.001$). Children with WHO clinical stage 4 were most likely to be initiated on IPT with $p=0.017$. Children on multi-month script schedule had more uptake than those on monthly script 88.4% ($p< 0.001$). However, it was found that child's gender and viral load suppression status had no influence on IPT uptake.

Table 4.3: Child-related factors associated with uptake of IPT among children living with HIV in Njombe TC (n=423)

	Uptake of Isoniazid Preventive Therapy (IPT)		
Variable	**Yes n (%)**	**No n (%)**	**χ^2 P – value**
Age group (years)			
1 – 4	37 (33.0)	75 (67.0)	**< 0.001**
5 – 9	236 (75.9)	75 (24.1)	
Sex			
Male	125 (64.1)	70 (35.9)	0.862
Female	148 (64.9)	80 (35.1)	
WHO clinical stage			
One	106 (59.2)	73 (40.8)	**0.017**
Two	54 (60.0)	36 (40.0)	
Three	98 (71.5)	39 (28.5)	
Four	15 (88.2)	2 (11.8)	
Latest viral load status			
Suppressed	196 (72.6)	74(27.4)	0.049
Not suppressed	64 (62.1)	39(37.9)	
Visiting schedule			
Monthly	143 (51.8)	133 (48.2)	**< 0.001**
Multi-months	130 (88.4)	17 (11.6)	

4.2.2 Caregiver-related factors associated with IPT uptake

There were no significant statistical association between child IPT uptake and his/her caregiver's sex, marital status, the highest level of education attained by the caregiver, relationship with a child and HIV status.

However, children of caregivers aged above 35 years had (71.4%) higher IPT uptake than the other age group (p=0.045). HIV status of the caregiver had no significant association with the uptake, however, in sub-analysis of HIV-infected caregivers and history of IPT use. It was noted that children whose caregiver had a history of ever been on IPT were more likely to be initiated on IPT (77.4%, $p < 0.001$) compared to their counterpart group. A large proportion of IPT uptake was observed in children whose caregivers had a medical history

of TB infection (89.1%, $p < 0.001$). Further, high IPT uptake was observed in children whose caregiver had/has patient with TB in the family or household (82.8%, $p=0.002$). The level of knowledge of caregiver was significantly associated with IPT uptake among children. Caregivers with a high level of knowledge had high IPT uptake among children (79.2%, $p < 0.001$). The caregiver-related factors associated with IPT uptake are presented in Table 4.4

Table 4.4: Caregiver factors associated with the uptake of IPT among children living with HIV in Njombe TC (n=423)

	Uptake of Isoniazid Preventive Therapy (IPT)		
Variable	**Yes n (%)**	**No n (%)**	**P – value**
Age group of caregivers (years)			
< 25	32 (59.3)	22 (40.7)	**0.045**
25 – 35	116 (59.8)	78 (40.2)	
>35	125 (71.4)	50 (28.6)	
Sex of caregiver			
Male	37 (74.0)	13 (26.0)	0.136
Female	236 (63.3)	137 (36.7)	
Marital status			
Unmarried	86 (65.2)	46 (34.8)	0.859
Married	187 (64.3)	104 (35.7)	
Highest level of education			
No formal education	6 (75.0)	2 (25.0)	0.137
Primary	233 (62.6)	139 (37.4)	
Secondary	30 (76.9)	9 (23.1)	
College and above	4 (100)	0 (0.0)	
Relationship with child			
Mother	189 (65.4)	100 (34.6)	0.516
Father	27 (69.2)	12 (30.8)	
Guardian	57 (60.0)	38 (40.0)	
Caregiver HIV status			
Positive	238 (66.5)	120 (33.5)	0.050
Negative	35 (53.8)	30 (46.2)	
Ever been infected with TB			
Yes	49 (89.1)	6 (10.9)	**< 0.001**
No	224 (60.9)	144 (39.1)	
IPT use among HIV-infected			
Yes	206 (77.4)	60 (22.6)	**< 0.001**
No	32 (34.8)	60 (65.2)	
Ever have/had TB patient			
Yes	48 (82.8)	10 (17.2)	**0.002**
No	225 (61.6)	140 (38.4)	
Knowledge			
Low	45 (53.6)	39 (46.4)	**< 0.001**
Moderate	76 (51.7)	71 (48.3)	
High	152 (79.2)	40 (20.8)	

4.3 Determinants of IPT uptake among children living with HIV in Njombe Town Council

The multivariate analysis was executed to establish the strength of association of individual variable after controlling for confounding. The regression model comprises all variables that were statistically significant in bivariate analysis and those with p value < 0.2. However, the viral load suppression status was not included in multivariate analysis because 50(14.4%) were missing. The following predictors were included; child age-group, WHO clinical stage, visiting schedule, caregiver's age, gender, education level, HIV status, history of IPT use, history of TB infection, history of having patient with TB and knowledge level.

From the Poisson regression model only four variables were statistically significant associated with IPT uptake among children. The results are shown in Table 4.5.

Adjusted Prevalence shows children in the age category between 5 to 9 had 90% higher IPT uptake than those on age category 1 to 4 years (aPR= 1.9; 95% CI, 1.45 – 2.4; p <0.001). Further, children on mult-months visits had 40% higher uptake of IPT compared to children on monthly visits (aPR =1.4; 95% CI, 1.2 – 1.5; p<0.001). The uptake of IPT was 43% lower in children whose caregivers had never been on IPT as compared to those whose caregiver had ever been on IPT (aPR=0.57; 95% CI, 0.43 – 0.76: p<0.001). Furthermore, children whose caregiver had medical history TB infection had 17% higher uptake compared to children whose caregiver had no medical history of TB infection (aPR=1.17; 95% CI, 1.02 – 1.35; p= 0.022).

Therefore, the children aged 5-9 years, visiting schedule, caregiver history of IPT use and caregiver's medical history of TB infection were statistically significant associated with IPT uptake among children living with HIV in Njombe Town Council.

Table 4.5: Univariate and Multivariate of child and caregiver related factors associated with IPT uptake among children

		Univariate analysis			Multivariate analysis		
Variable	**Category**	**cPR**	**95% CI**	**P - value**	**aPR**	**95% CI**	**P - value**
Age (years)	5 – 9	2.30	1.75 – 3.01	< **0.001**	1.9	1.45 – 2.4	< **0.001**
	1 – 4	Ref					
Sex	Female	1.01	0.88 – 1.17	0.862			
	Male	Ref					
WHO stage	4	1.49	1.21 – 1.84	< **0.001**	1.18	0.92 – 1.50	0.198
	3	1.21	1.03 – 1.42	**0.021**	0.96	0.82 – 1.14	0.655
	2	1.01	0.82 – 1.25	0.902	0.99	0.85 – 1.14	0.837
	1	Ref					
Schedule	Multi-months	1.71	1.50 – 1.94	< **0.001**	1.4	1.2 – 1.5	< **0.001**
	Monthly	Ref					
Caregiver age	>35	1.21	0.95 – 1.53	0.125	0.79	0.62 – 1.01	0.058
(years)	25 – 35	1.01	0.79 – 1.30	0.944	0.80	0.63 – 1.03	0.083
	< 25	Ref					
Caregiver gender	Male	1.17	0.98 – 1.40	0.091	1.01	0.84 – 1.20	0.945
	Female	Ref					
Marital status	Unmarried	1.01	0.87 – 1.18	0.859			
	Married	Ref					
Education	No formal	0.75	0.50 – 1.12	0.159	1.11	0.66 – 1.87	0.685
	Primary	0.63	0.58 – 0.68	< **0.001**	0.92	0.72 – 1.17	0.503
	Secondary	0.77	0.65 – 0.91	0.003	1.15	0.87 – 1.52	0.320
	College &above	Ref					
Relationship	Mother	1.09	0.91 – 1.31	0.360			
	Father	1.15	0.88 – 1.51	0.292			
	Guardian	Ref					
HIV status	Positive	1.24	0.97 – 1.56	0.081	0.84	0.61 – 1.16	0.287
	Negative	Ref					
Ever been on IPT	No	0.55	0.45 – 0.66	< **0.001**	0.57	0.43 – 0.76	< **0.001**
	Yes	Ref					
TB infection	Yes	1.46	1.29 – 1.66	< **0.001**	1.17	1.02 – 1.35	**0.022**
	No	Ref					
TB patient	Yes	1.34	1.16 – 1.55	< **0.001**	1.13	0.995 – 1.281	0.059
	No	Ref					
Knowledge level	High	1.48	1.20 – 1.83	< **0.001**	1.07	0.82 – 1.39	0.616
	Moderate	0.97	0.75 – 1.24	0.78	0.879	0.68 – 1.14	0.328
	Low	Ref					

Key: cPR: Crude Prevalence Ratio, aPR: Adjusted Prevalence Ratio,

CHAPTER FIVE

5.0 DISCUSSION

The study revealed suboptimal IPT uptake and completion. Furthermore, the study revealed that older child aged 5-9 years, multi-months visiting schedule, caregiver's history of IPT use and caregiver medical history of TB infection were the determinants of IPT uptake among children living with HIV in Njombe Town Council.

5.1 IPT uptake

The study revealed IPT uptake 64.5%, which is higher than the previous reported uptake in our daily routine setting. Njombe region is implementing IPT for nine years now. This is reflecting the efforts and progress done to implement IPT in Njombe. The study revealed higher uptake than 14.38% uptake among all PLHIV in Njombe, Dar es Salaam and Iringa reported by Maokola et al (33). Since, the Maokola study recruited participants enrolled in care from 2012 to 2016 where the region was in its early stage of implementing IPT guidelines (16,63). The low uptake in Maokola study also could be explained by the difference in study population, where it studied PLHIV in all age groups compared to this study that involved children aged 1 to < 10 years. And lastly, the Maokola study covered three different geographical settings which may face different challenges during IPT implementation (5,33,41,64). The uptake in this study is higher than the 10% uptake among under-five in Njombe region reported 2018 by NTLP (18). The higher study findings could be due to fact that the study recruited all children living with HIV aged 1 to <10 regardless of their TB contact. The NTLP reported low IPT uptake because it is the uptake among under-five with TB contact which face challenges in contact tracing in the community and IPT initiation (47). Again this study has revealed higher IPT uptake than 44.9% IPT uptake reported in Songea Municipality (65).

Additionally, IPT uptake in this study is higher than the 37% and 53.2% uptake among children aged <15 years and 52.9% uptake among children aged 1 to 18 years reported in Ethiopia, Kenya and Uganda, respectively (42,44,53). The reason for the difference is that this study did not include adolescents; and may be adolescent are facing challenges in initiation of IPT. The uptake revealed by this study is not different from 68% uptake among children aged 1 to <10 years reported in Kenyatta Hospital (5).

The study has revealed higher IPT uptake compared to most of the previous studies done in Tanzania. This may reflect the efforts and commitment of NTLP and the country toward ending TB in accordance with the End TB Global strategy by 2030. However, the uptake is still lower than the recommended global set target (13). Thus, more efforts are required to reach a global set target of more than 90% and reduce TB burden among children living with HIV.

5.2 IPT completion

In aspect of completion, the study revealed 65.7% completion of 6-month course of IPT. This is indicating that there are challenges of IPT completion among children. The completion is lower than 74.2% 6-month course of IPT completion among children aged 1 – 15 years reported by Hunter et al (36). The high uptake reported in Dar es Salaam may be contributed by geographical settings where the latter was conducted in specialized HIV and well controlled clinic in City setting compared with this study which was conducted in routine clinic settings. Moreover, clients in DarDar study setting were reimbursed for round trip travel to the clinic, which may be the motivation for child/caregiver to come for a refill every scheduled visit. Again, this study IPT completion is lower than 87.5%, 87% and 76% 6-month course IPT completion among adult reported in Tanzania (34,35,38). The low IPT completion found could be explained by the fact that being child may be challenge in completing the dose simply because they are totally dependent on their caregiver.

Furthermore, the study reported low 6-month course of IPT completion compared with 82% and 88% IPT completion reported in Kenya (5,42). The low completion status of therapy we found could be explained by the fact that this study involved both low-level (dispensaries) and high-level health facilities compared to those study done in Kenya which were conducted in high-level health facilities (Tertiary hospital, district hospital and health center) in urban settings. The level of health facility might contribute to poor IPT completion. In addition, the study IPT completion is same as that was reported in Ethiopia and Indonesia (44,57). Generally, more efforts are required to enhance comprehensive counseling and monitoring of child's caregiver to encourage completion of preventive therapy. However, other barriers that hinder IPT completion such as distance to health facility, transport cost and drug stock-outs that were reported in other studies could be worked on to improve the uptake in our settings (44,52,58,65,66)

5.3 Child-related factors associated with IPT uptake

In this study, child's age and visiting schedule were significant associated with IPT uptake among children living with HIV in Njombe. Children aged 5 to 9 years had higher uptake of IPT compared to children aged 1 to 4 years. Similarly finding was reported in Kenya, which found IPT uptake significantly associated with children aged 5 to < 10 years (5). This could be explained by the fact that challenges in screening and ruling out active TB among under-five children may be a barrier in initiating IPT in this age group (53,67–71). Further postulation could be difficult drug administration for children aged < 5 years; hence, older children are easily initiated on preventive therapy (52,56,57,72). On contrary to study findings, a study done in Rwanda reported that children aged < 3 years were significantly associated with IPT uptake (51).

The children scheduled in multi-months (three-month visit) had higher IPT uptake than those in monthly visits, and the association is statistically significant. This is because children on multi-months' script are clinically stable hence easily for Health-care Provider (HCP) to rule out active TB disease. Further explanation is that children in multi-months visit have a good adherence to ART drugs which is among recommendation for IPT initiation (4). However, a study done in Kenya reported that frequency of clinic visits had no influence on child IPT uptake (42). Still, there is paucity of data on implementation of IPT in era of Differentiated Service Delivery Model (DSDM) hence a call for further research.

5.4 Caregiver-related factors associated with IPT uptake

The caregiver medical history of IPT use was statistically significant associated with the uptake. Children of caregivers who had never been on IPT had lower uptake of IPT compared to children whose caregiver had history of IPT use. The findings are similar to study done in Kenya (42). This implies that being on IPT is associated with exposure to IPT related education and counseling, hence the caregiver understands the benefits of IPT and easily accept the intervention for the child.

Further, caregiver medical history of TB infection was significantly associated with child IPT uptake. This is similar to study done in Indonesia that reported child adherence to IPT was related to their caregiver own experience with TB disease (58). Similarly, to the study done in Brazil, which reported that having been on TB treatment among caregivers was

associated with IPT completion among their children (66). The similarity of this study, Indonesia and Brazil findings could be explained by the fact that the caregiver with TB infection experience understands the disease severity so would not prefer their children to have the same experience and hence readily accept prevention therapy for their children (57). Our findings are in contrast to Mwangi et al results, which reported that having been on TB treatment had no association with IPT uptake among children (42).

The level of knowledge toward any intervention can play a major role in successful implementation of that intervention. Despite this known theory on knowledge, in our study after multivariate analysis, we found that the level of knowledge among caregivers toward IPT and LTB was not significantly associated with the uptake of IPT among their children. The reason for unusual finding is not clear perhaps this is a call for qualitative study to elicit some other information that was not picked up by quantitative design. However, studies done in other places have documented a significant association between the uptake of IPT and level of knowledge toward IPT and TB among caregivers (5,51,55,58,60,73).

5.5 Strengths and limitations of the study

This study applied stratification and random selection of health facilities hence allow representative of each level of the facility. In additional, the study was conducted in routine clinical settings that reflect the realities at the facility level. Further, a large sample size was used hence increased the power of the study.

Study had limitations, first, the study used consecutive sampling of participants which is convenience and hence cannot be generalized. Second, the method of interviewing on sensitive information (health related information) may have influenced the results. Respondents may have responded positively to questions and introduce social desirability response bias. This limitation was mitigated by assurance of confidentiality of study information during the informed consent process. Third, the study reviewed child medical records that had missing information that may have underestimate or overestimate the prevalence ratio for the association. However, to mitigate this, analysis was done based on the data with complete information. Lastly, the study cannot establish causal inference because of the study design, can only provide snapshot reference.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The provision of IPT is acknowledged as one of the most effective intervention for reducing the burden of TB among PLHIV. Therefore, it is important to understand the factors that influence the uptake of IPT. This study has shown the sub-optimal uptake and six-month course of completion of IPT among children**.**

Furthermore, the study has revealed the caregiver-related factors that influence the IPT uptake are history of TB infection and medical history of IPT use. Moreover, the child-related factors that influence the uptake are older children (5-9 years) and multi-month visiting schedule.

6.2 Recommendations

The following recommendations are proposed for consideration:

Health facility level:

Interventions are needed to support initiation of IPT among groups with low uptake

Further studies:

NTLP and other Stakeholders should conduct operational and implementation research to determine Provider-related and Health system factors that could be the main barrier in IPT uptake.

The study revealed sub-optimal completion of IPT that is below the recommended target. This is call for the programme and other stakeholders to explore barriers for IPT completion and address them accordingly**.**

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APPENDICES

APPENDICES

Appendix 1A: Data abstraction form

Data abstraction form to determine IPT uptake, completion and child's factors influencing Isoniazid Preventive Therapy uptake among children living with HIV in Njombe region, Tanzania

NAME OF HEALTH FACILITY: _____

1.	Level of health facility:	1. Hospital ☐ 2. Health center ☐ 3. Dispensary ☐
2.	Study ID number	☐☐☐
3.	Child's gender	1. Female ☐ 2. Male ☐
4.	Child's age	☐☐
5.	Duration of follow up	1. Less than 6 months ☐ 2. 6 months to 12 months ☐ 3. More than 12 months ☐

6. WHO clinical stage	1. Stage I ☐ 2. Stage II ☐ 3. Stage III ☐ 4. Stage IV ☐ 5. Not documented ☐
7. Latest viral load	1. Virally suppressed (<1000 cp/ml) ☐ 2. Not suppressed (>1000 cp/ml) ☐ 3. Not documented ☐
8. ART adherence status	1. Good ☐ 2. Poor ☐ 3. Not documented ☐
9. Visiting schedule	1. Monthly ☐ 2. Multi-months ☐
10. IPT initiated	1. Yes (go to question 12) 2. No (go to question 11)
11. If NO, why	1. Contraindication ☐ 2. Guardian decline ☐ 3. Not documented ☐ 4. Others, Specify_____
12. Documented evidence of completion of the 6 months' course of IPT	1. Yes 2. No (go to question 13)
13. If NO, why	1. Adverse drug reaction ☐ 2. Develop TB disease ☐ 3. Not documented ☐ 4. Others, specify_____
14. IPT status	1. Currently on IPT ☐ 2. Stopped ☐ 3. Decline ☐ 4. Completed 6-month ☐ 5. Never initiated ☐

Appendix 1B: Questionnaire – English version

Questionnaire to assess caregiver-related determinants of Isoniazid Preventive Therapy uptake among children living with HIV in Njombe region, Tanzania

SECTION 1: SOCIO-DEMOGRAPHIC DATA	
1.1 Date of Interview	___/___/_____
1.2 Study ID number	__/__/__
1.3 Gender	1. Male ☐ 2. Female ☐
1.4 How old are you? (age in years)	_____
1.5 What is the your current marital status	1. Single ☐ 2. Married ☐ 3. Separated ☐ 4. Divorced ☐ 5. Widow/Widower ☐
1.6 What is your highest level of education?	1. No formal education ☐ 2. Primary ☐ 3. Secondary ☐ 4. College and above ☐
1.7 What is your Occupation?	1. Farmer ☐ 2. Business man/woman ☐ 3. Civil servant ☐ 4. Others, specify_____
1.8 What is your relationship with a child?	1. Mother ☐ 2. Father ☐ 3. Guardian ☐

SECTION 2: HEALTH RELATED INFORMATION	
2.1 What is your HIV status?	1. Positive ☐ 2. Negative ☐ 3. I don't know ☐
2.2 Have you ever been infected with TB?	1. Yes ☐ 2. No ☐
2.3 Do you have/had any TB patient in your home?	1. Yes ☐ 2. No ☐
2.4Have you ever been on IPT?	1. Yes ☐ 2. No ☐ 2. I don't kno ☐
SECTION 3: CAREGIVER KNOWLEDGE ON IPT	
3.1 Have you ever heard of TB preventive therapy?	1. Yes *(if yes go to question 3.2)* ☐ 2. No (if No go to question 3.3) ☐
3.2 Where did you first hear about TB preventive therapy?	1. Health facility ☐ 2. Media ☐ 3. Relative/Friend ☐ 4. Leaflets ☐ 5. Don't remember ☐
3.3 What does it mean when someone is having latent TB?	1. To be infected with TB bacteria but do not have signs of active disease ☐ 2. To be infected with TB bacteria and showing symptoms such as cough, weight loss and excessive night sweats ☐ 3. Chest tightness ☐ 4. I don't know ☐
3.4 Is there treatment for latent TB?	1. Yes ☐ 2. No ☐ 3. Don't know ☐
3.5 For how long a child has to use IPT?	1. One Month ☐ 2. Two months ☐ 3. Six months ☐ 4. Don't know ☐ 5. Other, Specify_____
3.6 How many tablet of IPT should a child take per day?	1. One tablet ☐ 2. Tow tablets ☐ 3. Three tablets ☐ 4. I don't know ☐

3.7 Do you think that IPT reduces the risk of TB infection in HIV infected children?	1. Yes ☐ 2. No ☐ 3. I don't know ☐
3.8 What are the benefits of using IPT children living with HIV? *(Check all that is applicable*)	1. Protect the child from getting active TB disease ☐ 2. No any benefits for children ☐ 3. Protect a child from getting fever ☐ 4. Don't know ☐ 5. Other, specify ☐
3.9 Who can get TB?	1. Only poor people ☐ 2. Only elderly people ☐ 3. Any person ☐ 4. Only people with HIV ☐ 5. Don't know ☐
3.10 How people get TB?	1. A curse ☐ 2. Family lines ☐ 3. Airborne bacteria ☐ 4. Sharing utencils ☐ 5. Sharing food ☐ 6. Don't know ☐ 7. Others, specify
3.11 What other ways can you prevent TB? *(Tick all that is applicable*)	1. Avoid shaking hands ☐ 2. Cover one's mouth and nose when coughing ☐ 3. Handwashig ☐ 4. No prevention measures ☐ 5. Don't know ☐ 6. Others, specify_____

Thank you

Appendix 1C: Questionnaire – Kiswahili version

Dodoso kwa ajili ya utafiti wa kubaini sababu zinazoshawishi kutumia tiba ya kuzuia kifua kikuu kwa watoto wanaoishi na maambukizi ya virusi vya Ukimwi mkoani Njombe, Tanzania

SEHEMU YA 1:TAARIFA ZA AWALI ZA ANAYEHOJIWA	
1.1 Tarehe ya mahojiano	___/___/_____
1.2 Namba ya utafiti	__/__/__
1.3 Jinsia	1. Mwanaume ☐ 2. Mwanamke ☐
1.4 Una umri gani? (kwa miaka)	_____
1.5 Hali yako ya ndoa kwa sasa	1. Hajaoa/hajaaolewa ☐ 2. Nimeoa/nimeolewa ☐ 3. Tumengana ☐ 4. Nimeachika ☐ 5. Mjane/mgane ☐
1.6 Kiwango chako cha juu cha elimu ni kipi??	1. Sijasoma ☐ 2. Elimu ya msingi ☐ 3. Elimu ya sekondari ☐ 4. Chuo au elimu ya juu ☐
1.7 Unafanya kazi gani?	1. Mkulima ☐ 2. Mfanyabiashara ☐ 3. Mtumishi wa umma ☐ 4. Nyinginezo, Taja_____
1.8 Una mahusiano gani na huyu mtoto?	1. Mama ☐ 2. Baba ☐ 3. Mlezi ☐
SEHEMU YA 2: TAARIFA ZA AFYA ZA ANAYEOJIWA	
2.1 Hali yako ya maambukizi ya VVU ikoje?	1. Nina maambukizi ☐ 2. Sina maambukizi ☐ 3. Sijui ☐

2.2 Umewahi kuugua ugonjwa wa kifua kikuu?	1. Ndio ☐ 2. Hapana ☐
2.3 Umewahi ishi/unaishi na mgonjwa wa kifua kikuu?	1. Ndio ☐ 2. Hapana ☐
2.4 Umewahi kutumia tiba ya kuzuia kifua kikuu?	1. Ndio ☐ 2. Hapana ☐ 3. Sijui ☐
SEHEMU YA 3: UFAHAMU JUU YA DAWA YA KUZUIA UGONJWA WA KIFUA KIKUU	
3.1 je umewahi kusikia tiba ya kifua kikuu ambukizi/changa?	1.Ndio (Kama ndio nenda swali 3.2) 2. Hapana (Kama hapana nenda swali 3.3)
3.2 Ulipata wapi taarifa kuhusu tiba ya kifua kikuu ambukizi/changa?	1. Kituo cha Afya ☐ 2. Vyombo vya Habari ☐ 3. Ndugu au rafiki ☐ 4. Vipeperushi ☐ 5. Sikumbuki
3.3 Inamaanisha nini mtu akiwa na kifua kikuu ambukizi/changa?	1. Kuwa na bakteria wa kifua kikuu katika miili yao lakini hawagonjeki (hawana dalili za kifua kikuu) ☐ 2. Kuwa na bakteria wa kifua kikuu na konyesha dalili kama kukohoa, kupungua uzit na kutokwa na jasho jingi usiku ☐ 3. Kubanwa mbavu ☐ 4. Sijui ☐
3.4 Je Kifua kikuu ambukizi/changa kinaweza kutibiwa?	1. Ndio ☐ 2. Hapana ☐ 3. Sijui ☐
3.5 Je mtoto anatakiwa kutumia tiba ya kifua kikuu ambukizi/changa kwa muda gani?	1. Mwezi mmoja ☐ 2. Miezi miwili ☐ 3. Miezi sita ☐ 4. Sijui ☐ 5. Nyingine, Taja_____
3.6 Mtoto anatakiwa kumeza vidonge vya kutibu kifua kikuu changa/ ambukizi vingapi kwa siku?	1. Kimoja ☐ 2. Viwili ☐ 3. Vitatu ☐ 4. Sijui ☐

3.7 Je unafikiri tiba ya kifua kikuu ambukizi/changa inapunguza hatari ya kupata ugonjwa kifua kikuu kwa watoto wenye maambukizi ya VVU?	1. Ndio ☐ 2. Hapana ☐ 3. Sijui ☐
3.8 Zipi ni faida za kutumia tiba ya kifua kikuu ambukizi/changa kwa watoto wenye maambukizi ya VVU? (*tiki pote panapostahili)*	1. Kumlinda mtoto asipate ugonjwa wa kifua kikuu ☐ 2. Hakuna faida yoyote kwa watoto ☐ 3. Kumlinda mtoto asipate homa ☐ 4. Sijui ☐ 5. Nyingine, Taja_____
3.9 Nani anaweza kupata kifua kikuu?	1. Maskini tu ☐ 2. Wazee tu ☐ 3. Mtu yoyote ☐ 4. Wenye VVU tu ☐ 5. Sijui
3.10 Kifua kikuu kinaambukizwaje?	1. Laana ☐ 2. Kurithi kwenye familia ☐ 3. Husababishwa na bakteria wa hewa ☐ 4. Kuchangia vyombo ☐ 5. kuchangia chakula ☐ 6. Sijui ☐ 7. Nyingine, Taja_____
3.11 Ni njia zipi zinatumika kuzuia ugonjwa wa kifua kikuu? (*tiki pote panapostahili)*	1. Kuacha kupeana mikono ☐ 2. Kufunika mdomo na pua wakati wa kukohoa ☐ 3. Kunawa mikono ☐ 4. Hakuna njia za kujizuia 5. Sijui ☐ 6. Nyingine, Taja_____

Ahsante

Appendix II: Consent forms

Appendix IIA: Informed Consent form (English Version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

INFORMED CONSENT FORM

ID NUMBER_____

Consent to Participate in INTERVIEW

Greetings! My names are Adelina ALFRED, a master degree student from Muhimbili University of Health and Allied Sciences. As part of my studies, I am conducting a research on factors influencing Isoniazid Preventive Therapy uptake among children living with HIV in Njombe region, Tanzania

Purpose of the study

To determine factors influencing Isoniazid Preventive Therapy (IPT) uptake among children living with HIV in Njombe region, Tanzania.

Procedures participation involves

If you agree to participate in this research you will be required to answer series of questions asked from the questionnaire to capture information on factors influencing IPT uptake among children living with HIV. Do not hesitate because in this interview there is no RIGHT or WRONG answers.

Confidentiality

All collected information will be assigned code number and entered into computers. Data collection tools will be held in folders, which will be locked in cabinets for storage throughout the study period. Computer documents will have passwords only accessible to the researcher. All the information gathered by the researcher will only be used for study purposes.

Costs and Compensation

Your participation in the study will not take long time and you will not be paid or compensated for the participation.

Benefits

The information provided will help to improve the provision of Isoniazid Preventive Therapy among children living with HIV in this region and other places in the country. Also if you have any problem concerning Tuberculosis and Isoniazid Preventive Therapy you may ask the researcher.

Risks

There is no harm will happen to you because of participation in this study. The gathered information will be confidential and will not be easy to trace it back to the participant.

New findings

Results will be disseminated to the Ministries of Health before being published in scientific journal.

Right to refuse or withdraw

Participation in this study is completely your choice and no one will force you to participate. You can discontinue participating in this study at any time, even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Contacts

If you have any question, suggestion or opinion about this study, you may contact:

Adelina Alfred,
Researcher,
Mobile number: +255 712 253 489
E-mail address: adelinapesha@yahoo.com

If you ever have questions about your rights as a participant, you may contact:

Prof. David P. Urassa,
Deputy Vice Chancellor-PFA,
Muhimbili University of Health and Allied sciences,
The main supervisor,
Mobile number +255 754 279 553
E-mail address durassa2@yahoo.com

Prof. Billy E. Ngasala,
The co-supervisor of this study,
Mobile number: +255 754 316 359
E-mail address: bngasala70@yahoo.co.uk
OR

Director of Research and publications,
Muhimbili University of Health and Allied Sciences
P.O. Box 65001, Dar es Salaam, Tanzania.
Signature_____

Agreements

Do you agree to participate? Participant agrees_____ Participant does not agree_____. I, _____have read/listened the contents in this form and my questions have been answered. I am willing to participate in this study.

Signature of participant_____
Signature of research assistant_____
Date _____

Appendix IIB: Informed Consent form (Kiswahili Version)

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI CHA MUHIMBILI

FOMU YA IDHINI YA USHIRIKI KATIKA UTAFITI

NAMBA YA UTAMBULISHO: _____

Idhini ya kushiriki kwenye UTAFITI

Habari! Naitwa Adelina Alfred, ni mwanafunzi wa uzamili kutoka Chuo Kikuu cha Afya na Sayansi Shirikishi Cha Muhimbili. Kama sehemu ya masomo yangu kwa sasa nafanya utafiti wenye lengo kubaini sababu zinazoshawishi kutumia tiba ya kuzuia kifua kikuu kwa watoto wanaoishi na maambukizi ya virusi vya Ukimwi mkoani Njombe, Tanzania

Lengo la utafiti

Ni kubaini sababu zinazoshawishi kutumia tiba ya kuzuia kifua kikuu kwa watoto wanaoishi na maambukizi ya virusi vya Ukimwi mkoani Njombe, Tanzania

Taratibu za kushiriki

Kama utaridhia kushikiri kwenye utafiti huu utahitajika kujibu maswali yaliyopo kwenye dodoso yanayolenga kubaini sababu zinazoshawishi kutumia tiba ya kuzuia kifua kikuu kwa watoto wanaoishi na maambukizi ya virusi vya Ukimwi mkoani Njombe, Tanzania. Usisite kujibu kwa sababu katika mahojiano haya hakuna jibu SAHIHI wala LISILO SAHIHI.

Usiri

Taarifa zako zitakazokusanywa zitawekewa namba ya utambulisho bila jina. Pia taarifa zako zitatatunzwa sehemu maalumu kwa usiri mkubwa na zitatumika kutimiza malengo ya utafiti huu tu.

Fidia na Gharama

Ushiriki wako kwenye huu utafiti hautachukua muda mrefu na pia hautalipwa au kupewa fidia ya ushiriki wako.

Faida

Taarifa zitakazokusanywa kutokana na utafiti huu zitasaidia uboreshaji wa utoaji wa huduma ya kutoa tiba ya kuzuia kifua kikuu kwa watoto wanaoishi na maambukizi ya virusi vya Ukimwi katika wilaya yako na sehemu zingine za nchi. Pia kama una swali lolote kuhusu kifua kikuu na matumizi ya dawa za kuzuia wa kifua kikuu unaweza kuuliza.

Hasara

Hakutakuwa na madhara yatakayotokea kutokana na ushiriki wako katika utafiti huu.

Haki ya kukataa au kuacha kushiriki

Ushiriki wako katika huu utafiti ni wa hiari na haulazimishi.Na pia unaweza kuacha kushiriki muda wowote hata kama umeshatoa idhini yako . Kutoshiriki kwenye huu utafiti hakutohathiri chochote katika kazi zako.

Mawasiliano

Kama utakuwa na swali lolote au maoni kuhusu huu utafiti, unaweza kuwasiliana na

Adelina ALFRED,
Mtafiti mkuu
Namba ya simu +255 712 253 489
Barua pepe: adelinapesha@yahoo.com

Kama una maswali ambayo yatahitaji ufafanuzi zaidi,kama mshiriki una haki ya kuwasiliana na:

Prof. David P. Urassa,
Naibu Makamu mkuu-Mipango, Fedha na Utawala,
Chuo cha afya na sayansi shirikishi cha Muhimbili,
Msamizi mkuu wa utafiti,
Namba ya simu; +255 754 279 553

Barua pepe: durassa2@yahoo.com

Prof. Billy E. Ngasala,
Msimamizi msaidizi wa utafiti,
Namba ya simu: +255 754 316 359
Barua pepe:bngasala70@yahoo.co.uk

AU
Mkuregenzi wa utafiti na uchapishaji
Chuo cha afya na sayansi shirikishi cha Muhimbili
P.O. Box 65001,
Dar es Salaam,
Tanzania. Sahihi _____

Makubaliano
Je unakubali kushiriki? Ndio_____ Hapana _____.
Mimi, _____nimesoma au kusikia maelezo kusiana na huu utafiti na maswali yangu yamejibiwa
Nimekubali kushiriki katika huu utafiti.
Sahihi ya mshiriki_____
Sahihi ya mtafiti msaidizi/ mtafiti_____
Tarehe _____

Appendix III: Ethical clearance letter

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain material transfer agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country,
8. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
9. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
10. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

Muhimbili University of Health and Allied Sciences
DIRECTOR
Research & Publications
Box 65001

Dr. Bruno Sunguya
Chairman, MUHAS Research and Ethics Committee

Cc: Director of Postgraduate Studies

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1038; Direct Line:+255-22-2152489;Telefax:+255-22-2152489;E-mail:drp@muhas.ac.tz;Web:https://www.muhas.ac.tz

Appendix IV: Introduction letter from Njombe Regional Administrative Secretary

Appendix V: Introduction letter from District Executive Director

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

Simu Na: (026) 2782912
2782913

Nukushi: (026) 2782914
Barua Pepe: rc@njombe.go.tz
ras@njombe.go.tz
ras.njombe@tamisemi.go.tz
info@njombe.go.tz
Tovuti: www.njombe.go.tz

Ofisi ya Mkuu wa Mkoa
S.L.P. 668
NJOMBE.

Unapojibu tafadhali taja:-
Kumb. Na. AB.301/326/01H/68

28 Mei, 2021

Mkurugenzi Mtendaji,
Halmashauri ya Mji,
S. L. P. 577,
NJOMBE.

Kuh: **UTAMBULISHO**

Tafadhali husika na somo la hapo juu.

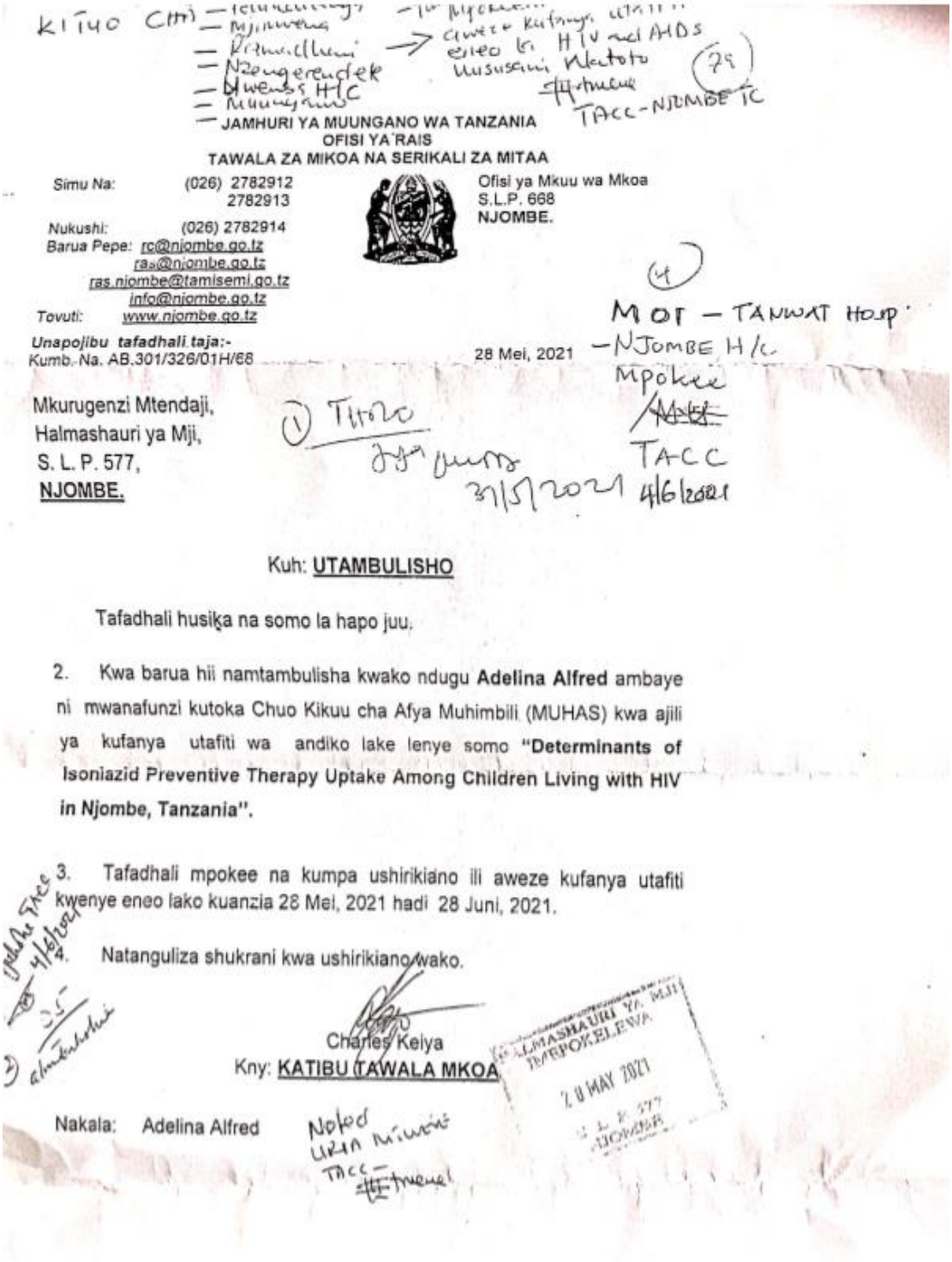
2. Kwa barua hii namtambulisha kwako ndugu **Adelina Alfred** ambaye ni mwanafunzi kutoka Chuo Kikuu cha Afya Muhimbili (MUHAS) kwa ajili ya kufanya utafiti wa andiko lake lenye somo **"Determinants of Isoniazid Preventive Therapy Uptake Among Children Living with HIV in Njombe, Tanzania".**

3. *Tafadhali* mpokee na kumpa ushirikiano ili aweze kufanya utafiti kwenye eneo lako kuanzia 28 Mei, 2021 hadi 28 Juni, 2021.

4. Natanguliza shukrani kwa ushirikiano wako.

Charles Keiya
Kny: **KATIBU TAWALA MKOA**

Nakala: Adelina Alfred



JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

Simu Na: (026) 2782912
2782913
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Barua Pepe: rc@njombe.go.tz
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S.L.P. 668
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4. Natanguliza shukrani kwa ushirikiano wako.

Charles Kelya
Kny: **KATIBU TAWALA MKOA**

HALMASHAURI YA MJI
IMEPOKELEWA
28 MAY 2021
S. L. P. 577
NJOMBE

Nakala: Adelina Alfred