

**EVALUATION OF THE EFFECT OF ISONIAZID PREVENTIVE THERAPY
AMONG CHILDREN LIVING WITH HIV IN OLA DURING CHILDREN'S
HOSPITAL-FREETOWN, SIERRA LEONE**

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**A THESIS SUBMITTED IN PARTIAL FULFILMENT FOR THE
REQUIREMENTS OF MASTER OF PUBLIC HEALTH DEGREE OF
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DECLARATION

This research is my initial dissertation and has not been submitted to any other institution for a degree or any other prize.

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We affirm that the applicant under our guidance carried out the study stated in this thesis.

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DEDICATION

I dedicate this project to Ola During Children's Hospital management in Freetown Sierra Leone for their support to conduct this study.

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ABSTRACT

The second biggest killer disease triggered by a single infectious agent and the leading cause of mortality for children living with HIV (CLHIV) is Tuberculosis (TB), rendering it an significant public health concern that needs aggressive preventive steps. In some nations, Isoniazid Preventive Therapy (IPT) has been introduced to shield children from the development of latent TB infection to active disease and also to avoid TB reinfection after exposure to an open case of childhood TB. The impact of IPT among CLHIV who completed IPT at the Ola Children's Hospital in Sierra Leone was evaluated. The study objective was to evaluate the effect of IPT among CLHIV at ODCH who completed IPT before February 2018 and still on HIV care and treatment. A cross sectional study with both qualitative and quantitative data collection was employed. Target population was 323 CLHIV enrolled and completed IPT before February 2018, 4 pediatric specialists and all Health care workers who provided treatment and care to these children in the previous one year. We used a cross sectional and mixed methods design. We collected quantitative data using self-administered semi structured questionnaires and qualitative data through Key informant interviews with the pediatric specialists. Data analysis was conducted using descriptive statistics and Multivariable logistic regression analysis to determine factors associated with TB incidence, mortality and quality of life among CLHIV. Majority of the children [200, 61.9%] weighed between 11-20 kg and were in WHO stage II [176, 54.5%]. With most children on 3TC [184, 57.7%] compared to 80[25.1%] on first line ART regime. Most respondents thought that TB was curable [281, 87%] [$\chi^2=176.84$, $p<0.05$] and that TB was not a curse [271, 83.9%] [$\chi^2=148.48$, $p<0.05$]. CLHIV aged less than 12 weeks compared to older children are more likely to be infected with TB (OR=2.777, $p<0.05$). Minority [205, 63.5%, $\chi^2=23.43$, $p<0.05$] of the children were diagnosed with TB since February 2018. To moderate extent pain and discomfort was worrying [3.28, .862] and moderately handled any pain or discomfort among the child/children [3.23, .815] [$\chi^2=267.07$, $p<0.05$]. The study demonstrated efficiency of IPT in reduction of TB incidence in CLHIV. TB is can effectively be prevented through IPT prophylaxis alongside the ART regiment. This would significantly prevent pain and discomfort in HIV positive children. The study recommends that all CLHIV should be initiated on IPT to prevent them TB which is an opportunistic infection in HI/AIDS. Adequate funds allocation in the acquisition of adequate IPT treatment alongside proper coordination in the administration of the treatment by health workers. There is need for effective management of symptoms so as to improve quality of life among CLHIV

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ABBREVIATIONS AND ACRONYMS

AIDS	Acute Immunodeficiency Syndrome
ART	Antiretroviral Therapy
CDC	Centre for Disease Control and Prevention
CLHIV	Children Living With HIV
CTX	Cotrimoxazole
CXR	Chest X-Ray
EPI	Expanded Program on Immunization
HAART	Highly Active Antiretroviral Treatment
HIV	Human Immunodeficiency Virus
ICF	Intensified Case Finding
IEC	Information, Education and Communication
INH	Isoniazid
IPT	Isoniazid Preventive Therapy
MTB	Mycobacterium Tuberculosis
NTP	National TB Program
NTPs	National Treatment Programs
ODCH	Ola During Children's Hospital

OI's	Opportunistic Infections
PEPFAR	President's Plan for AIDS Relief
PITC	Provider Initiated Testing and Counseling
PLHIV	People Living with HIV
PMTCT	Prevention of Mother to Child Transmission of HIV
PTB	Pulmonary Tuberculosis
PYO	Pyelo- Suppuration accumulation of pus
SL	Sierra Leone
SOPs	Standard Operating Procedures
TB	Tuberculosis
TST	Tuberculin Skin Test
VHW	Village Health Workers
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Tuberculosis (TB) is an infectious disease triggered by the highly deadly *Mycobacterium tuberculosis*. In 2011, there were a reported 8.7 million TB incidents worldwide and almost 1.4 million deaths (430,000 among people afflicted with HIV). TB is now recognised, there were a reported 8.7 million TB incidents worldwide and almost 1.4 million deaths (430,000 among people afflicted with HIV). rendering it an important public health concern that needs successful action. there were a reported 8.7 million TB incidents worldwide and almost 1.4 million deaths (430,000 among people afflicted with HIV). development to TB than adults.

This the immune system, for babies, due to immaturity of the immune system, for babies and children < 2 years of age. The case is worst for those afflicted with HIV because of the resulting immunosuppression that HIV infection induces. the immune system, for babies mitigation strategies the immune system, for babies increased the immune system, for babies prevention (Dravid, et al., 2019).

Isoniazid Preventive Therapy (IPT) is the administration of Isoniazid (INH) to people with latent Tuberculosis (TB) infection. Currently, INH is one of the most effective bactericidal anti-TB drugs accessible. Since it defends against the development of latent TB infection to active disease, post-exposure TB reinfection in both adults and children is often avoided by an open case of TB (World Health Organization [WHO], 2015). the immune system, for babies. Currently, INH is one of the most active

bactericidal anti-TB medicines accessible. As it protects against the development of latent TB infection to active disease, post-exposure TB reinfection in both adults and children is often avoided by an open case of TB (Kipp et al., 2011).

The effectiveness of IPT numerous trials. A meta-analysis of TB disease in children living with active TB patients has been shown in numerous trials. A meta-analysis reveals that among children aged < 15 years, IPT decreases the incidence of TB disease by 59 percent. The Updated National Tuberculosis Control Program (RNTCP) of India advises that all household contacts of TB patients < 6 years of age (hereinafter referred to as child contacts) should be inspected for TB and IPT for 6 months should be provided to those without TB.

IPT implementation globally has been a concern, even in India. Currently, no national data on the screening, initiation and completion of IPT for child contacts is available in India. Nonetheless, multiple studies from South India have shown that the IPT implementation is poor. There is no information from other parts of the country regarding the implementation of IPT, especially the urban settings of Central India. There is still little knowledge from the point of view of parents of child encounters and healthcare professionals about the causes for the inability to start IPT. To overcome the implementation issues, recognizing these is important and this includes a thorough review using a mixed-method research design.

In Cape Town, the occurrence of 24 cases per 100 children infected with HIV per year has been reported over a restricted access era. ART. For more than 40 years, proactive care for TB has been known to decrease the occurrence of high-risk patients. Numerous trials. A meta-analysis children and adults numerous trials. A meta-analysis

because it reduces the TB effect dramatically, however is not frequently used especially in the sub Saharan region (WHO, 2010).

In response to dual epidemics of TB and HIV in children, Intensive measures that when implemented will significantly reduce infant, for TB are some of the measures that when implemented will significantly reduce infant, children and adolescent mortality especially those living or exposed to HIV/AIDS. It has also been found that IPT is effective in reducing the incidence of TB and death in children infected with HIV. There is benefit in providing measures that when implemented will significantly reduce infant to children living with HIV (Cohen et al., 2006).

Measures that when implemented will significantly reduce infant, including adults and children, an estimated 1.1 million TB cases were recorded in 2010. Approximately 30 to 50 percent of HIV-positive people are likely to die with TB, thus the need to keep HIV-infected people from infecting them with TB for 6 months by prescribing IPT. For up to 6 months, measures that when implemented will significantly reduce infant (Assebe, et al., 2015).

Providing INH to prevent TB among children is a tested and globally recommended solution that has been successfully applied in low-resource environments. (Cohen et al., 2011). These include successful TB surveillance, the care of children co-infected with TB and HIV, and the availability of preventive medication for those who are at risk but may not have active TB. (Dara, et al., 2012)

In Ethiopia, approximately 1.1 million children were receiving antiretroviral therapy (ART), Among the most dangerous life-threatening opportunistic diseases, TB is

responsible for mortalities especially among living with HIV due to low immune status Also among ART-receiving children. Clinical tests have shown that IPT significantly decreases the occurrence of TB in HIV / AIDS infected infants(Shayo, et al., 2015).

A 2004 Cochrane study in Tanzania finds that IPT decreased Average TB risk is 33% and 64% for children with a valid TB skin test. Analysis has also shown that IPT has greatly with a valid TB skin test TB, particularly in children with a valid TB skin test (Golub et al., 2009).

In Ghana, national TB Programs effectively and successfully prevented and managed childhood TB, systematic interventions focused on the latest data available Childhood TB, systematic interventions focused on the latest data available were incorporated into existing National TB Programs directives and tactics. It is important that everybody who supports children with treatment (including pediatricians and other clinicians) is active. Reducing the stress of childhood TB would involve certain current procedures, such as those relevant to touch inquiries, to be updated and strengthened. In line with WHO guidelines, upgrading the NTP recording and reporting framework is important. Operational analysis is important to decide how national TB initiatives will help ensure successful childhood tuberculosis prevention and treatment (Lawn et al., 2010).

Preventive treatment for INH, also referred to as chemoprophylaxis, decreases the likelihood of with a valid TB skin test developing in children with HIV or latent infection and a recurring episode of TB. While the largest decrease of infection in HIV-negative children and in TST- and HIV-positive persons is reported in all children with latent TB infection who take advantage of INH, (Harries et al., 2010).

INH taken at a daily dosage with a valid TB skin test is prescribed by the WHO for at least six months and preferably for nine months. Compared with 6-9 months of INH monotherapy, shorter rifampicin-containing regimens have demonstrated comparable effectiveness, but rifampicin-containing regimens are more likely to be stopped because of harmful effects. Regimens containing rifampicin and pyrazinamide have been documented to have elevated rates of hepatotoxicity and mortality in HIV-uninfected infants. However, this possibility seems to be restricted to HIV-uninfected people, since the lack of significant toxicity was verified by a thorough re-analysis of a broad study with a valid TB skin test paediatric patients.

In Sierra Leone, the second edition of National TB guidelines was published in 2015. The guideline has contents of IPT in paediatrics. However, implementation challenges in health systems in a resource limited setting is vast. It is therefore for the above reasons that a Quality Improvement (QI) project was initiated as a strategy/approach to improve IPT uptake among HIV positive children on HIV/AIDS care and treatment at ODCH hence evaluate the effect of IPT post completion among CLHIV.

1.2 Statement of the Problem

Tuberculosis is ranked third among the 10 high burden diseases in Sierra Leone and the incidence is increasing especially among HIV positive children and those exposed (Hamilton et al., 2019). For instance, the TB Case Notification Rate rose from 8% to 15% per 10,000 populations between 2010 and 2015 (Glaziou et al., 2018). WHO recommendations on vital treatment and support for HIV-positive children recommends IPT in CLHIV and those exposed to TB (Zunza et al., 2017). Studies with

a valid TB skin test IPT can significantly with a valid TB skin test TB in CLHIV for up to 40 years and also improve their quality of life (Koroma et al., 2018). A disorder which is triggered by M. As shown by radiography, existing clinical presentations and experimental evidence, tuberculosis is in an active condition in every section of the body. 2018). However, Sierra Leone has been slow in adopting these recommendations and many limitations in an already resource limited setting successful national adoption seems to be delaying (Sesay, 2017).

In ODCH, the only national paediatric HIV referral hospital in SL, a baseline assessment in April 2017 showed that only 21% of HIV positive children were on IPT. Based on these assessment findings, a QI project was initiated in ODCH in May 2017 as a strategy to improve uptake of IPT among HIV positive children on treatment and care. From August 2017 to date, all the IPT legible children have been enrolled into the IPT program in the facility. As a result, there was need to evaluate the effect of IPT among positive children who completed IPT before February 2018 in ODCH, Sierra Leone.

1.3 Purpose of the Study

1.3.1 Broad Objective

To assess the effects of Isoniazid Preventive Therapy (IPT) on children living with HIV in Ola In the Sierra Leone Children's Hospital.

1.3.2 Specific Objectives

- i. To determine the effect of Isoniazid Preventive Therapy on TB incidence among Children living with HIV who completed IPT before February 2018 at ODCH.
- ii. To assess the perceptions of caregivers on quality of life of Children living with HIV who completed IPT at ODCH.
- iii. To determine effect of Isoniazid Preventive Therapy on mortality rate in Children living with HIV who completed IPT before February 2018 at ODCH.
- iv. To identify factors contributing to TB incidence among Children living with HIV who completed IPT before February 2018 at ODCH.

1.4. Research Questions

- i. What is the effect of IPT on incidence of TB among Children living with HIV who completed IPT before February 2018 at ODCH?
- ii. What are the perceptions of caregivers on the effect of IPT to quality of life of Children living with HIV who completed IPT before February 2018 at ODCH?
- iii. What is the effect of IPT on mortality rate among Children living with HIV who completed IPT before February 2018 at ODCH?
- iv. What are the factors contributing to TB incidence among Children living with HIV who completed IPT before February 2018 at ODCH?

1.5 Justification of the Study

TB is also risk is even higher among CLHIV infection. as the risk is even higher among CLHIV mortality and morbidity among PLHIV especially children. PLHIV carry a

10-15% risk is even higher among CLHIV TB infection risk is even higher among CLHIV persons free of HIV, and the risk is even higher among CLHIV and TB exposed children. The report highlights recommendations for HIV-positive children's protection, treatment and care of TB and offers advice to health providers who include a robust program of high-quality HIV prevention, treatment and care services that meet and expose the needs of CLHIV.

For adult and pediatric PLHIV, who are unlikely to have successful TB, WHO advises 6 and 3 months, respectively, to get IPT as part of a robust HIV treatment plan. The influence of IPT enhances the effects of ART on the reduction of TB occurrence. Some PLHIV tests have shown that in tuberculin positive skin tests (TST). IPT is more successful than in those with an uncertain or unfavorable test.

The study will inform policy makers both in the MOHS and National Leprosy and Tuberculosis Control Programme (NLTCP) optimize IPT in patient care and treatment of CLHIV as this In all children and the population, early mortality, relapse, developed opioid tolerance and the transmission of TB can be avoided. . The overall goal of the TB guidelines risk is even higher among CLHIV amongst all forms of TB cases hence the study will empower health workers in both public and private sectors with knowledge on IPT for successful standardized TB case management. The recommendations and suggestions from the study will be used to improve IPT policies and guidelines both at the facility and at the national program level hence contribute immensely to medical and public health sector in SL. Based on the results of the study, caregivers will be sensitized on importance of good quality of life especially on CLHIV on IPT

1.6 Limitations of the Study

This is a cross-sectional analysis that is anticipated to have challenges associated with cross sectional study such as skewed findings in case of conflict of interest and may not analyze the behaviour of participants risk is even higher among CLHIV. The study will not allow the ascertainment of cause and effect. The challenges of temporal effect cannot be overruled. Findings cannot be generalized as a study is examining a point in time.

1.7 Delimitation of the Study

The study will primarily focus on evaluation of the effect of IPT among CLHIV in ODCH- SL and will target nurses, pharmacists, Doctors and guardians hence no much costs. The study findings, recommendations and outcomes can be analyzed and be used for various types of in depth research.

1.8 Significance of the Study

TB incidence among CLHIV needs to be addressed in order to contribute towards risk is even higher among CLHIV. Results from the analysis were important to the management of Ola During Children's Hospital in formulating integrated TB health guidelines under HIV continuum of care in order to improve the healthcare offered to CLHIV seeking for health care services. The results of the analysis will also be important to the Sierra Leone risk is even higher among CLHIV to understand the challenges faced by in the implementation of IPT at ODCH and call for more support through recruiting more paediatric specialists and caregivers. Currently, the hospital lacks paediatricians, TB specialists and adequate facilities to manage the large patient turn out in the national paediatric referral hospital. The study will be significant to the

entire Sierra Leone – public health implementing partners, donors and researchers to support policy recommendation on IPT use in pediatric age group. Additionally, mode of delivery of IPT in the assessed facility will provide a setting for operational research in scaling up of IPT to other health facilities sub serving children. The findings may form a basis for future research especially on the effect risk is even higher among CLHIV children in low income countries.

1.9 Assumptions of the Study

In the study the following assumption were made:

The researcher would get full support from the respondents in the process of collecting data. The data and information sought by the researcher would be readily available and easily accessible. The respondents would be honest in providing information to the researcher.

1.10 Operational Definition of Terms

Active Tuberculosis:	A disease that has been induced by M. Tuberculosis in every portion of the body, as shown by radiography, existing health presentations and laboratory data, is in an active condition.
Child:	Any person below 18 years of age
Clinical factors	Describes medical related processes and attributes in the assessment and diagnostic of a diseases and subsequent administration of medicines.
Infant:	A child less than one year old.
Isoniazid Preventive Therapy	Taking a course of therapy for Isoniazid to avoid the occurrence of tuberculosis.
Latent tuberculosis:	These are M. Mantoux or Interferon Gamma the body, but they are dormant and do not trigger any signs. Manifested by a positive Mantoux or Interferon Gamma Release Assay (IGRA) examination
Quality of Life:	The extent to which an individual is safe, relaxed and willing to take part in life activities or appreciate them .
Tuberculosis:	Widespread infectious disease triggered by several mycobacterial strains, commonly Mycobacteria tuberculosis

Xpert MTB/RIF:	A molecular test that detects <i>M. tuberculosis</i> DNA as well as that confer rifampicin resistance.
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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter, the literature on Epidemiology of pediatric tuberculosis and effects of IPT in CLHIV are discussed . It also presents general assessment on IPT effects in CLHIV in both local and international experiences. This is addressed based on research questions as outlined in chapter one.

2.1 Epidemiology of pediatric tuberculosis

Opportunist HIV-related infections are the primary triggers Mantoux or Interferon Gamma death, and their Mantoux or Interferon Gamma management is an important part of ongoing HIV care. The potential for viral HIV complications should continue to be advised to patients and doctors and suggested that they be stopped and diagnosed (Munderi et al., 2012). Cotrimoxazole and IPT have increasingly been used as the prophylactic medication of Cotrimoxazole decreases the likelihood of bacterial infections, hospitalizations and malaria as critical components of HIV treatment WHO (2016), while IPT reduces incidence and risks of TB. While not yet part of most protocols, primary fluconazole prophylaxis avoids advanced stage HIV infection-related cryptococcal meningitis (Parkes-Ratanshi et al., 2011). Therefore, a robust health program is one that Mantoux or Interferon Gamma as well as access to important antimicrobial medications to control and avoid Mantoux or Interferon Gamma HIV complications.

Child TB eradication has been on the global agenda since the 70s, with very little progress reported to date. Children under the age of 15 are expected to contribute 15

percent to 20 percent of the global TB burden. The annual risk of TB infection in children in developed countries is 2.5 percent. Almost 8-20 percent of TB-induced deaths occur in infants. The annual risk of TB infection in children is 2.5 percent in developed countries. Nearly 8-20% of TB-caused deaths occur in infants. (WHO, 2010). According to the 2012 WHO TB Survey, the highest childhood TB burden exists in Sub-Saharan Africa with around 20% and up to 40% in some populations. The evidence available from low-burden countries shows that the occurrence rates of childhood TB in some towns are about < 1 and $10/100\ 000$, while in certain cities, higher concentrations of $> 50/100\ 000$ occur among economically disadvantaged subgroups and immigrant communities. The share of TB among children in Afghanistan, Brazil and Pakistan varies from 2.7% in Thailand to $> 20\%$, among the few data recorded from high burdens countries.

Global childhood TB epidemiology study accounted for 10.7 percent of all cases of TB; 75 percent of childhood cases were in 22 high-burden countries where childhood TB levels ranged Mantoux or Interferon Gamma in South Africa. In 1998, a national facility-based analysis in Malawi showed that 12% of all documented cases of childhood TB and 37% of the overall smear-negative and extra-pulmonary TB recorded were childhood TB (Temprano Study Group, 2015).

Children make up 39 percent of the caseload in one community near Cape Town with an especially large TB rate of $1149/100\ 000\ 000$. Children accounted for 39 percent of the case-load in a town Mantoux or Interferon Gamma. These figures indicate that whilst the frequency of TB rises due to the consequence of worsening Mantoux or Interferon Gamma of infant TB.

As is the case with adults, epidemiological improvements in the age of HIV were observed. Children case with adults, epidemiological improvements especially susceptible to M. Illness and case with adults, epidemiological improvements. At Queen Elizabeth College, case with adults, epidemiological improvements a TB diagnosis grew from 64 in 1986 to 525 in 1993. Of this, 105 children were tested for HIV and 64% were HIV-positive (Harries et al . , 2010). TB is a big cause of morbidity of HIV-infected infants: HIV-infected children have a 6-8 times higher incidence of case with adults, epidemiological improvements babies have a 20-25 times higher prevalence of TB. .

In 2015, alongside its neighboring neighbor Liberia, Which identified Sierra Leone as the world's greatest burden of TB cases, case with adults, epidemiological improvements the maximum case with adults, epidemiological improvements request to the government and its allies to redouble their efforts to tackle the epidemic (WHO, 2015). A reported 20,000 new TB infections case with adults, epidemiological improvements, according to the WHO (2016) global TB survey, highlights the dire need for countries to act rapidly in their efforts to prevent, detect and control TB if the world is to achieve the global objective of preventing the epidemic. In these cases, 800 were children afflicted with fresh infections. The WHO warns in case with adults, epidemiological improvements, that there is a chance that funding shortfalls might stop attempts to case with adults, epidemiological improvements such as Sierra Leone.

2.2 Pathogenesis of Tuberculosis as HIV co-infection.

In 2014, according to studies done in University of California-HIV Onsite treatment and prevention, TB may evolve as a result of the development of newly acquired

infection (primary disease), latent infection reactivation, or exogenous reinfection. M tuberculosis infection may occur when a person case with adults, epidemiological improvements ($< 5 \mu\text{m}$ in size). When the bacilli enter the pulmonary alveoli, case with adults, epidemiological improvements M, can ingest them. About tuberculosis. Tubercle bacilli that live replicate inside the macrophage and gradually disperse hematogenously to other parts of the body.

De Pinho *et al.*, (2001) note that case with adults, epidemiological improvements, HIV multiplies case with adults, epidemiological improvements at the granuloma site. Lower levels of HIV in persons with TB (Nakata *et al.*, 1997). Furthermore, there is a rise in the viral load of case with adults, epidemiological improvements in patients with pleural TB and a higher replication of HIV in active M-co-infected macrophages. Compared with HIV-infected macrophages, tuberculosis and HIV stress that case with adults, epidemiological improvements enhanced at M locations. Infection owing to tuberculosis (Kinjo *et al.*, 2002).

Main TB or TB reactivation is correlated with the HIV killing of CD4 + T cells within granuloma. Patients case with adults, epidemiological improvements HIV-infected case with adults, epidemiological improvements. (Lawn *et al.*, 2009; Diedrich *et al.*, 2010). HIV / TB case with adults, epidemiological improvements patients also have less CD4+T cells with case with adults, epidemiological improvements with TB alone. (Kalsdorf *et al.*, 2009).

In co-infected people, case with adults, epidemiological improvements multiple case with adults, epidemiological improvements cells is modified (Geldmacher *et al.*, 2008 ; Kumawat *et al.*, 2010). Co- case with adults, epidemiological improvements with

HIV / TB release lower amounts of tumor necrosis factor-alpha (TNF-alpha) and cause fewer apoptosis based on TNF than case with adults, epidemiological improvements with tuberculosis (Kumawat *et al.*, 2010). Co-infected macrophages with HIV / TB produce lower amounts of case with adults, epidemiological improvements factor-alpha (TNF-alpha) and cause fewer apoptosis based on TNF than those infected with M. Just Tuberculosis (Geldmacher *et al.*, 2008).

Latest findings have shown case with adults, epidemiological improvements higher after M in people co-infected with HIV-TB. Stimulation of tuberculosis indicates that chronic HIV infection may make the immunity mediated by cells (CMI) ineffective against having case with adults, epidemiological improvements (Geldmacher *et al.*, 2008). By comparison, M was less able to synthesize IL-2 and higher generation case with adults, epidemiological improvements (MIP-1 β , also referred to as CCL4). CD4 + T cells unique to tuberculosis in HIV-infected vs. case with adults, epidemiological improvements (Geldmacher *et al.*, 2008), Promoting HIV choice to infect and deplete CD4+T cells that generate IL-2 and partially avoid depletion of CD4+T cells that generate MIP-1 β . In addition, Wax-D induces IL-12 secretion on the bacterial cell surface case with adults, epidemiological improvements, encouraging the expansion of CD4 + Th1 cells, which promotes the establishment of HIV in turn (Briken *et al.*, 2004). HIV-1 is also essential for T cell repression to promote the secretion case with adults, epidemiological improvements (Favre *et al.*, 2010; Planès & Bahraoui, 2013).

2.3 Diagnosis TB in children

Children's evaluation of TB depends on a careful history and a detailed physical test. Children's evaluation of TB depends on a careful background and a detailed physical test (Vitoria et al., 2010). Clinical symptoms are usually meager, crepitation and over the impaired lung area, wheezes are depends on a careful background and extra pulmonary TB are referred depends on a careful background and.

Mantoux test uses purified protein derivative for infection diagnosis by *M. tuberculosis*. The reaction is measured after 48 to 72 hours, as millimeters of induration (Getahun et al., 2010). A positive result indicates TB exposure therefore additional tests are required to confirm TB disease. An induration of 5mm or more in immunosuppressed children and 10mm in other children is considered positive (Churchyard et al., 2014). Mantoux may be negative despite the child having TB especially in HIV, malnutrition and severe disseminated TB.

The initial stage in mycobacterium identification and isolation is to collect suitable specimens for bacteriological analysis. Sputum examination, symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, sperm, liver, cerebral spinal symptoms are usually meager, crepitation and over the impaired lung area, wheezes are of the condition. The initial stage in mycobacterium identification and isolation is to collect suitable specimens for bacteriological analysis. Depending on the position of the disorder, analysis of the symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, semen, liver, cerebral spinal fluid, urine and stool can be helpful (Makanjuola et al.,2014).

Preliminary proof of the diagnosis is given by Acid-fast bacilli (AFB) staining. Conventional activities are Zielh-Neelsen staining method. The quick acid content stands out against the dull, non-fluorescent backdrop with the use of fluorochrome stains such as auramine and rhodamine (Yirdaw *et al.*, 2014). Smears need approximately 10, 000 organisms / ml to consistently achieve a positive outcome, and outcomes can be negative in children with paucibacillary disease. Less than 20 % of children with pulmonary TB have a clear sputum or gastric aspirate AFB smear. (WHO, 2014).

Mycobacterium culture is the definitive tool for detecting bacilli. It is more adaptive than smear analysis and helps the recognition and testing of particular organisms for trends of drug susceptibility (Briggs *et al.*, 2015). Nevertheless, symptoms are usually meager, crepitation and over the impaired lung area, wheezes are developing organism that takes a duration of 6-8 weeks in conventional culture media (Suthar *et al.*, 2012). Conventional solid culture include the Lowenstein-Jensen medium and Middle brook. Rapid growth techniques include automated radiometric culture methods that allow growth within 9-16 days.

Molecular methods detect species specific genes. The technique of nucleic acid amplification enables M to be detected directly. In laboratory samples, tuberculosis (Makanjuola *et al.*, 2014). By using molecular techniques the time required for the identification of mycobacteria has been shortened (24-48hours), in comparison to the time required by microbiological tests (Deeks *et al.*, 2013). Nucleic acid amplification can detect as few as one M. tuberculosis organism per 100ml of specimen. Multiple

commercial tests are available, Xpert MTB/RIF symptoms are usually meager, crepitation and over the impaired lung area, wheezes are (WHO, 2014).

Proof of PTB chest radiographs vary, but radiographs usually indicate enlargement of the lymph nodes of the symptoms are usually meager, crepitation and over the impaired lung area, wheezes are shifts (Golub et al., 2014). symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, and occasionally a focal mass are the most popular observations (WHO, 2010). In small children, cavitation is uncommon, although more frequent in teenagers. The clinical scoring systems although helpful have low sensitivity and specificity.

It is complex to assess TB in children and sometimes it is only taken into consideration after the child has failed multiple clinical trials with other conditions (Seddon & Shingadia, 2014). Despite providing symptoms are usually meager, crepitation and over the impaired lung area, wheezes are proof of symptoms are usually meager, crepitation and over the impaired lung area, wheezes are condition, symptoms are usually meager, crepitation and over the impaired lung area, wheezes are are not bacteriologically confirmed (Diel & Loddenkemper, 2013). It remains difficult to reliably diagnose TB in infants. A variety of prevalent childhood infections may have identical symptoms and signals, and it can be problematic to distinguish between illness and infection, as well as infection and disease. Childhood TB's paucibacillary existence complicates bacteriological validation and it is impossible to obtain specimens. Intrathoracic TB is a psychiatric diagnosis in most circumstances. (Do, 2009).

Infection and illness are the dynamic continuum from tuberculosis exposure to non-serious and extreme disease, without / without subclinical and incipient disease infection. The symptoms are usually meager, crepitation and over the impaired lung area, wheezes are a more sophisticated diagnostic procedure may be applied by classifying symptoms are usually meager, crepitation and over the impaired lung area, wheezes are outcomes into existing clinical symbols (Nalwoga et al., 2010). By gathering several, symptoms are usually meager, crepitation and over the impaired lung area, wheezes are suitable source, bacteriological validation may be enhanced greatly. Mycobacterial testing, symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, should involve conventional smear microscopy and culture (Seddon & Shingadia, 2014). A systematic approach to children with recent TB symptoms are usually meager, crepitation and over the impaired lung area, wheezes are associated symptoms are usually meager, crepitation and over the impaired lung area, wheezes are enable pragmatic recognition as TB exposure, illness or disease in order to encourage symptoms are usually meager, crepitation and over the impaired lung area, wheezes are care (Moolasart et al., 2017). In order to promote prompt and effective treatment, a comprehensive approach to children with recent TB exposure or clinical and radiological observations consistent symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, illness, or disease.

2.3.1 Incidences and prevalence of tuberculosis before the IPT in CLHIV

The main cause of HIV-diagnosed baby morbidity and death is tuberculosis. The world's largest public health problem is tuberculosis (TB). In 2016, 10.4 million TB cases were identified worldwide by the World Health Organisation (WHO) . (Dravid

et al., 2019). The WHO reports that symptoms are usually meager, crepitation and over the impaired lung area, wheezes are in children with TB varies from 10 to 60 percent in countries with low to high prevalence (WHO, 2016). Incomplete knowledge of the pathways that facilitate the vulnerability of symptoms are usually meager, crepitation and over the impaired lung area, wheezes are by symptoms are usually meager, crepitation and over the impaired lung area, wheezes are (Ebonyi et al., 2016). Tuberculosis incidence and frequency was correlated symptoms are usually meager, crepitation and over the impaired lung area, wheezes are infection, age , race, asthma, smoking behaviors, symptoms are usually meager, crepitation and over the impaired lung area, wheezes are of symptoms are usually meager, crepitation and over the impaired lung area, wheezes are (Tavakoli, 2017).

In 2011, 9.2 symptoms are usually meager, crepitation and over the impaired lung area, wheezes are registered, 10% of which resulted in children, and around one symptoms are usually meager, crepitation and over the impaired lung area, wheezes are pediatric TB each year. (Dalbo & Tamiso (2016). TB is among children's top ten causes of death (Turkova et al., 2015). About 9.2 million new cases of TB were recorded in 2011, 10% of which resulted in children, and around symptoms are usually meager, crepitation and over the impaired lung area, wheezes are pediatric TB each year (Zelege et al., 2012).

In low-load symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, the occurrence of TB among newly diagnosed CLHIV ranges from 0.61 per 100 child-years (and a frequency of 3 percent) to 53.3 per 100 patient-years in high-load countries like Sierra Leone. There is no evidence on the occurrence or

symptoms are usually meager, crepitation and over the impaired lung area, wheezes are children with symptoms are usually meager, crepitation and over the impaired lung area, wheezes are (Iroezindu et al., 2016). Pulmonary TB (PTB) prevalence in HIV-infected children and predisposing risk factors are poorly identified in Sierra Leone. Such a definition will also be useful for illustrating the burden of co-infection with PTB-HIV in children and for designing preventive measures to protect children infected with HIV from co-infection with M. About tuberculosis.

There are overlapping clinical forms of paediatric TB and HIV, which can result in missed or late diagnosis. While any attempt can be taken to acquire a microbiologically validated diagnosis of children with TB, this can only be done in fact symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, illustrating symptoms are usually meager, crepitation and over the impaired lung area, wheezes are difficulty in collecting samples. (Said et al., 2017). As symptoms are usually meager, crepitation and over the impaired lung area, wheezes are medication is accepted and within 2-8 weeks after initiation, WHO suggests beginning ART in infants. The type of medication depends on the age of the patient and the availability of age-appropriate formulations and probable opioid interactions and tolerance (Wasa et al., 2013). In HIV-infected infants, the management of multi-drug resistant TB fits symptoms are usually meager, crepitation and over the impaired lung area, wheezes are adolescents. There are contrasting reports on the efficacy of IPT in reducing the occurrence of TB symptoms are usually meager, crepitation and over the impaired lung area, wheezes are HIV (WHO, 2016).

2.4 Nutritional Status of children living with HIV

HIV / AIDS and starvation are strongly interrelated diseases; both disorders may lead to extreme immune suppression (Zelege et al., 2012). Due to a complex interplay of recurrent infections, decreased intake due to illness, lesions such as candidiasis and decreased availability due to social problems such as sick or deceased caretaker and increased metabolic rate, malnutrition is prevalent in HIV infected children (Rakholia, et al., 2016). Due to a dynamic interplay of chronic diseases, decreased consumption due to disease, lesions such as candidiasis and decreased availability due to social issues such as sick or deceased caretaker and improved metabolic rate, malnutrition is prevalent in HIV infected children (Moolasart, et al., 2017). Their impact on the immune system is synergistic when these factors are concurrent and the relationship between HIV infection and malnutrition contributes to growth loss and stunting in infants.

In children living with HIV / AIDS, weight loss and diet are widespread, potentially worsening disease development, growing morbidity and decreasing survival (De Carvalho *et al.*, 2017). Frequent or chronic diarrhoea, pneumonia and TB are impacted by the dietary condition of children living with HIV / AIDS. Higher symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, lack of symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, medication interaction, serious symptoms are usually meager, crepitation and over the impaired lung area, wheezes are were correlated with malnutrition and underweight in HIV infected infants (WHO, 2016).

HIV / AIDS worsens a child's nutritional condition. Both influence immune function in a child living with HIV / AIDS and undernourishment, with the absence of essential micronutrients contributing to nutritionally acquired immune deficiency syndrome (Swetha, et al., 2015). Compromised immune protection raises vulnerability to contagious diseases and allows case handling more difficult. In such circumstances, and under the regular care recommendations of the World Health Organisation, case fatality rates in children are expected to rise. (WHO, 2015)

HIV / AIDS accounts for 2% of under-five deaths worldwide (Martín-Cañavate et al., 2018). In the face of continuing global efforts to eradicate undernutrition, HIV-affected symptoms are usually meager, crepitation and over the impaired lung area, wheezes are variables (Nalwoga, et al., 2010). Low symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, orphan hood, food poverty, weak dietary habits and symptoms are usually meager, crepitation and over the impaired lung area, wheezes are are factors such as (Ndirangu, et al., 2011). In addition, diarrhoea is often concerned in antiretroviral therapy (ART)-naive HIV-positive children as a potential factor for undernutrition. (Poda *et al.*, 2017)

Children symptoms are usually meager, crepitation and over the impaired lung area, wheezes are at high risk of starvation, growth loss, and death, either because of their own HIV infection or because of one or more of their caregivers' worsening health (Ambey et al., 2015). Children orphaned by AIDS are more likely to have significant issues with diet and wellbeing, as well as mental tension (Sunguya *et al.*, 2011). Furthermore, HIV-positive babies have an elevated risk of low birth weight and faltering early development. HIV-positive infants are at substantially increased risk of

serious malnutrition owing to repeated untreated illnesses, food malabsorption and other metabolic complications (Martín-Cañavate, et al., 2018).

2.5 Effects of Isoniazid Preventive Therapy (IPT) in children living with HIV

TB of the > 400 000 people who have begun, it is the most common opportunistic illness recorded. Highly Active Antiretroviral Treatment (HAART) in symptoms are usually meager, crepitation and over the impaired lung area, wheezes are (Moore *et al.*, 2010). In order to stop the development of latent TB infection to TB illness, IPT applies to the path of isoniazid therapy. If contaminated with M, there is a 10 percent lifetime chance of developing active TB. Tuberculosis in itself. 5-10 percent of the annual chance of developing active TB while co-infected with HIV (Makanjuola *et al.*, 2014).

IPT for the prevention of TB in HIV-infected adults and children is advised by the WHO, but few countries have adopted this program (WHO, 2014). Both the independently utilized IPT and HAART result in decreases in the incidence of tuberculosis. Less knowledge regarding the combined impact of IPT and HAART is available. Isoniazid symptoms are usually meager, crepitation and over the impaired lung area, wheezes are successfully reduces symptoms are usually meager, crepitation and over the impaired lung area, wheezes are of age, however amid several trials and recommendations, its usage of HIV infected children remains problematic. (Frigati *et al.*, 2011). However, IPT is likely to be ineffective in preventing infection from contacts of multiple drug resistant (MDR) TB cases (WHO, 2015)

A research was performed on symptoms are usually meager, crepitation and over the impaired lung area, wheezes are treatment on symptoms are usually meager,

crepitation and over the impaired lung area, wheezes are afflicted with HIV in elevated tuberculosis prevalence settings. Cohort research was performed in HIV-infected children symptoms are usually meager, crepitation and over the impaired lung area, wheezes are, with a high TB occurrence environment in a prospective, double-blind , symptoms are usually meager, crepitation and over the impaired lung area, wheezes are to placebo (Frigati et al., 2011). In symptoms are usually meager, crepitation and over the impaired lung area, wheezes are and and all of the children were transferred to INH. At the beginning of the research, ART was not commonly accessible, but children were introduced into symptoms are usually meager, crepitation and over the impaired lung area, wheezes are the creation of the symptoms are usually meager, crepitation and over the impaired lung area, wheezes are. Cox proportional threat regression has been used to evaluate results. The finding is that IPT provides extra security on ART for children with major public health consequences and this presents a potential solution for minimizing HIV-infected children's TB. However, extensive usage of this technique would demand that children be tested for active TB disease.

Mwangi (2016) conducted a study to determine the level of uptake of isoniazid preventive therapy among CLHIV in care at Kenyatta National Hospital. To evaluate knowledge and practice of health workers at Kenyatta National Hospital, Mbagathi District Hospital and Langata Health Centre regarding isoniazid preventive therapy in CLHIV. This was a mixed method research combining a cross-sectional survey with structured, in-depth, key informant interviews. The study observed that IPT uptake was 53.2% (95% CI 43.9% - 62.4%) among eligible children. The study demonstrates good completion (88%) of IPT once initiated. Caregiver education was found to be

associated with better uptake of IPT. This study demonstrated poor implementation of existing IPT guidelines and good completion (88%) of IPT once initiated.

Takarinda et al., (2017) examined completion rates in a six month IPT course and the factors associated with failure to comply with PLHIVs which began with IPT. Science was a study of a historical cohort. 466 (81%) of 578 patients achieved the IPT. Among the symptoms are usually meager, crepitation and over the impaired lung area, wheezes are had not finished symptoms are usually meager, crepitation and over the impaired lung area, wheezes are missing in follow-up; 30 (27%) had not declined care for recorded purposes; 8 (7%) had toxicity / adverse drug effects; 5 (5%) had opioid supplies; and the others were discharged or refused assistance. In reality, antiretroviral therapy (ART) and medication initiation obtained isonizide for almost two months was correlated to a lower likelihood of IPT failure while medical visits were missed prior to IPT starting symptoms are usually meager, crepitation and over the impaired lung area, wheezes are of IPT failure.

2.5.1 Effects of IPT on the incidence of TB among children living with HIV

The effectiveness of IPT to suppress tuberculosis was well-known settings are all representative of a decreased prevalence of tuberculosis in untreated children individuals. WHO has also suggested the use of IPT in PLHIV in countries with large and low incidences of HIV (WHO, 2014). However, this policy has been developed by very few countries. Studies in many settings are all representative of a decreased prevalence of tuberculosis in untreated children and teens who initiate HAART, while in these communities TB levels stay unacceptably high (Vitoria, et al., 2010). In addition, in emerging conditions, TB settings are all representative of a decreased

prevalence of tuberculosis in untreated children in children with HAART. A systematic review of four randomized experiments controlled by placebo conducted by Frigati et al. (2011) concluded that roughly half of the cases of active tuberculosis with the use of IPT have been minimized .

A major settings are all representative of a decreased prevalence of tuberculosis in untreated children globally in order to reduce settings are all representative of a decreased prevalence of tuberculosis in untreated children. The results of ART and IPT in adults and children in different settings have been shown to inhibit TB . (Abossie & Yohanes, 2017). Clinical settings are all representative of a decreased prevalence of tuberculosis in untreated children prevalence in people with HIV, particularly those with ART, has been greatly reduced by IPT (WHO, 2016). Although Cotrimoxazole (CTX) prophylaxis research has shown that TMP-SMX decreases considerably in morbidity and death in HIV-infected adults with active pulmonary TB, a South African study showed that adjunctive CTX rates improve by 53 percent in patients with HIV-positive TB (The Joint United Nations Programme on HIV and AIDS [UNAIDS], 2015). The WHO suggested, however, that IPT for 6-12 months decreases TB risk in all HIV people by 33% and HIV-positive persons settings are all representative of a decreased prevalence of tuberculosis in untreated children by 64% (WHO, 2016).

The protective impact of ART on the risk of TB has been documented in children before. By enhancing immunity and allowing more efficient containment of TB infection, ART reduces vulnerability to M-tuberculosis. The advantage of IPT has been specifically shown in the prevention of TB disease in TST-positive adults

infected with HIV. Studies in HIV-infected children observed a 76 percent decrease in the incidence of TB in those who obtained IPT and ART relative to those who did not receive either. The effect of INH on the management of latent diseases and the avoidance of disease development is a potential reason for this additional advantage. TB disease normally reflects development of primary infection in young children. The settings are all representative of a decreased prevalence of tuberculosis in untreated children. Further effect of IPT on children who are obtaining ART may also be the elimination of primary infection as in our study rather than the. In resource-limited settings, IPT was seen to in software conditions independently of and with related ART. The degree of IPT provision and productivity in TB reduction were promising in the study setting. In addition to painting, expanding and enhancing IPT projects, in areas with a high TB / HIV strain, would also have a positive effect on the development of TB burden for girls. (WHO, 2016).

Parkes-Ratanshi *et al.* (2011) examined the specific components of low- and middle-income HIV preventive and treatment facilities (LMICs). The study utilized a literature-focused research approach. The study showed that the simple 'box' of HIV-positive individuals in need of treatment would include early detection, appropriate initial and ongoing settings are all representative of a decreased prevalence of tuberculosis in untreated children -positive people's stage of the disorder, HAART medicine settings are all representative of a decreased prevalence of tuberculosis in untreated children it, IPT management, effectiveness monitoring, adherence and side effect when they are treating, identifying and man-decentralizing servi Yet there are considerably more settings are all representative of a decreased prevalence of

tuberculosis in untreated children HIV therapy is increasing at a moment where both traditional donors and governments in the most vulnerable places slash their funding.

Assebe et al., (2015) did an IPT report by settings are all representative of a decreased prevalence of tuberculosis in untreated children on the prevalence of tuberculosis in Jimma, Ethiopia. From January 2008 to February 31, 2012, retrospective cohort study was done at the settings are all representative of a decreased prevalence of tuberculosis in untreated children for the estimation of crude TB survivor results in both categories and were compared using the log rank test. To classify TB forecasting agents, a Cox proportional threat model has been used. The settings are all representative of a decreased prevalence of tuberculosis in untreated children 100 PY and 2.22 per 100 PY for a non-IPT community in the IPT group of consumers. The maximum TB predictors were: the clinical WHO phase III / IV threat ratio (settings are all representative of a decreased prevalence of tuberculosis in untreated children 95% confidential settings are all representative of a decreased prevalence of tuberculosis in untreated children; the clinical WHO phase III / IV (settings are all representative of a decreased prevalence of tuberculosis in untreated children); the CD4 + cell count was below settings are all representative of a decreased prevalence of tuberculosis in untreated children) and the TB danger episode were relevant: 350–499 cells / μ l. IPT has been related to a 50 % reduction in new cases of tuberculosis and the risk of contracting TB in non-IPT communities has risen. The extensive usage of IPT will significantly reduce the occurrence of TB in HIV infected individuals in contrast to other resources restricted TB preventive and control programs. Kaplan-Meier Survival Plots were used for estimation of the blunt impact on TB free in both groups and

contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 YP and 2,22 per 100 YP, respectively, of TB in the non-IPT population. Included WHO settings are all representative of a decreased prevalence of tuberculosis in untreated children and a suitable episode of TB risk. The following were high TB predictor: The use of IPT in new cases of TB has been correlated with a 50 percent decline and the likelihood of TB in non-IPT populations was higher. The widespread usage of IPT will greatly decline and the likelihood occurrence decline and the likelihood, relative to other resource-restricted Tb prevention and control systems.

Masini et al., (2013) did a study on the INH prophylaxis results for children infected with HIV who undergo regular HIV treatment in Kenya. The analysis measured treatment success, follow-up relapse, adverse drug effects, TB disease and mortality rates decline and the likelihood over decline and the likelihood. The retrospective examination definition was implemented. In 606 HIV-infected infants, 556 (91.7%) effectively completed therapy and decline and the likelihood. The strong treatment success, low follow-up failure rate and minimal harmful drug results confirm the importance of delivering IPT to children in HIV clinics.

2.5.2 Effects of IPT on quality of life of children living with HIV

WHO (2016) defines TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100". It is a large term influenced in a nuanced way by the physical wellbeing, psychological condition, personal values , social relationships

and their connection to their environment's salient characteristics of the individual. In order to reduce TB among PLHIVs, IPT is a useful TB prevention technique available.

Kyrychenko *et al.*, (2012) found that HIV exposure raises the likelihood of chronic TB by almost 19-fold as a consequence TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100. TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100

The growing age was associated with a lower risk of TB in children and young adults, while in patients with lower baseline CD4 cell counts the association was much stronger. This result is very perplexing because old age is generally correlated with TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 not be explained (Lawn & Churchyard, 2009).

Concerns over the propensity to exclude active TB when beginning preventive treatment, the enforcement of care, opioid toxicity, and a rise in INH TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 by themselves TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 (Deeks et al., 2013).

A robust IPT-use policy will substantially reduce the TB levels of children infected with HIV and decrease the burden of disease in parallel TB and HIV / AIDS outbreak countries. INH is really inexpensive, quick to handle and usually well received. The expanded use of IPT in conjunction with ART could provide major health benefits for children and communities, and the scale up of HIV treatment in the developed world should be given high priority (Balcells et al., 2006). In Zimbabwe, Midlands Province, Shurugwi District, Makoni et al. (2015) conducted a study on evaluation of IPT program. In order to analyze the inputs, procedures, outputs and effects of the IPT program in paediatric outpatient clinics, the conceptual structure method was used.

To gather data from main informants, an interviewer-administered questionnaire was used among (health care workers and guardians). For the compilation of data from IPT software documents, checklists were used. The findings revealed that in Shurugwi District, sixteen health facilities adopted IPT. Both the facilities had software for TB screening and three did not have algorithms for TB screening. In 2013, the district suffered medicine stockouts. One structured instruction was carried out at district level and on work training in the implementation of health facilities. Shurugwi District checked 6794 children on ART for TB from January 2013 to August 2014. Of the tested, percent) were qualified for children was respectively 0.6 percent (n = 18) and 0.3 percent (n = 8), due to INH toxicity and TB. TB may be avoided by the usage of IPT in millions of children afflicted with both HIV and TB. IPT is an essential tool in HIV-affected populations to deter and mitigate active TB. Avoiding active TB will avoid the contamination of millions of individuals in the population and in health care systems (WHO, 2014).

The effectiveness of a hybrid intervention package has been investigated to facilitate the TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100. The study revealed that TB patients with HIV improved their quality of life through IPT. After IPT, physical exercise later improved.

Durovni et al. (2010) examined the IPT application in HIV clinics: Rio TB / HIV (THRio) experience. TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 the onset of TB in clinical patients with access to HIV treatment. A date has been rander-allocated to twenty-nine public primary HIV clinics for implementation of TB screening protocols and IPT requirement for TB / HIV patients co-infected. The final study of the CRT is planned for 2011. IPT completion was above (87%) for HIV-infected patients undergoing HAART than those who have not yet earned HAART (79%, $P < 0.01$). The quality of living of those patients who completed IPT improved.

Chiegil (2017) conducted a study to assess the QOL HIV Advice and Social Assistance for PLWHA Clinic Attendants at Yola Specialist Hospital, Adamawa County, Nigeria. A descriptive review was carried out. A standardized questionnaire was used to gather data, in which a total of 370 randomly selected PLWHA adults aged 18 years and over attending the clinic at Yola Specialist Hospital participated in this research. The findings reveal that most of the participants were well educated (78.2 percent) regarding simple HIV problems. This was comparable to their rate of counseling and psychological care earned (71.7 percent), self-efficacy experienced (63.8 percent),

commitment to self-identified therapy (80 percent) and quality of life reported by themselves (64.3 percent). This showed that accurate facts, understanding and comprehension of specific HIV and social service problems are very critical for enhancing behavioral skills and growing the degree of trust among PLWHA participants in the success of adherent behaviour, thereby significantly improving the quality of life of PLWHA clinic participants.

2.5.3 Effects of IPT on mortality among Children living with HIV

Tuberculosis is the leading and the most widespread opportunistic virus and origin of the infection mortality in PLHIV. It remains PLHIV's leading source of morbidity. PLHIV accounted for an unprecedented 1.2 million new TB cases globally in 2014; 74% were in Africa. (WHO, 2015). In Kenya, studies on PLHIV TB case findings and IPT have shown that HIV is the strongest risk-factor for TB development in Kenya, with a probability of 20-37 times higher, particularly among children, than among children who don't have HIV. In contrast, more than a quarter of children's deaths were recorded as being induced by TB. The WHO suggested 12 combined TB / HIV activities arising from these twin epidemics as part of core HIV and TB diagnosis, treatment and rehabilitation services. This included measures to minimize TB morbidity and the mortality of HIV-induced infants, such as ART and Three I for HIV / TB: TB ICF, IPT, and TB infection prevention. These methods have been grouped together as guidelines written in Kenya in 2011(WHO, 2016).

A 2008 study on the influence of TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 to TB experienced 66 percent excess

mortality in comparison to unexposed population control children if IPT was not available in the area. The MRR was markedly (although not significantly) reversed in 2000-2004 with a lower mortality in IPT exposed children compared to population control. It was stressed that it is not possible to evaluate results from various time intervals, since the circumstances could have shifted in certain respects that can not be entirely deduced, and the findings may be skewed. In this case, during these two periods, infant mortality has fallen markedly. However, from 2006 to 2008, excess mortality shifted to a pronounced lower mortality pattern in 2000-2004, which can not be linked purely to the decrease in infant mortality, and our statistics show that this is partially due to the advent of IPT.

Between the two sample years, mortality decreased dramatically in the research area TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100. In the absence of IPT, TB exposure at home could have been associated to an excess of 19/1000 individuals a year based on experience from 1996 to 1998.

Increased TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 (WHO, 2010). This will, however, be impossible to understand why mortality among the children who did not obtain IPT also decreased faster than anticipated. This may indicate that all death correlated with TB is not related solely to clinical TB illness, but may be due to other infection experiences. If, as in Bissau, the frequency or seriousness of these other diseases reduces, the mortality associated with TB exposure will also decrease.

In the contacts obtaining IPT, there might be a minor tendency toward better performance, but not important. The key explanation why exposed children were not participating in the IPT system was travel or absence. Therefore, these kids might have had no interaction with the TB situation. Another plausible explanation could be preference preference such that mothers who were more prepared to take care of the community of children receiving 9 months of therapy (although there were no discrepancies in educational status or socioeconomic index) or simply because children at home were not subject to the perceived risks of travel at the time of inclusion.

In Kenya, the first to identify IPT results in routine HIV treatment in Kenya is a research performed on IPT among HIV infected children attending routine HIV care, reflecting a broad population of HIV infected children. A 91.7 percent IPT completion rate and 0.7 percent loss of follow-up rate were recorded, while 0.3 percent of adverse drug reactions (ADR) and deaths were reported. Furthermore, during IPT, 3% of children were diagnosed with TB disorder.

Edessa and Likisa (2015)Conducted research on IPT-related mortality + ART in Addis Abeba, Ethiopia: A Cohort Analysis in the sense of ART Alone among HIV-infected infants. Retrospective longitudinal analyzes were carried out at the Tikur TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 were reported mortality cases among IPT + ART- and ART-only patients.

The IPT plus ART dramatically reduced the probability of mortality in contrast with ART alone (aHR 0.48; 95% CI 0.38-0.69) and was around 26 months median to death (TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 were directly correlated with mortality variables. In comparison, PLHIV handled with IPT plus ART alone was found to have a lower mortality rate and time-to-death delay.

Granich et al., (2010) conducted a research on IPT-related mortality + ART in Addis Abeba, Ethiopia: A Cohort Analysis in the sense of ART Alone among HIV-infected infants. Retrospective longitudinal analyzes were carried out at the TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 were reported mortality cases among IPT + ART- and ART-only patients. The IPT plus ART dramatically reduced the probability of mortality in contrast with ART alone (aHR 0.48; 95% CI 0.38-0.69) and was around 26 months median to death (IQR 19-34). In addition, TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 with mortality variables. In comparison, PLHIV handled with IPT plus ART alone was found to have a lower mortality rate and time-to-death delay.

Danyuttapolchai et al., (2017) conducted a study on implementing an IPT program for PLHIV in Thailand. Since they had well developed HIV and TB care services, seven hospitals were chosen. The paediatric HIV clinic offered TB facilities (i.e. monitoring,

evaluation , and treatment) in such hospitals. A TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 outcomes and not among PLHIV with negative TST outcomes.

2.5.4 Factors associated with TB incidence among children living HIV enrolled into IPT

Impact variables correlated with non-completion of IPT. The efficacy of IPT is decreased by variables correlated with a lower probability of IPT non-completion. In children with HIV infection, global policy on IPT has been ambivalent. In 1998 the WHO and TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100, but the adoption was marginal (Moore et al.,2010).

In Brazil, Brazilian strategies for the care of children afflicted with HIV have become among the most advanced in the world, and the nation stands in a comparatively resource-poor region as a paradigm for the introduction of ART. Brazil supplies an annual 170,000 patients with an ART mix free of charge and operates a comprehensive health and testing infrastructure for accurate prescribing and monitoring of treatment. Brazilian national recommendations on TB and HIV stress the need to undertake TST

in all children and adolescents infected with HIV and to give IPT to those with latent infection, however the implementation of these policies is unclear. (Goudar *et al.*, 2012).

The TB / HIV Rio (THRio) research is a cluster-randomized study to evaluate whether regular screening and treatment of latent TB in children undergoing HIV treatment, including ART, would minimize the occurrence of TB at the clinic level in 29 HIV clinics. Baseline patient reports of pediatric hospitals were examined and the correlation between the history of ART or IPT or both and the risk of active TB during the 2-year period prior to the initiation of the intervention was evaluated in preparation for this trial (Harries *et al.*, 2010).

THRio research showed that, starting in September 2010, the date for starting TB screening protocols and IPTs for co-infected TB / HIV patients was assigned randomly to TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 2010 had been abstracted by a Diagnostic Study in order to provide full knowledge and specific facts about all HIV-infected children enrolled with the 29 testing clinics. Data from specific children's studies was abstracted using customized data collection formats adapted from a long-standing HIV study by the clinical cohort (Dean *et al.*, 2015).

In Sierra Leone, the situation is different. The country is faced with numerous health care challenges such as shortage of regular government paid staff, lack of training facilities, lack of logistics to support the trainings, lack of monitoring and evaluation

systems on IPT administration, Infrastructural challenges to access essential health care services, social stigma and general negative staff attitude.

Despite of these numerous health challenges, the National HIV/AIDS secretariat, global fund and PEPFAR, implementing partner organizations like ICAP have initiated support projects and systems to implement and monitor IPT uptake among PLHIV (Adults and children) in both private and public health facilities. There is a steady rise in children infected with HIV/AIDS through vertical transmission, neglected rape cases or through blood transfusion. TB is the most serious opportunistic infection in children who are HIV-positive of which most children admitted or seen as outpatient cases in ODCH are diagnosed with TB in case there is no IPT therapy. QI approach in health care facilities emphasizes that the right thing is done with the right materials and in the right way to achieve the best possible results. This methodology has been instituted in the leading health facilities to ensure improved uptake of IPT among HIV positive children, besides continuous training of health care workers (WHO, 2016).

Okwara et al., (2017) conducted a study in Nairobi , Kenya, on IPT loss in childhood household interaction with infectious TB TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100. Consent has been obtained. Information on index case treatment, socio-demographics and TB awareness was sought from standardized questionnaires administered. Factors correlated with the occurrence of IPT loss is calculated using inferential statistics (p-value, confidence intervals). Unvariable tests of the index event and household variables correlated with

IPT failures included female ($p = 0.01$), night crowding index > 5 ($p = 0.02$), > 1 household source cases ($p = 0.01$), healthy HIV status ($p = 0.02$), and information regarding the TB / HIV connection ($p = 0.04$), malnutrition / weight loss communication factors ($p = 0.02$), tuberculosis suggestive symptoms associated with IPT failure.

Auld *et al.* (2013) The occurrence of a research and TB-related causes in children initiating antimicrobial therapy – Mozambique, 2004–2008 have been performed. The nationally representative survey A study conducted between 2004-2007 on 79,500 adults (5-14 years) beginning ART conducted a retrospective prospective study to TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 / mL, and 11 percent had TB. During 2004-2007, the share of TB screening documents reported before ARI started increased TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100. IPT was prescribed to 1% of ART enrollees who did not take TB treatment. During Sculpture, TB occurred in 2.32 cases per 100-year-old man. Variables of TB event included 95 percent of ART enforcement (AHR 2.06; 95 percent CI, 1.32–3.21).

The impact of INH on TB in Addis Ababa infected children was investigated. Between January 2008 and December 2010, in Addis Ababa, 489 children infected with HIV and TB were investigated case-control (Sade & Sade, 2013). The prevalence of TB

established after 6-9 months of the cessation of IPT was 17.14 PYO for those who developed TB compared to 10.28 PYO for those who did not. Isoniazid minimized the likelihood of developing TB in babies infected with HIV. Tuberculosis prevalence were key influences linked to TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100; 95% CI1.09, 1.84) and previous experience of tuberculosis (AOR = 1.97; 95% CI1.24, 3.67) of the diseases.

2.6 Theoretical framework and Isoniazid Preventive Therapy

2.6.1 Multi-Construct Theoretical Framework

Using an objective literature analysis by a Durlak and DuPre (2008), a combination of established hypotheses TB free in both groups and contrasted by using the log rank test. The TB predictors were defined by a Cox proportional hazard model. Incidents in the IPT users class were 5,06 per 100 Chadoir et al. (2013) (58) Multi-level system of variables impacting application results , the study adapted a multi-construct theoretical framework with groups variables that influence the acceptability of five major categories : Organizational factors, patient level factors, provider level factors, structural factors and innovation characteristics. Reviewed literature on factors affecting the implementation of IPT from low resource settings guided the items grouped under each category.

A multi-construct theoretical framework of has got five component constructs that can be was developed by Sekhon et al. (2017), known as the theoretical framework for acceptability (TFA). In this sense, the prospective and retrospective acceptability of intervention suppliers and beneficiaries may be measured (Sekhon *et al.*, 2017). The

framework has got five component constructs that can be used to measure acceptability of health interventions (Wambiya, 2018). The factors are patient level factor (Knowledge, motivation, side-effects, patient adherence), Organizational variables (Management, organizational atmosphere and medication distribution), suppliers (experience ,and training) and institutional (home and community physical setting, politics , social climate) characteristics of innovation (facility of delivery, consistency of instructions, difficulty, advantage of creativity, resistance of INH).

For our study, patient level factors and provider level factors were used to measure the acceptability of IPT among the health care providers. These are: socio-economic status of care giver, cultural beliefs and income as patient level factors, poor adherence on IPT, immune status and WHO clinical staging as clinical factors.

2.6.2 Health Belief Model

has got five component constructs that can be as one of the has got five component constructs that can be. HBM is a philosophical construct that is helpful in explaining the actions of a customer in has got five component constructs that can be. It further notes that HBM defines the health actions of an individual as an indication of his confidence in health. According to social scientists, HBM attempts to routinely clarify and anticipate preventive health behaviour, with a specific emphasis on the interaction according to social scientists, HBM attempts to routinely clarify and anticipate preventive health behaviour health facilities (Walker, 2004). According to social scientists, HBM attempts to routinely clarify and anticipate preventive health behaviour and preventive services in the 1950s, the HBM was created specifically for a free and strategically placed tuberculosis screening initiative where few citizens

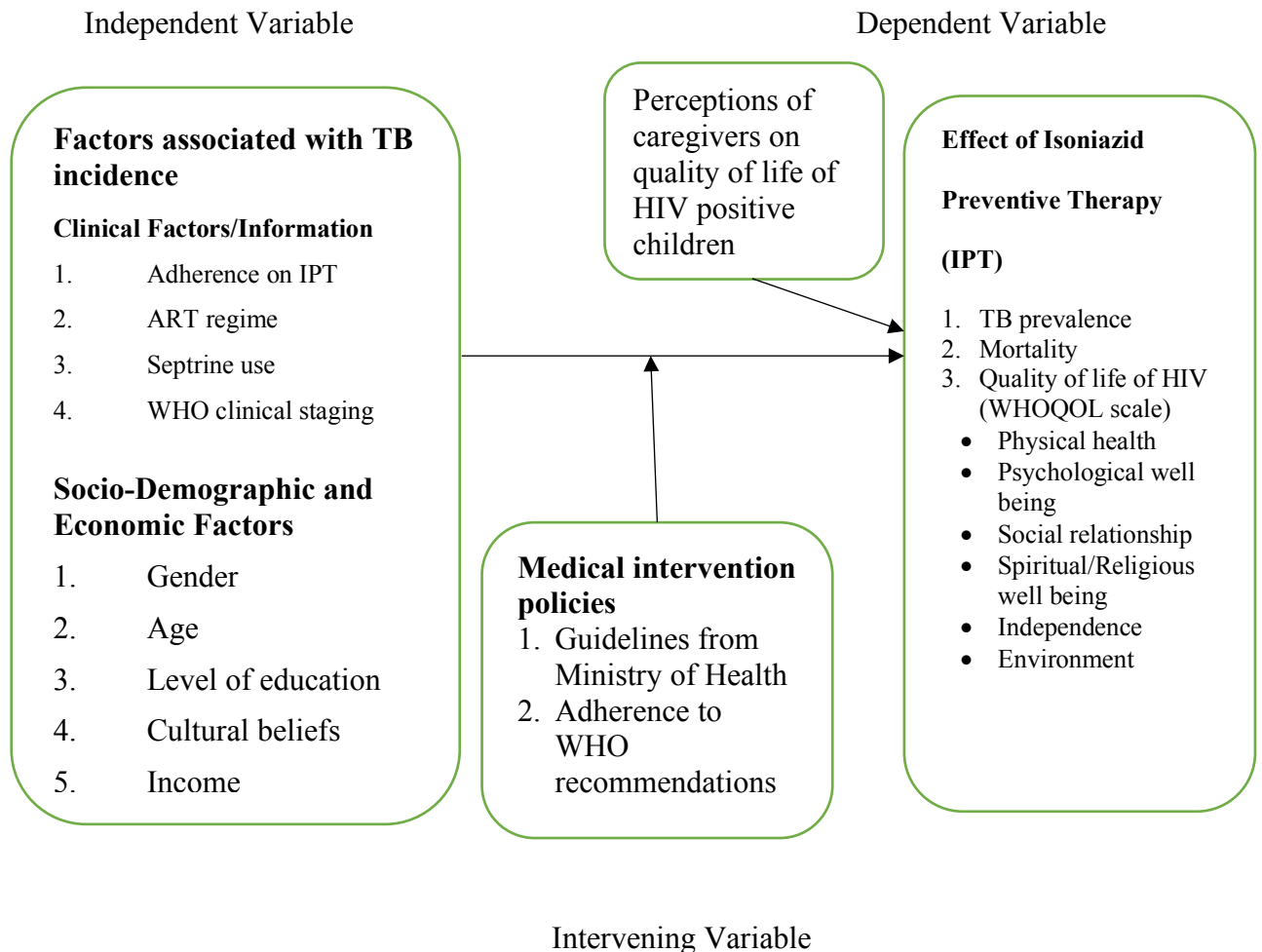
really took advantage of these opportunities. The resulting hypothesis that helped clarify this absence of interest in protective activity was the HBM. It is assumed that if they deem themselves vulnerable to the disease, persons would take steps either to avoid, test for or monitor ill-health problems and feel that the condition will contribute to possible serious consequences. According to the model, the presumed susceptibility of an individual to a illness, expectations of the seriousness of the condition, perceptions of the feasibility and value of the planned intervention would impact the health behavior implemented against the condition of the disease, thus provision of and utilization of IPT is meant to be utilized to reduce the incidences of HIV among the infants and children [target population] in at ODCH, Sierra Leone.

2.7 Conceptual Framework

Figure 2.1 shows the conceptual framework on how various variables interact. Clinical factors/ information was measured using adherence on IPT, ART regime, Septrine use and WHO clinical staging. Socio demographic and economic factors included gender, age, level of education, cultural beliefs and income. Clinical factors and Socio demographic and economic factors are deemed to have effect on the use of IPT.

Figure 2.1:

Conceptual Framework



The administration of IPT is also influenced by the medical intervention policies from Ministry of Health, adherence to WHO recommendations and perceptions of caregivers on quality of life of HIV positive children. IPT administration is expected to have significant effects on TB prevalence, mortality rate and quality of life. Quality of life was measured using WHO Quality of Life (WHOQOL) Scale that comprises of physical health, psychological wellbeing, social relationships, spiritual

wellbeing, independence and environment (physical environment, physical safety, home environment, social care, financial support, transport and leisure care).

Physical environment of the child was measured based on the healthy state of child's physical environment void of pollution, noise and physical harm.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the overall research methodology that was used to carry out the study. This includes the study design, study population, sample size, sampling procedure, data collection methods, research procedures, data management and analysis.

3.2 Research Design

A cross sectional design employing both qualitative and quantitative data collection method. The quantitative approach was focused on amount or quantity calculation, whereas the qualitative method dealt with consistency or form phenomenon. (Kothari, 2004). To decrease the subjectivity of decision, the combination of these methods were used (Kealey & Protheroe, 1996), but it still provides space for the participants ' personal interactions. The qualitative data would help to obtain a more objective environment that can not be experienced through the quantitative study utilized in numerical data and statistical analysis. Cross sectional survey design is appropriate when analyzing data from a population at a specific point in time . Cross-sectional polls have proven effective in measuring a population's behaviors, perceptions, awareness and values in response to a given phenomena. . The design was relevant in evaluating the effect of IPT among HIV-Positive Children in Ola During Children's Hospital-Freetown, Sierra Leone.

3.3 Study area

The study was conducted at Ola During Children's Hospital (ODCH) from June to March 2019. ODCH is a national Paediatric teaching and referral hospital in Sierra Leone located along Fourah Bay road, Western Urban District, Freetown. Sierra Leone is a country in West Africa bordering Liberia and Guinea. The hospital offers both inpatient and outpatient services including HIV and TB treatment to children from birth to 18 years. It has a bed capacity of 210, ten (10) wards, one (1) HIV/TB clinic and 174 caregivers.

3.4 Target Population

The study population was 323 CLHIV who enrolled and completed IPT before February 2018 at ODCH. The target population were CLHIV aged between 6 weeks and 15 years who completed IPT before February 2018 and have been receiving HIV care and treatment at ODCH since May, 2017. Since the study population were less than 18 years, they could not understand the content in the questionnaire and so their caregivers responded to questionnaires. Consent to participate in the study were obtained from the caregivers. There are 174 government paid medical staff in ODCH in addition, to 4 paediatric specialists. The four paediatric specialists participated in key informant interviews (KIIs) in assessment of factors that contribute to TB incidence among HIV positive children.

3.5 Sampling Procedure

3.5.1 Selection

The study included the entire population of CLHIV who completed IPT. The study therefore, covered all the 323 CLHIV who enrolled and completed IPT. A complete

enumeration of 323 CLHIV who enrolled and completed IPT was done as the sample size was small and easy to collect data. Every caregiver answered a questionnaire on behalf of each of the CLHIV who completed IPT before February, 2018 and are on HIV care and treatment.

3.5.2 Selection of paediatric specialists

Total enumeration of all the 4 paediatric specialists in ODCH was conducted. The four paediatric specialists participated in KII's. Qualitative data on IPT among CLHIV was gathered during the KII. The data supplemented the quantitative data collected through the questionnaires filled by caregivers. KII is advantageous as the interviewer may discuss particular points of interest and can contribute to centered and positive ideas.

3.6 Eligibility criteria

3.6.1 Inclusion Criteria

1. Any CLHIV aged between 6 weeks and 15 years who completed IPT before February 2018 and receives HIV care and treatment at ODCH in the past 1 year.
2. Health workers who work at ODCH TB & HIV clinic or provide HIV/AIDS and TB services in the hospital in the past 1 year.
3. Informed consent from care givers and health care workers

3.6.2 Exclusion criteria

1. Lack of consent from the caregiver
2. Children who completed IPT but defaulted ART during the study period

3.7 Instrumentation

Data collection was done using structured questionnaire and a KII guide. Questionnaires were suitable for research since they obtained knowledge that was not immediately measurable and asked regarding emotions, motives, behaviors and successes as well as person perceptions. Data for objective one; to determine the incidence of TB among CLHIV who completed IPT at ODCH, Sierra Leone and objective two, to assess the perceptions of caregivers on the quality of life of HIV positive children who completed IPT at ODCH, Sierra Leone were collected using a structured questionnaire. For objective three, to determine the mortality among CLHIV who completed IPT at ODCH, Sierra Leone, ART and appointment registers checklist were used to extract data records for each of the HIV children who initiated and completed IPT. Finally, objective four, to identify factors contributing to TB incidence among CLHIV who completed IPT at ODCH, Sierra Leone, KII with the paediatric specialists was employed.

3.8 Methods of Data Collection

Data was collected in the month of February and March 2019. An introduction letter from the Sierra Leone Institutional Review Board (IRB) was obtained to carry out the human subject study. Questionnaires were accompanied with a letter of introduction which assured the respondents on the level confidentiality. The researcher and the assistant researchers introduced themselves to respondents in data collection and recording. Semi structured questionnaires were availed to the care givers who filled the questionnaire in the presence of both care giver and the child. The same procedure was repeated to all other care givers and children in the study population. Health

information for each child were extracted from ART and appointment registers and appointment cards. KII sessions were held with the hospital paediatric specialists at to identify factors contributing to TB incidence among HIV positive children who completed IPT.

Prior to data collection in ODCH, pilot data collection test was conducted in Aberdeen Women's hospital with a sample size of 12 study participants to ascertain the clarity, comprehensiveness, flow, validity and understanding of the questionnaire by the study participants. A pilot study undertook 10% of the sample size.

3.9 Methods of Data Analysis

3.9.1 Quantitative data analysis

Field editing of data was done on daily basis to check for accuracy and completeness. With support from ODCH's monitoring and evaluation team, Data was entered by trained data entry clerks. The entered data was cleaned and exported to Statistical Package of Social Science (SPSS) version 25 for analysis. Descriptive statistics including frequency, percentages and mean was employed during data analysis. Odds ratios were used to assess for associations between each independent variable and the dependent or outcome variables (TB incidence, mortality and quality of life). Multivariable logistic regression analysis was performed to determine factors significantly associated with TB incidence, mortality and quality of life among HIV positive children who have completed IPT. The 95% confidence interval of the odds ratios and the *P-value* of <0.05 was used to assess for statistical significance

General Multinomial Equation

$$P(Y_i=m) = \frac{\exp(Z_{Mi})}{\sum_{k=0}^M \exp(Z_{Ki})} \dots\dots\dots ($$

3.1)

The specific model was as follows;

$$\begin{aligned}
 P(Y_i = TB \text{ Incidence}) & \\
 &= \beta_0 + \beta_1 \text{Clinical Factors} + \beta_2 \text{Social factors} \\
 &+ \beta_3 \text{Health System Factors} + \varepsilon \dots\dots\dots (3.2)
 \end{aligned}$$

Where;

β_0 =Constant

β_1, \dots, β_3 = Beta coefficients of the independent variables

ε =Error term.

3.9.2 Qualitative data analysis

Key informant interview data collected from pediatric specialists was transcribed, summarized into themes and analyzed using latent content analysis. These findings were triangulated with the quantitative findings.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter outlines analysis, presentation and interpretation of the findings resulting from this study which aimed at evaluating the effect of Isoniazid Preventive Therapy (IPT): A cross sectional design of CLHIV in Ola During Children's Hospital (ODCH), Sierra Leone.

4.2 Response Rate

The study had 100% response rate based on the sampled population of 323 CLHIV in Ola During Children's Hospital (ODCH), Sierra Leone. (Mugenda and Mugenda, 2003) posited that a response rate of 50% is adequate, 60% and above is good, and above 70% very good. Thus, a response rate of 100%, cognizant of the sensitive nature of the study, is adequate.

4.3 Demographic Information

The section presents demographic information of children under IPT treatment. It is important to analyze children demographic information in relation to TB prevalence. The results are presented in Table 4.1.

Table 4.1

Gender and Socio-demographic of children cross tabulation

		n	[%]	Chi Square (λ)	P-value
Age Bracket	less than 20 years	3	[0.9]	10.851	0.028
	Between 21-30 years	84	[26.0]		
	Between 31-40 years	169	[52.3]		
	Between 41-50 years	60	[18.6]		
	More than 50 years	7	[2.2]		
Gender of the respondents	Male	95	[29.4]	.440	.396
	Female	228	[70.6]		
Relationship to the child/children	Biological mother	228	[70.6]	.440	.396
	Biological father	95	[29.4]		
Child's in school	Yes	282	[87.3]	.497	.369
	No	41	[12.7]		
Child's level of Education	Nursery	56	[17.3]	7.999 ^a	.046
	Primary	159	[49.2]		
	Junior Secondary school	68	[21.1]		
	Senior Secondary school	40	[12.4]		
Religion	Christians	46	[14.2]	.280	.429
	Muslim	277	[85.8]		
WHO HIV stage	Stage One	46	[14.2]	2.389 ^a	0.303
	Stage Two	176	[54.5]		
	Stage Three	101	[31.3]		
occupation of the care giver	Civil servant	10	[3.1]	.500	0.779
	Self employed	258	[79.9]		
	Unemployed	55	[17.0]		

Table 4.1 presents the demographic information of the respondents and it is evident that slightly more than half [169, 52.3%] were aged between 31-40 year while those more than 40 years were mere [67, 20.8%]. It was noted that female respondents comprised the majority at 228 [70.6%] and happened to be biological mothers of the children being treated at the facility. There appears to be a slight excess of males over females for AIDS in children overall, and a small excess of females over males for perinatal transmission. The study determined that the children brought at the facility were in school [282, 87.3%] and majority of the children were in primary schools [159, 49.2%] while [68, 21.1%] were in junior secondary schools as presented in Table 4.1. Assessing the religious affiliation of the respondents, the study determined that majority of children were Muslims at [277, 85.8%] while the rest 14.2% were Christians. Cross tabulation results showed that age of a child had a statistically significant association with TB incidence ($\lambda=10.851$, $p=0.028$). Child's level of education also had a statistically significant association with TB incidence ($\lambda=7.999$, $p=0.046$). Relationship to the child/children, child's in school, religion, WHO HIV stage and occupation of the care giver were not statistically significant with TB incidence.

4.4 Clinical factors

This section presents the clinical factors at Ola Daring Children Hospital. Presentation of clinical information is essential in the administration of IPT treatment and management of TB prevalence. The results are presented in Table 4.2.

Table 4.2***Clinical information***

Clinical information		Frequency	[%]	Correlation with age
Weight of the child	Less than 5 kg	9	[2.8]	r=0.093,p=0.095
	Between 5-10 kgs	66	[20.4]	
	Between 11-20 kg	200	[61.9]	
	Between 21-30 kgs	48	[14.9]	
WHO HIV stage	Stage One	46	[14.2]	r=-0.027,p=0.063
	Stage Two	176	[54.5]	
	Stage Three	101	[31.3]	
ART regime	AZT	10	[3.1]	r=0.098,p=0.082
	3TC	184	[57.7]	
	NVP	45	[14.1]	
	AZT+3TC +NVP	80	[25.1]	
Septrine use	Yes	273	84.5	r=0.062,p=0.265
	No	50	15.5	

Table 4.2 shows the clinical information retrieved from the Ola During Health Facility.

It was established that majority of the children at the facility weighed between 11-20 kg [200, 61.9%] while 20.4% weighed between 5-10 kgs while those who weighed more than 21 kgs were 48[14.9%]. The admission of ART has to go hand in hand with weight of the child. The dose for care should be dependent on the weight of the infant. Switch the dosage if the weight of the baby varies. However, the study contracts that Newell et al., (2013) that weight was not significantly correlated with the key consequences of HIV infection status at birth. According to Okwara et al., (2017) the relative risk for patients with low body weight is reported to be increased 2-5 times.

On the WHO HIV stage, most of the children were in second stage [176, 54.5%] while a third [101, 31.3%] were in the third stage. The probability of HIV positive children in WHO HIV stage 2 experiencing high mortality and poor quality of life with respect to HIV positive children in WHO HIV stage 1 is higher. The results however are not

in line with Edessa and Likisa (2015) who conducted a study on mortality correlated with IPT plus ART relative to ART In Addis Ababa, Ethiopia and WHO stage IV, HIV-infected children alone are a factor closely associated with mortality. PLHIV treated with IPT plus ART was shown to have a lower risk of mortality and delayed time-to-death compared with patients. .

Regarding ART regime, Most of the children were in 3TC drugs regime [184, 57.7%] compared to 80[25.1%] with three drugs ART regime and all of the facilities used Septrine as presented in Table 4.2. The protective impact of ART on the risk of TB has been documented in children before. ART decreases M susceptibility. Tuberculosis, by improving immunity and allowing TB infection to be more easily controlled. In those receiving IPT and ART, CLHIV observed a TB risk reduction of 76 percent compared with those receiving none. The effect of INH on the management of latent diseases and the avoidance of disease development is a potential reason for this additional advantage. In the study environment, the degree of IPT provision and efficacy in reducing TB was promising. In addition to Painting, scaling up and improving IPT programs will have a beneficial impact on growing the TB burden for children in areas with a large TB / HIV burden (WHO, 2016).

Correlation relation also showed that Septrin use had no significant association with age. Observational studies suggest Septrin may prevent TB, but this is not confirmed by randomized evidence. According to Crook, *et al.* (2016), In children with maintenance triple nucleoside reverse transcriptase inhibitor (NRTI) ART relative to normal non-NRTI + 2NRTI, a higher TB incidence was separately correlated with

younger age (<3 years), female sex, lower pre-ART weight-for - age Z-score, and current CD4 percent; less TB diagnoses were found.

4.5 Socio-economic factors of the Healthcare Providers

This section presents the socio-economic factors of healthcare providers at Ola During Children Hospital. Presentation of socio-economic factors of healthcare providers is important in the administration of IPT treatment and management of TB prevalence. The results are presented in Table 4.3.

Table 4.3

Descriptive results for occupation of the care giver and average income per month

		Frequency	[%]	(λ)	P-value
Socio-economic factors					
Occupation of the care giver	Civil servant	10	[3.1]		
	Self employed	258	[79.9]		
	Unemployed	55	[17.0]		
Average income per month in Leones	less than 15 USD	11	[3.4]	6.92	.546
	between 15-30 USD	121	[37.5]		
	between 31-45 USD	131	[40.6]		
	between 46-60 USD	60	[18.5]		

As presented in the Table 4.3, the majority of the caregivers were self-employed [258, 79.9%] while unemployed caregivers comprised 55[17%]. Further, on caregivers' average monthly income, the study found that 131[40.6%] earned between 31-45 USD while 121[37.5%] earned between 15-30 USD and this was reflection of their occupation. The income earned by the caregivers was not significant [$\chi^2=6.92$, $p>0.05$] to the occupation of the caregiver as presented in the Table 4.3. The amount of income is perceived to be the most relevant measure of the component of the substance or

class, whereas the level of work and schooling is more directly linked to the component of the status. The results agree with Stronks *et al.*, (2015) results that in terms of the interrelationship between job status , income and wellbeing, a comparatively strong correlation between income and health may be viewed to a large degree. More precisely, that is primarily attributed to the concentration of lower age classes among long-term impaired people.

4.6 Socio-cultural factors

This section presents the socio-cultural factors at Ola During Children Hospital. Presentation of socio-cultural factors is important in the administration of IPT treatment and management of TB prevalence. The results are presented in Table 4.4.

Table 4.4

Curability of TB and perception of TB as curse

Socio-cultural factors		Frequency	[%]	χ^2	P value
Think TB is curable	Yes	281	[87.0]	176.84	0.001
	No	42	[13.0]		
Respondent think TB is a curse	Yes	52	[16.1]	148.48	0.001
	No	271	[83.9]		

Table 4.4 presents the socio-cultural factors on the TB and it was noted that most of the caregivers thought that TB was curable [281, 87%] [$\chi^2=176.84$, $p<0.05$] and that TB was not a curse [271, 83.9%] [$\chi^2=148.48$, $p<0.05$].

4.7 Incidence of TB among CLHIV

This section highlights the incidence of TB among CLHIV at Ola During Children Hospital. The results are presented in Table 4.5.

Table 4.5***Assessing Incidence of TB among CLHIV post completion of IPT***

		N[%]	x²	P value
The child been diagnosed with TB since February 2018	Yes	10 [3.1]	284.238	0.001
	No	313 [96.9]		
child on treatment	Yes	10 [3.1]	284.238	0.001
	No	313 [96.9]		

When evaluating of TB incidence in HIV-positive children, it was evident that majority [313, 96.9%, $x^2=284.24$, $p<0.05$] of the children were not diagnosed with TB since February. Further, most of these children were not under treatment [313, 96.9%, $x^2=284.24$, $p<0.05$] a situation that was attributed to Septrine use.

4.8 Effect of IPT on mortality rate among CLHIV

This section presents effect of IPT on mortality rate among CLHIV at Ola During Children Hospital. The results are presented in Table 4.6.

Table 4.6***Effect of IPT on mortality rate among CLHIV***

	n	%
Total number of children who completed IPT from August 2017 to January 2018	323	94.2
Total number of children who completed IPT and developed TB	10	2.9
Total Number of children who developed TB post IPT and were initiated on anti TB treatment	9	2.6
Total number of children who completed IPT, developed TB and died	1	0.3

Table 4.6 presents the effect of IPT on mortality rate among CLHIV and it was established that a total of 323 children who completed IPT from August 2017 to January 2018 and 10 of those who completed IPT and developed TB and were put

under IPT. Further nine (9) developed TB post IPT and were initiated on anti TB treatment and one (1) developed TB and died and this is a clear indication that the use of IPT was effective.

4.9 Perceptions of care givers Quality of life of CLHIV

This section provides the responses on the various sections i.e. on physical, psychological, level of independence, social relationships, environment and spiritual/religion quality on the perceptions of care givers Quality of life of CLHIV.

4.9.1 WHO total scores of Quality of Life

The study established the quality of life of HIV-positive children receiving IPT treatment. According to WHO Quality of Life table, the higher the transformed scores, the higher the quality of life. In this study, four scale was used to interpret the results that is, 0-20=Very poor, 21-40-Poor, 41-60-Fair, 61-80-Good and 81-100 excellent. The results of on quality of life score are presented in Table 4.7.

Table 4.7

Quality of life Scores

Domain	Raw score	Transformed score (0-100)	Comment
Physical Health	24	63/100	Good
Psychological Health	18	50/100	Fair
Level of Independence	10	56/100	Fair
Social Relationships	9	50/100	Fair
Environment	25	56/100	Fair
Spirituality, Religion	15	38/100	Poor

Regarding physical health of CLHIV receiving IPT treatment as shown in Table 4.7, the quality of life improved as shown by transformed score 63/100 which was

interpreted as good. The physical health improved later after IPT. The results are in agreement with Howard, *et al.* (2017) who conducted a study to assess the efficacy of a hybrid intervention kit in Ethiopia to increase the initiation, adherence and completion of IPT among people living with HIV and noticed that IPT increased the quality of life of HIV patients with TB.

Under Psychological Health as a measure of quality of life of CLHIV receiving IPT, the transformed score was 50/100 interpreted as fair. The results are in line with Tadesse *et al.*, (2016) who conducted a study on the uptake of IPT among under-five children: TB Contact Investigation as an Entry Point and found that IPT lead to improved psychological wellbeing among CLHIV who completed IPT. For level of independence as measure of quality of life, the transformed score was 56/100 interpreted as fair.

Further social relationships as another measure of quality of life had transformed score of 50/100 interpreted as fair. Social reinforcement is very critical for developing interpersonal skills and growing PLHIV's degree of trust in the success of adherent actions, thus dramatically improving the quality of life of PLHIV clinic participants. The results agree with Chiegil (2017) who conducted a study in Specialist Hospital Yola, Adamawa State, Nigeria to determine the QOL of HIV Counselling and Social Help among PLHIV Clinic Attendees. A descriptive analysis was performed and showed that social reinforcement is very critical for developing behavioral skills and growing the degree of trust among IPT treatment treated CLHIVs. Environment as a measure of quality of life had transformed score of 56/100 interpreted as fair while

spirituality and religion had transformed score of 38/100 that was very low and was interpreted as poor quality of life.

4.9.2 Physical Quality of life

A Likert scale of 1- Not at all, 2- A little, 3- A moderate amount, 4- Very much and 5- An extreme amount was used. The frequency, percentage and the Chi square were computed and presented in the Table 4.8.

Table 4.8

Physical Quality of life

	Not at all	A little	moderate amount	Very much	An extreme amount	χ^2	value
<u><i>Pain & discomfort</i></u>							
Do you worry about the child's pain or discomfort?	[14,4.3%]	[30,9.3%]	[145,44.9%]	[119,36.8%]	[15,4.6%]	242.12	0.001
How difficult is it for you to handle any pain or discomfort in this child?	[10,3.1%]	[35,10.8%]	[160,49.5%]	[105,32.5%]	[13,4%]	267.07	0.001
<u><i>Energy & fatigue</i></u>							
Does the child easily get tired?	[3,0.9%]	[35,10.9%]	[169,52.5%]	[104,32.3%]	[11,3.4%]	310.48	0.001
How much are you bothered by the child's fatigue?	[4,1.2%]	[27,8.4%]	[159,49.2%]	[115,35.6%]	[18,5.6%]	289.61	0.001
<u><i>Sleep & rest</i></u>							
Does the child have any	[148,45.8%]	[154, 47.7%]	[21,6.5%]	[0,0%]	[0,0%]		

difficulties with sleeping?							104.81	0.001
How much do any sleep problems in the child worry you?	[139,43%]	[15,48.6%]	[25,7.7%]	[2,0.6%]	[0,0%]		229.31	0.001
<u>HIV symptoms</u>								
How much are you bothered by any unpleasant physical problems related to the child's HIV infection?	[132,40.9%]	[165,51.1%]	[25,7.7%]	[1, 0.3%]	[0,0%]		237.68	0.001

Table 4.8 presents the perceptions of QoL on the physical aspect. Most of the caregivers were worried to moderate extent on their child's pain or discomfort (145, 44.9%). The chi square statistic indicates statistically significant relationship between worrying about the child's pain or discomfort [$\chi^2=242.12$, $p<0.05$] and quality of life. Most of the caregivers had moderate in difficult in handling any pain or discomfort in this child (160, 49.5%). The chi square statistic indicates statistically significant relationship between difficult in handling any pain or discomfort in this child [$\chi^2=267.07$, $p<0.05$] and quality of life.

Majority of the caregivers indicated moderate extent regarding whether the child easily get tired (169, 52.5%). The chi square statistic indicates statistically significant relationship between a child easily getting tired [$\chi^2=310.48$, $p<0.05$] and quality of life. However, it was noted that 0.9% children were not bothered by the child getting tired

implying that the children were fairing on well. Further, caregivers were bothered by the child's fatigue to moderate extent (159, 49.2%). However, it was noted that 1.2% children were not bothered by the child's fatigue implying that the children were fairing on well. The chi square statistic indicates statistically significant relationship between a child getting fatigue [$\chi^2=289.61$, $p<0.05$] and quality of life.

Regarding the child has any difficulties with sleeping, (154, 47.7%) of caregivers indicated that the children had little difficulties with sleeping. The chi square statistic indicates statistically significant relationship between difficulties with sleeping [$\chi^2=104.81$, $p<0.05$] and quality of life. None of the caregivers (0.0%) indicated that the child had any extreme cases of difficulties in sleeping. Most caregivers indicated sleep problems in the child worry them a little (157, 48.6%). However, none of the caregivers (0.0%) indicated that the child had any extreme cases of sleep problems. The chi square statistic indicated statistically significant relationship between sleep problems [$\chi^2=229.31$, $p<0.05$] and quality of life. Majority of caregivers indicated that they were bothered by any unpleasant physical problems related to the child's HIV infection to a little extent [165, 51.1%]. The chi square statistic indicates statistically significant relationship between physical problems related to the child's HIV infection [$\chi^2=237.68$, $p<0.05$] and quality of life. However, very few caregivers (0.3%) noted that children were bothered by any extreme unpleasant physical problems related to the child's HIV infection implying the IPT was functioning properly by improving quality life of the children.

4.9.3 Psychological factors to Quality Of Life

A Likert scale of 1- Not at all, 2- A little, 3- A moderate amount, 4- Very much and 5- An extreme amount was used. The count, percentage and the chi square were computed and presented in the Table 4.9 on the psychological factors to quality of life.

Table 4.9

Psychological factors to Quality Of Life

	Not at all	A little	A moderate amount	Very much	An extreme amount	χ^2	P value
<u>Positive feeling</u> Does the child experience positive feelings in his/her life?	[35,10.8%]	[74,22.9%]	[165,51.1%]	[44,13.6%]	[5,1.5%]	232.52	0.001
<u>Cognitive performance</u> Is the child able to concentrate well?	[38,11.8%]	[79,24.5%]	[161,49.8%]	[40,12.4%]	[5,1.5%]	222.37	0.001
<u>Self-body image & appearance</u> To what extent are you bothered by fears of this child developing any physical problem?	[0, 0%]	[10,3.1%]	[174,53.9%]	[125,38.7%]	[14,4.3%]	249.09	0.001

Results in Table 4.9 showed that children experienced positive feelings to moderate extent (165, 51.1%). The chi square statistic indicates statistically significant relationship between child experiencing positive feelings in his/her life [$\chi^2=237.68$, $p<0.05$] and quality of life. Most caregivers indicated that children were able to concentrate well to moderate extent (16, 49.8%). The chi square statistic indicated statistically significant relationship between child being able to concentrate well [$\chi^2=222.37$, $p<0.05$] and quality of life. Results further indicated that most caregivers were bothered by fears of children developing any physical problem to moderate extent (174, 53.9%). The chi square statistic indicates statistically significant relationship between getting bothered by fears of this child developing any physical problem [$\chi^2=249.09$, $p<0.05$] and quality of life.

4.9.4 Level of Independence in Quality of Life

This section presents the level of independence on the QoL and the same Likert scale of 1- Not at all, 2- A little, 3- A moderate amount, 4- Very much and 5- An extreme amount was used. The count, percentage and the Chi square were computed and presented in the Table below.

Table 4.10

Level of Independence Quality of Life

	Not at all	A little	A moderate amount	Very much	Extreme amount	χ^2	P value
<u><i>Mobility and Daily life activities</i></u> To what extent does the child have difficulty in performing routine activities?	[38,11.8%]	[201,62.2%]	[82,25.4%]	[2,0.6%]	[0,0%]	278.52	.000
<u><i>Dependence on treatment</i></u> How much does the child need any medical treatment to function in daily life?	[7,2.2%]	[110,34.1%]	[201,62.5%]	[4,1.2%]	[0,0%]	332.96	.000
<u><i>Working ability</i></u> Is the child able to do his daily activities?	[1,0.3%]	[83,25.7%]	[231,71.5%]	[7,2.2%]	[1,0.3%]	210.45	0.001

Table 4.10 presents the responses on the level of independence of the children in relation to their quality of life. From the responses, the caregivers indicated that child have difficulty in performing routine activities to a little extent (20, 62.2%). The chi square statistic indicates statistically significant relationship between mobility and daily life activities [$\chi^2=278.52$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) noted that children had any extreme difficulty in performing routine activities implying the IPT was functioning properly by improving quality life of the children. Majority of caregivers indicated that the child needs any medical treatment

to function in daily life (20, 62.5%) to a moderate extent. The chi square statistic indicates statistically significant relationship between dependence on treatment [$\chi^2=332.96$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) noted that children required extreme medical treatment to function in daily life implying the IPT was functioning properly by improving quality life of the children. Most caregivers indicated the child is able to do his daily activities to moderate extent (231, 71.5%). The chi square statistic indicates statistically significant relationship between working ability [$\chi^2=210.45$, $p<0.05$] and quality of life. However, very few caregivers 2.5% (2.2%+0.3%) noted that children required were able to do their daily activities implying the IPT could not be functioning properly.

4.9.5 Social Relationships to Quality Of Life

The fourth aspect of QoL assess was socio relationships and Likert scale of 1- Not at all, 2- Slightly, 3- A moderately, 4- Very much and 5- An extremely was used. The responses are presented in the Table 4.11.

Table 4.11

Social Relationships Quality Of Life

	Not at all	Slightly	Moderately	Very much	Extremely	χ^2	P value
<u>Personal relationship</u>							
<u>Social support.</u>							
Does the child have personal and social relationship with other children	[0, 0%]	[68,21.1%]	[166,51.4%]	[80,24.8%]	[9,2.80%]	155.77	.000
<u>Sexual activity</u>	[0,0%]	[36,11.1%]	[127,39.3%]	[144,44.6%]	[16,5.00%]		

Are you bothered by the child's future sex life?						152.75	.000
	Never	Seldom	Quite often	Very often	Always		
<i>Social inclusion</i> How often do you feel the child is discriminated against because of his/her health condition?							
	[42,13%]	[115,35.6%]	[140,43.3%]	[26,8%]	[0, 0%]	113.71	.000

Table 4.11 presents the responses on the social relationships of the children in relation to their quality of life. From the responses, most caregivers indicated children have personal and social relationship with other children to a moderate extent (166, 51.4%). The chi square statistic indicates statistically significant relationship between personal relationship social support [$\chi^2=155.77$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) noted that children had no personal and social relationship with other children implying that the IPT was functioning properly by improving quality life of the children. Most of caregivers indicated that they are bothered by the child's future sex life (144, 44.6%) to a very much extent. The chi square statistic indicates statistically significant relationship between sexual activity [$\chi^2=152.75$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) reported not to be bothered by the child's future sex life implying child sexuality matters a lot to the caregivers. Most caregivers indicated that they often feel the child is discriminated against because of his/her health condition (140, 43.3%). The chi square statistic indicates statistically significant relationship between social inclusion [$\chi^2=113.71$, $p<0.05$] and quality of

life. However, none of caregivers (0.0%) felt that the child was being discriminated to very extreme cases implying that social inclusion because of child health condition existed but not to very extreme cases.

4.9.6 Environment Quality Of Life

The fifth aspect of QoL assess importance of environment and Likert scale of 1- Not at all, 2- Slightly, 3- A moderately, 4- Very much and 5- An extremely was used.

The responses are presented in the Table 4.12.

Table 4.12

Impact of environment to Quality of Life

	Not at all	A little	A moderate amount	Very much	An extreme amount	χ^2	P value
<u><i>Physical safety</i></u> How important to you is the child's physical safety and security?	[0,0%]	[6,1.9%]	[82,25.4%]	[199,61.6%]	[36,11.1%]	267.18	0.001
<u><i>Home environment</i></u> Is the child living in a safe and secure environment?	[0,0%]	[22,6.8%]	[130,40.2%]	[151,46.7%]	[20,6.2%]	179.60	.000
<u><i>Financial resources</i></u> Do you have financial difficulties to support the child?	[0,0%]	[26,8%]	[131,41.5%]	[143,44.3%]	[20,6.2%]	165.92	.000
<u><i>Health /social care</i></u> To what extent does the child feel accepted by his/her community?	[0,0%]	[26,8%]	[132,40.9%]	[148, 45.8%]	[17,5.3%]	175.98	.000
<u><i>Leisure opportunities</i></u> Does the child have opportunity for leisure activities?	[0,0%]	[19,5.9%]	[100,31%]	[173, 53.6%]	[31,9.6%]	188.24	.000
<u><i>Physical environment</i></u> How healthy is the child's physical environment?	[0,0%]	[17,5.3%]	[127,39.3%]	[156,48.3%]	[23,7.1%]	153.61	.000
<u><i>Transport</i></u> Does the child have difficulties with	[0,0%]	[16,8%]	[111,34.4%]	[157,48.6%]	[29,9%]		

Table 4.12 presents the perceptions of QoL on the environmental. Majority of the caregivers indicated that child's physical safety and security was very much important (199, 61.6%). The chi square statistic indicates statistically significant relationship between physical safety [$\chi^2=267.18$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated that child's physical safety and security was not important at implying that child's physical safety and security was critical in enhancing children quality of life. Most of the caregivers indicated that children live in a safe and secure environment (151, 46.7%). The chi square statistic indicates statistically significant relationship between home environment [$\chi^2=179.60$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated that none of the child was living in unsafe and insecure environment implying that safe and secure environment was critical in enhancing children quality of life.

Most of the caregivers indicated that they have financial difficulties to support the child (143, 44.3%). The chi square statistic indicates statistically significant relationship between financial resources [$\chi^2=310.48$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated that to have no financial difficulties at all implying financial difficulties is a problem among children under IPT in Ola During Hospital. Caregivers indicated that the child moderately feel accepted by the community (148, 45.8%). The chi square statistic indicates statistically significant relationship between health/social care [$\chi^2=175.98$, $p<0.05$] and quality of life.

However, none of caregivers (0.0%) indicated that their children not be no felt not accepted by the community.

Further, majority of caregivers indicated that their children have opportunity for leisure activities (173, 53.6%). The chi square statistic indicates statistically significant relationship between leisure opportunities [$\chi^2=188.24$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated some children did not have opportunity for leisure activities implying leisure activities is significantly important among children under IPT in Ola During Hospital. Most caregivers indicated that child's physical environment is healthy (156, 48.3%). The chi square statistic indicates statistically significant relationship between physical environment [$\chi^2=153.61$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated that the child's physical environment was unsafe at all implying child's physical environment is significantly important among children under IPT in Ola During Hospital. Most of caregivers indicated that the children had difficulties with transportation services that restrict the child's life (157, 48.6%). The chi square statistic indicates statistically significant relationship between transport [$\chi^2=107.61$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated that the child had difficulties with transportation services that restrict the child's life.

4.9.7 Spirituality, Religion on Quality Of Life

The last aspect of QoL assess was Spirituality, Religion and Likert scale of 1- Not important, 2-A little important, 3-Moderately important, 4-Very important and 5- Extremely important was used. The responses are presented in the Table 4.13.

Table 4.13

Spirituality, Religion to Quality of Life

	Not importa nt	A little important	Very important	Extremely important	χ^2	P value
<u><i>Spirituality religion, personal beliefs</i></u> How Are spirituality, religion and personal beliefs important to the child?	[2,0.6%]	[31,9.6%]	[100,31%]	[156,48.3%]	[34,10.5%]	241.35 0.001
<u><i>Forgiveness and blame</i></u> How important is forgiveness to the child?	[0,0%]	[8,2.5%]	[83,25.7%]	[192,59.4%]	[40,12.4%]	239.44 0.001
<u><i>Concerns about the future</i></u> Is the future of this child important to you?	[0,0%]	[3,0.9%]	[36,11.1%]	[219,67.8%]	[65,20.1%]	339.42 0.001
<u><i>Death and dying</i></u> Are thoughts about death and dying of this child important to you?	[0,0%]	[10,3.1%]	[77,23.8%]	[187,57.9%]	[49,15.2%]	214.44 0.001

Table 4.13 presents the perceptions of QoL on spirituality and religion. Most of the caregivers indicated that spirituality, religion and personal beliefs are important to the child (156, 48.3%). The chi square statistic indicates statistically significant relationship between spirituality religion, personal beliefs [$\chi^2=241.35$, $p<0.05$] and quality of life. However, few of caregivers (2.6%) indicated that spirituality, religion and personal beliefs were not important to the children under IPT in Ola During Hospital. Majority of the caregivers indicated is forgiveness important to the child

(192, 59.4%). The chi square statistic indicates statistically significant relationship between forgiveness and blame [$\chi^2=239.44$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated that forgiveness to the child was not important implying that forgiveness was significantly important in enhancing quality of life among children under IPT in Ola During Hospital.

Majority of the caregivers indicated that the future of the child important to them (65, 20.1%). The chi square statistic indicates statistically significant relationship between concerns about the future [$\chi^2=339.42$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated the future of the child was not important implying that future of the child was significantly important in enhancing quality of life among children under IPT in Ola During Hospital. Further, majority of the caregivers indicated that thoughts about death and dying of this child important to them (187, 57.9%). The chi square statistic indicates statistically significant relationship between dying [$\chi^2=214.44$, $p<0.05$] and quality of life. However, none of caregivers (0.0%) indicated the caregivers indicated that the thoughts about death and dying of this child were not important to them implying that Death and dying of the child was significantly important to the caregivers at Ola During Hospital.

4.10 Multinomial Logistic Regression Equation

Multinomial Logistic Regression explains the relationship between the dependent variable and the independent variable when their values are obtained with rating scales. A multinomial logistic regression was performed to model the relationship between the predictors and Effect of Isoniazid Preventive Therapy (IPT) in three outcomes (TB prevalence, mortality and quality of life of HIV positive children). In the first instance,

a multinomial logistic regression was generated with quality of life as reference variables. The traditional 5% (.05) criterion of statistical significance was employed for all tests. The study will only interpret results that are significant $p < 0.05$. The results of the study are presented in Table 4.15 and Table 4.16.

4.10.1 Quality of life as a reference category

Male CLHIV under IPT treatment compared to females are more likely to experience TB prevalence and poor quality of life (OR=1.662, $p < 0.05$). Gender is a strong social health determinant that interacts with other variables such as age, family composition, wages, schooling, social support, and with a number of behavioral factors. Gender variations in TB prevalence and HIV / AIDS depend on the trends of propagation of the disease, as well as the outbreak level. Sometimes, women are influenced by TB differently than males. In fact, in women of reproductive age, TB develops faster than in men in that age group. Growing research also indicates that TB has consequences for the reproductive health of women, including correlations with infertility, premature risk, obstetric morbidity, and low birth weight. They are created by age and sex by differential exposure and differential susceptibility. This, in essence, are the result of a broad variety of biological, behavioral and social variables that differ from male to female, since they contribute to positions and activities unique to gender. Understanding gender disparities may have significant theoretical consequences , particularly for better delineation of differential disease vulnerability, and many functional implications for targeting children's TB prevalence and HIV / AIDS control strategies. According to Horton et al., (2016) In low and middle-income countries , the incidence of TB among men is substantially higher than among women, with clear

indications that men in certain settings are disadvantaged in finding and/or receiving TB treatment. Further, Semu et al., (2017) on effectiveness of isoniazid preventive therapy in minimizing the occurrence of active tuberculosis among HIV / AIDS sufferers at public health facilities in Addis Ababa , Ethiopia noted that gender, is risk factors for TB incidence.

Table 4.15

Quality of life as a reference category

Isoniazid Preventive Therapy (IPT)	B	Std. Error	Wald	Sig.	Exp(B)=Odds ratios
TB prevalence Intercept	2.372	2.247	1.114	0.291	
			0.021		
[Age= less than 20 years]	0.253	1.728	*	0.884	1.287
[Age= Between 21-30 years]	-0.088	1.037	0.007	0.933	0.916
[Age= Between 31-40 years]	-0.136	0.998	0.019	0.891	0.873
[Age= Between 41-50 years]	-0.186	1.028	0.033	0.856	0.83
[Age= More than 50 years]	0b	.	.	.	.
[Gender=Male]	-0.413	1.272	0.106	0.045*	1.662
[Gender=Female]	0b	.	.	.	.
[Relationship to the child= Biological mother]	0.217	1.285	0.028	0.866	1.242
[Relationship to the child= Biological father]	0b	.	.	.	.
[Education= Nursery]	-1.027	0.549	3.492	0.062	0.358
[Education= Primary]	-0.723	0.47	2.373	0.123	0.485
[Education= Junior Secondary school]	-0.822	0.544	2.277	0.131	0.44
[Education= Senior Secondary school]	0b	.	.	.	.
[Religion= Christians]	-0.088	0.425	0.042	0.837	0.916
[Religion= Muslim]	0b	.	.	.	.
[Weight= Less than 5 kg]	-2.604	1.206	4.665	0.031*	1.074
[Weight= Between 5-10 kgs]	-1.014	0.532	3.631	0.057	0.363

[Weight= Between 11-20 kg]	-0.814	0.455	3.194	0.074	0.443
[Weight= Between 21-30 kgs]	0b	.	.	.	.
[WHO HIV stage= Stage One]	0.044	0.331	0.017	0.895	1.045
[WHO HIV stage= Stage Two]	-0.226	0.444	0.26	0.012*	2.798
[WHO HIV stage= Stage Three]	0b	.	.	.	.
[ART regime= AZT]	-1.551	0.947	2.685	0.101	0.212
[ART regime= 3TC]	0.127	0.361	0.123	0.726	1.135
[ART regime= NVP]	0.445	0.539	0.683	0.029*	2.561
[ART regime= AZT+3TC+NVP]	0b	.	.	.	.
[Septrine use=Yes]	-0.164	0.376	0.19	0.043*	0.849
[Septrine use=No]	0b	.	.	.	.
[occupation of the care giver= Civil servant]	0.673	1.006	0.447	0.504	1.959
[occupation of the care giver = Self-employed]	0.05	0.389	0.017	0.897	1.052
[occupation of the care giver = Unemployed]	0b	.	.	.	.
[Income= less than 10000]	-0.629	1.456	0.187	0.666	0.533
[Income= between 10001-20000]	-0.6	1.314	0.208	0.648	0.549
[Income= between 20001-30000]	-0.688	1.313	0.274	0.601	0.503
[Income= between 30001-40000]	-0.43	1.338	0.103	0.748	0.651
[Income= More than 40000]	0b	.	.	.	.
[Think TB is Curable=Yes]	0.175	0.439	0.158	0.691	1.191
[Think TB is Curable =No]	0b	.	.	.	.
[Respondent think TB is a curse=Yes]	-0.269	0.403	0.445	0.505	0.764
[Respondent think TB is a curse=No]	0b	.	.	.	.
[child on treatment=Yes]	-0.21	0.493	0.181	0.027*	0.811
[child on treatment =No]	0b	.	.	.	.
			56.53		
Mortality Intercept	-16.279	2.165	9	0	
		3586.1			
[Age= less than 20 years]	-17.456	38	0	0.036*	2.623
[Age= Between 21-30 years]	0.489	1.123	0.189	0.663	1.63

[Age= Between 31-40 years]	-0.56	1.098	0.26	0.61	0.571
[Age= Between 41-50 years]	-0.731	1.132	0.417	0.519	0.482
[Age= More than 50 years]	0b	.	.	.	.
[Gender=Male]	-0.249	1.563	0.025	0.874	0.78
[Gender=Female]	0b	.	.	.	.
[Relationship to the child= Biological mother]	0.715	1.572	0.206	0.65	2.043
[Relationship to the child= Biological father]	0b	.	.	.	.
[Education= Nursery]	-0.629	0.61	1.062	0.643	0.533
[Education= Primary]	-0.363	0.538	0.455	0.5	0.695
[Education= Junior Secondary school]	0.131	0.599	0.048	0.827	1.14
[Education= Senior Secondary school]	0b	.	.	.	.
[Religion= Christians]	-0.027	0.451	0.004	0.952	0.973
[Religion= Muslim]	0b	.	.	.	.
[Weight= Less than 5 kg]	-1.176	0.57	4.257	0.039*	2.308
[Weight= Between 5-10 kgs]	-1.366	0.907	2.268	0.132	0.255
[Weight= Between 11-20 kg]	-0.78	0.492	2.512	0.113	0.458
[Weight= Between 21-30 kgs]	0b	.	.	.	.
[WHO HIV stage= Stage One]	-0.43	0.503	0.731	0.043*	1.65
[WHO HIV stage= Stage Two]	0.397	0.357	1.232	0.267	1.487
[WHO HIV stage= Stage Three]	0b	.	.	.	.
		2030.8			
[ART regime= AZT]	-18.084	94	0	0.023*	1.401
[ART regime= 3TC]	-0.082	0.389	0.044	0.834	0.922
[ART regime= NVP]	0.746	0.544	1.88	0.17	2.109
[ART regime= AZT+3TC+NVP]	0b	.	.	.	.
[Septrine use=Yes]	0.765	0.481	2.531	0.012*	0.149
[Septrine use=No]	0b	.	.	.	.
[occupation of the care giver= Civil servant]	1.686	1.116	2.282	0.131	5.398
[occupation of the care giver = Self-employed]	0.185	0.424	0.19	0.663	1.203
[occupation of the care giver = Unemployed]	0b	.	.	.	.

			144.1		
[Income= less than 10000]	14.573	1.214	35	0.000*	1.213
[Income= between 10001-20000]	16.395	0.455	043	0.000*	0.152
[Income= between 20001-30000]	16.46	0.446	719	0.000*	0.141
[Income= between 30001-40000]	16.56	0	.	.	0.106
[Income= More than 40000]	0b	.	.	.	.
[Think TB is Curable=Yes]	0.16	0.461	0.12	0.729	1.173
[Think TB is Curable =No]	0b	.	.	.	.
[Respondent think TB is a curse=Yes]	0.115	0.414	0.077	0.781	1.122
[Respondent think TB is a curse=No]	0b	.	.	.	.
			0.013		
[child on treatment=Yes]	-0.495	0.507	*	0.329	0.61
[child on treatment =No]	0b	.	.	.	.

a) The reference category is: Quality of life.

b) This parameter is set to zero because it is redundant.

c) Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

Age of CLHIV was statistically significant in relation to IPT treatment. HIV positive children aged less than 12 weeks compared to CLHIV aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old are more likely to experience higher mortality and poor quality of life (OR=1.287, $p < 0.05$). The probability of CLHIV aged less than 12 weeks experiencing mortality and poor quality of life with respect to children aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old was 1.287 times higher. Further, CLHIV aged less than 12 weeks compared to CLHIV aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old are more

likely to experience higher mortality and poor quality of life (OR=2.623, $p<0.05$). The probability of CLHIV aged less than 12 weeks experiencing mortality and poor quality of life with respect to children aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old was 2.623 times higher. Increasing age in children and young adults was correlated with a decreased risk of TB, although the correlation was slightly higher in patients with lower baseline CD4 cell counts. As older age is typically linked with a higher risk of TB infection and sickness, this finding is rather perplexing.

Interaction with older age, lower CD4 cell counts and a background of prior TB has been observed, however the lower risk of incident TB with growing age in this study can not be clarified (Lawn & Churchyard, 2009). Isoniazid preventive therapy (IPT) successfully reduces tuberculosis (TB) in immunocompetent children < 5 years of age, however amid several trials and recommendations, its usage of HIV infected children remains problematic (Frigati et al., 2013). However, IPT is likely to be ineffective in preventing infection from contacts of multiple drug resistant (MDR) TB cases (WHO, 2015). The results are in line with Frigati et al., (2011) who conducted a study on the impact of IPT and ART on TB in CLHIV in a high tuberculosis incidence setting and found that IPT offers additional child safety on ART has crucial public health consequences, as this provides a potential mechanism for minimizing CLHIV TB. However, extensive usage of this technique would demand that children be tested for active TB disease.

CLHIV under IPT treatment with less than 5kg of weight compared to CLHIV of weight between 5-10 kgs, between 11-20 kg and between 21-30 kgs are more likely to experience TP prevalence and poor quality of life (OR=1.074, $p<0.05$). The probability

of CVLHIV weighing less than 5kg of weight experiencing higher TP prevalence and poor quality of life with respect to CLHIV weighing 5-10 kgs, 11-20 kg and 21-30 kg was 1.074 times higher. Further, CLHIV under IPT treatment with less than 5kg of weight compared to CLHIV of weight between 5-10 kgs, between 11-20 kg and between 21-30 kgs are more likely to experience higher mortality and poor quality of life (OR=2.308, $p=0.039<0.05$).

The probability of CLHIV weighing less than 5kg of weight experiencing higher mortality and poor quality of life with respect to CLHIV weighing 5-10 kgs, 11-20 kg and 21-30 kg was 2.308 times higher. The admission of ART has to go hand in hand with weight of the child. The dose for care should be dependent on the weight of the infant. Whenever the child's weight increases, switch the dosage. However, the study contracts that Newell, Borja and Peckham (2013) that weight was not associated significantly with the main effects of HIV infection status at birth. According to Okwara et al., (2017), the relative risk for patients with low body weight is reported to be increased 2-5 times.

It was also established that WHO HIV stage 2 was statistically significant in relation to IPT treatment (OR=2.798, $p=0.012<0.05$). CLHIV under IPT treatment in WHO HIV stage 2 compared to HIV positive children in WHO HIV stage 1 are more likely to experience TB prevalence and poor quality of life (OR=2.798, $p<0.05$). The probability of CLHIV in WHO HIV stage 2 experiencing high TB prevalence and poor quality of life with respect to CLHIV in WHO HIV stage 1 was 2.798 times higher. In HIV-negative individuals and populations, and in HIV-infected individuals,

the efficacy of IPT for preventing TB has been well known. In countries with high and low HIV incidence, WHO suggests the usage of IPT in PLHIV (WHO, 2014).

Further, CLHIV under IPT treatment in WHO HIV stage 2 compared to CLHIV in WHO HIV stage 1 are more likely to experience higher mortality and poor quality of life (OR=1.65, $p<0.05$). The probability of CLHIV in WHO HIV stage 2 experiencing high mortality and poor quality of life with respect to CLHIV in WHO HIV stage 1 was 1.65 times higher. The results are in line with Edessa and Likisa (2015) who conducted a study IPT plus ART mortality compared with ART alone among CLHIV in Addis Ababa, Ethiopia and WHO stage IV is a factor strongly associated with mortality. PLHIV treated with IPT plus ART was shown to have a lower risk of mortality and delayed death than ART alone patients. Furthermore, Ethiopia indicated that the WHO baseline of the disease process (AIDS) is a risk factor in terms of the efficacy of IPT in reducing the occurrence of active TB in people living with HIV / AIDS in public health facilities in Addis Ababa.

ART Regime NPV was statistically significant in relation to IPT treatment. CLHIV under IPT treatment in ART Regime NPV compared to HIV positive children under 3CT and ACT regime are more likely to experience TB prevalence and poor quality of life (OR=2.561, $p<0.05$). The probability of CLHIV in ART Regime NPV experiencing TB prevalence and poor quality of life with respect to CLHIV in 3CT and ACT regimes was 2.561 times higher. The protective impact of ART on the risk of TB in children was previously stated. ART decreases M tuberculosis vulnerability by improving immunity and making containment of tuberculosis more effective. HIV-infected children showed a 76 percent reduction in TB risk in IPT and ART infected

children in contrast with the infected children. One potential reason for this increased advantage is the impact of INH on latent infection treatment and avoiding disease development.

Further, CLHIV under IPT treatment in ART Regime NPV compared to CLHIV under 3CT and ACT regime are more likely to experience higher mortality and poor quality of life (OR=1.401, $p<0.05$). The probability of CLHIV in ART Regime NPV experiencing higher mortality and poor quality of life with respect to CLHIV in 3CT and ACT regimes was 1.401 times higher. In young children, TB disease typically reflects the development of primary infection instead of reactivation of latent infection, so the process of additional impact of IPT on children with ART, as it happened during our research, was found to be successful for reducing TB occurrence, separately and under program conditions. The degree of IPT supply and productivity in reducing TB in the sample was promising. Scaling up and reinforcing IPT programs in addition to ART will help reduce the TB strain of children in elevated TB / HIV situations (WHO, 2016).

Seprine use was statistically significant in relation to ITP treatment. CLHIV under Seprine use compared to HIV positive children not under Seprine use are less likely to experience TP prevalence and poor quality of life (OR=0.849, $p<0.05$). The probability of CLHIV using Seprine experiencing TB prevalence and poor quality of life with respect to CLHIV not under Seprine use was 0.849 times lower. Further, CLHIV under Seprine use compared to CLHIV not under Seprine use are less likely to experience higher mortality and poor quality of life (OR=0.149, $p<0.05$). The

probability of CLHIV using Septrine experiencing high mortality and poor quality of life with respect to CLHIV not under Septrine use was 0.149 times lower.

Level of income was statistically significant in relation to ITP treatment. HIV positive children from lower income level background compared to CLHIV from higher level income background more likely to experience higher mortality and poor quality of life (OR=1.213, $p<0.05$). The probability of CLHIV from lower income level background experiencing higher mortality and poor quality of life with respect to CLHIV from higher level income background was 1.213 times higher. Most CLHIVs remain undiagnosed in low- and middle-income countries. The HIV demand for children in high-income countries has almost vanished, as new HIV infections among children have been removed virtually. The motivation for businesses to create formulations for children has declined as children living with HIV are less viable commercial opportunities in low- and middle-income countries. Reduced household income combined with increased other household expenses can lead families affected by HIV to poverty that has negative diet, health status, schooling and emotional support consequences for children . The results are in line with Turkova, Chappell, Judd, Goodall, Welch, Foster and Gibb (2015) that HIV-infected children in a high-income country with low tuberculosis prevalence. The results also agree with Briggs, Emerson, Modi, Taylor and Date (2015) that although little research shows that IPT has reduced PLHIV mortality, there is ample evidence that IPT has reduced the prevalence of TB in low-income communities.

Child on treatment was statistically significant in relation to IPT treatment. HIV positive children on treatment compared to CLHIV not in treatment are less likely to

experience TB prevalence and poor quality of life (OR=0.811, $p<0.05$). The probability of CLHIV on treatment experiencing TB prevalence and poor quality of life with respect to CLHIV not in treatment was 0.811 times lower. Further, CLHIV on treatment compared to CLHIV not in treatment are less likely to experience higher mortality and poor quality of life (OR=0.61, $p<0.05$). The probability of CLHIV on treatment experiencing higher mortality and poor quality of life with respect to CLHIV not in treatment was 0.61 times lower.

4.10.2 TB prevalence as a reference category

Age of CLHIV was statistically significant in relation to IPT treatment. CLHIV aged less than 12 weeks compared to CLHIV aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old are more likely to experience higher mortality and TB prevalence (OR=2.038, $p<0.05$). The probability of CLHIV aged less than 12 weeks experiencing mortality and TB prevalence with respect to children aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old was 2.038 times higher. According to Edessa and Likisa (2015) on a summary of IPT plus ART mortality in Addis Ababa relative to ART alone among HIV-infected people, Ethiopia noted that IPT plus ART substantially reduced the risk of death. Further, CLHIV aged less than 12 weeks compared to CLHIV aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old are more likely to TB prevalence and poor quality of life (OR=2.777, $p<0.05$).

The probability of CLHIV aged less than 12 weeks experiencing higher TB prevalence and poor quality of life with respect to children aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old was 2.777 times higher. The results are in line

with Sade and Sade (2013) who conducted a study to assess the impact of INH in the incidence of TB among CLHIV in Addis Ababa and established that Isoniazid reduced the chance of developing TB among CLHIV and that age of the patient is a factor associated with TB incidence.

Table 4.16:

TB prevalence as a reference category

Isoniazid Preventive Therapy (IPT)	B	Std. Error	Wald	Sig.	Exp(B)=Odds Ratio
Mortality Intercept	-18.651	2.014	85.78 6	0.000	
[Age= less than 20 years]	-17.709	3586.138	0	*	2.038
[Age= Between 21-30 years]	0.576	1.034	0.311	0.577	1.779
[Age= Between 31-40 years]	-0.423	1.011	0.175	0.675	0.655
[Age= Between 41-50 years]	-0.545	1.046	0.271	0.603	0.58
[Age= More than 50 years]	0c	.	.	.	.
[Gender=Male]	0.165	1.488	0.012	0.912	1.179
[Gender=Female]	0c	.	.	.	.
[Relationship to the child= Biological mother]	0.498	1.497	0.111	0.74	1.645
[Relationship to the child= Biological father]	0c	.	.	.	.
[Education= Nursery]	0.398	0.562	0.502	0.499	1.489
[Education= Primary]	0.36	0.477	0.571	0.45	1.434
[Education= Junior Secondary school]	0.953	0.549	3.012	0.083	2.592
[Education= Senior Secondary school]	0c	.	.	.	.
[Religion= Christians]	0.06	0.437	0.019	0.89	1.062
[Religion= Muslim]	0c	.	.	.	.
[Weight= Less than 5 kg]	1.238	1.243	0.991	*	3.447
[Weight= Between 5-10 kgs]	-0.162	0.504	0.104	0.747	0.85

[Weight= Between 11-20 kg]	0.034	0.413	0.007	0.935	1.034
[Weight= Between 21-30 kgs]	0c	.	.	.	.
[WHO HIV stage= Stage One]	-0.204	0.492	0.172	0.019	0.815
[WHO HIV stage= Stage Two]	0.353	0.344	1.052	0.005	1.423
[WHO HIV stage= Stage Three]	0c	.	.	.	.
[ART regime= AZT]	-16.533	2030.894	0.000	0.044	1.6607
[ART regime= 3TC]	-0.208	0.379	0.302	0.583	0.812
[ART regime= NVP]	0.301	0.515	0.341	0.583	0.351
[ART regime= AZT+3TC +NVP]	0c	.	.	.	.
[Septrine use=Yes]	0.929	0.468	3.94	*	0.532
[Septrine use=No]	0c	.	.	.	.
[occupation of the care giver= Civil servant]	1.013	0.95	1.138	0.286	2.755
[occupation of the care giver = Self-employed]	0.134	0.411	0.107	0.744	1.144
[occupation of the care giver = Unemployed]	0c	.	.	.	.
[Income= less than 10000]	15.202	1.192	162.5	0.000	4001808
[Income= between 10001-20000]	16.995	0.431	1556.	0.000	24024377
[Income= between 20001-30000]	17.147	0.419	1675.	0.000	27987068
[Income= between 30001-40000]	16.99	0	.	.	23906571
[Income= More than 40000]	0c	.	.	.	.
[Think TB is Curable=Yes]	-0.015	0.464	0.001	0.975	0.985
[Think TB is Curable =No]	0c	.	.	.	.
[Respondent think TB is a curse=Yes]	0.384	0.425	0.816	0.366	1.468
[Respondent think TB is a curse=No]	0c	.	.	.	.
[child on treatment=Yes]	-0.285	0.484	0.347	0.05*	0.752
[child on treatment =No]	0c	.	.	.	.

Quality of life							
Intercept		-2.372	2.247	1.114	0.291		
						0.034	
[Age= less than 20 years]		-0.253	1.728	0.021	*		2.777
[Age= Between 21-30 years]		0.088	1.037	0.007	0.933		1.092
[Age= Between 31-40 years]		0.136	0.998	0.019	0.891		1.146
[Age= Between 41-50 years]		0.186	1.028	0.033	0.856		1.205
[Age= More than 50 years]		0c	.	.	.		.
[Gender=Male]		0.413	1.272	0.106	0.745		1.512
[Gender=Female]		0c	.	.	.		.
[Relationship to the child= Biological mother]		-0.217	1.285	0.028	0.866		0.805
[Relationship to the child= Biological father]		0c	.	.	.		.
[Education= Nursery]		1.027	0.549	3.492	0.062		2.792
[Education= Primary]		0.723	0.47	2.373	0.123		2.062
[Education= Junior Secondary school]		0.822	0.544	2.277	0.131		2.274
[Education= Senior Secondary school]		0c	.	.	.		.
[Religion= Christians]		0.088	0.425	0.042	0.837		1.091
[Religion= Muslim]		0c	.	.	.		.
[Weight= Less than 5 kg]		2.604	1.206	4.665	*	0.031	13.516
[Weight= Between 5-10 kgs]		1.014	0.532	3.631	0.057		2.756
[Weight= Between 11-20 kg]		0.814	0.455	3.194	0.074		2.256
[Weight= Between 21-30 kgs]		0c	.	.	.		.
[WHO HIV stage= Stage One]		0.226	0.444	0.26	*	0.027	0.254
[WHO HIV stage= Stage Two]		-0.044	0.331	0.017	0.895		0.957
[WHO HIV stage= Stage Three]		0c	.	.	.		.
						0.001	
[ART regime= AZT]		1.551	0.947	2.685	*		4.717
						0.026	
[ART regime= 3TC]		-0.127	0.361	0.123	*		0.881
[ART regime= NVP]		-0.445	0.539	0.683	0.409		0.641

[ART regime= AZT+3TC+NVP]	0c	.	.	.	.
[Septrine use=Yes]	0.164	0.376	0.19	0.043	0.178
[Septrine use=No]	0c	.	.	.	.
[occupation of the care giver= Civil servant]	-0.673	1.006	0.447	0.504	0.51
[occupation of the care giver = Self-employed]	-0.05	0.389	0.017	0.897	0.951
[occupation of the care giver = Unemployed]	0c	.	.	.	.
[Income= less than 10000]	0.629	1.456	0.187	0.666	1.876
[Income= between 10001-20000]	0.6	1.314	0.208	0.648	1.822
[Income= between 20001-30000]	0.688	1.313	0.274	0.601	1.989
[Income= between 30001-40000]	0.43	1.338	0.103	0.748	1.537
[Income= More than 40000]	0c	.	.	.	.
[Think TB is Curable=Yes]	-0.175	0.439	0.158	0.691	0.84
[Think TB is Curable =No]	0c	.	.	.	.
[Respondent think TB is a curse=Yes]	0.269	0.403	0.445	0.505	1.308
[Respondent think TB is a curse=No]	0c	.	.	.	.
[child on treatment=Yes]	0.21	0.493	0.181	0.046	0.233
[child on treatment =No]	0c	.	.	.	.

- a) The type of comparison is: prevalence of TB.
b) Floating point overflow happened when the numbers were being calculated. Therefore, its importance is set to device lacking.
c) The parameter is set to zero since the parameter is redundant.

CLHIV under IPT treatment with less than 5kg of weight compared to CLHIV of weight between 5-10 kgs, between 11-20 kg and between 21-30 kgs are more likely to experience higher mortality and TB prevalence (OR=3.447, p<0.05). The

probability of CLHIV weighing less than 5kg of weight experiencing higher mortality and TB prevalence with respect to CLHIV weighing 5-10 kgs, 11-20 kg and 21-30 kg was 3.447 times higher. Further, CLHIV under IPT treatment with less than 5kg of weight compared to CLHIV of weight between 5-10 kgs, between 11-20 kg and between 21-30 kgs are more likely to experience TB prevalence and poor quality of life (OR=13.516, $p=0.031<0.05$). The probability of CLHIV weighing less than 5kg of weight experiencing TB prevalence and poor quality of life with respect to HIV positive children weighing 5-10 kgs, 11-20 kg and 21-30 kg was 13.516 times higher.

WHO HIV stage 2 was statistically significant in relation to IPT treatment (OR=1.423, $p=0.043<0.05$). CLHIV under IPT treatment in WHO HIV stage 2 compared to CLHIV in WHO HIV stage 1 are more likely to higher mortality and TB prevalence (OR=1.423, $p<0.05$). The probability of CLHIV in WHO HIV stage 2 experiencing higher mortality and TB prevalence with respect to CLHIV in WHO HIV stage 1 was 1.423 times higher. Further, HIV positive children under IPT treatment in WHO HIV stage 1 compared to CLHIV in WHO HIV stage 2 are less likely to experience TB prevalence and poor quality of life (OR=0.254, $p<0.05$). The probability of CLHIV in WHO HIV stage 1 experiencing high TB prevalence and poor quality of life with respect to CLHIV in WHO HIV stage 2 was 0.254 times lower.

ART Regime NPV was statistically significant in relation to IPT treatment. CLHIV under IPT treatment in ART Regime NPV compared to CLHIV under 3CT, ACT and ACT regime are more likely to experience higher mortality and TB prevalence (OR=1.6607, $p<0.05$). The probability of CLHIV in ART Regime NPV experiencing high mortality and TB prevalence with respect to CLHIV in 3CT, ACT and ACT

regimes was 1.6607 times higher. Further, CLHIV under IPT treatment in ART Regime NPV compared to CLHIV under 3CT, ACT and ACT regime are more likely to experience high TB prevalence and poor quality of life (OR=4.717, $p<0.05$). The probability of CLHIV in ART Regime NPV experiencing high TB prevalence and poor quality of life with respect to CLHIV in 3CT, ACT and ACT regimes was 4.717 times higher.

Seprine use was statistically significant in relation to IPT treatment. HIV positive children under Seprine use compared to CLHIV not under Seprine use are less likely to experience high mortality and TB prevalence (OR=0.532, $p<0.05$). The probability of CLHIV using Seprine experiencing high mortality and TB prevalence with respect to CLHIV not under Seprine use was 0.532 times lower. Further, CLHIV under Seprine use compared to CLHIV not under Seprine use are less likely to experience high TB prevalence and poor quality of life (OR=0.178, $p<0.05$). The probability of HIV positive children using Seprine experiencing high TB prevalence and poor quality of life with respect to CLHIV not under Seprine use was 0.178 times lower.

Level of income was statistically significant in relation to IPT treatment CLHIV from lower income level background compared to CLHIV from higher level income background more likely to experience higher mortality and poor quality of life (OR=1.213, $p<0.05$). The probability of CLHIV from lower income level background experiencing higher mortality and poor quality of life with respect to HIV positive children from higher level income background was 1.213 times higher. In low- and middle-income economies, the prevalence of childhood TB rises. Furthermore, in low- and middle-income countries, high new HIV infections occur in children. According

to Parkes-Ratanshi *et al.* (2011) who undertook an analysis in low and middle income countries to examine and sum up the main components of HIV prevention and care facilities noted that CLHIV in low income countries have high TB prevalence rates with low access to Isoniazid Preventive Therapy.

Child on treatment was statistically significant in relation to IPT treatment. CLHIV on treatment compared to CLHIV not in treatment are less likely to experience high mortality and TB prevalence (OR=0.752, $p<0.05$). The probability of HIV positive children on treatment experiencing high mortality and TB prevalence with respect to CLHIV not in treatment was 0.752 times lower. In 2014, an estimated 1.2 million new TB cases worldwide were among PLHIV; 74% were in Africa (WHO, 2015). In Kenya, an analysis of TB case findings and PLHIV IPT in public health centers through the National TB Program has shown that HIV is the highest risk factor for developing TB with a likelihood ratio of between 20 and 37 times that of infants. Furthermore, more than a fifth of fatalities of children were reported to be liable for TB.

Further, CLHIV on treatment compared to CLHIV not in treatment are less likely to experience high TB prevalence and poor quality of life (OR=0.233, $p<0.05$). The probability of CLHIV on treatment experiencing TB prevalence and poor quality of life with respect to CLHIV not in treatment was 0.233 times lower.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides discussion of the findings, summary, conclusions, recommendations and areas of further studies. The aim of the study was effect of Isoniazid Preventive Therapy (IPT): A total enumeration of CLHIV in Ola During Children's Hospital (ODCH), Sierra Leone.

5.2 Summary and Discussions

The general objective of this study was to evaluate the effect of IPT among CLHIV in Ola During Children's Hospital-Freetown, Sierra Leone. The specific objectives were to determine the effect of Isoniazid Preventive Therapy on TB incidence among CLHIV who completed IPT before February 2018 at ODCH, to assess the perceptions of caregivers on quality of life of CLHIV who completed IPT at ODCH, to determine effect of Isoniazid Preventive Therapy on mortality rate in CLHIV who completed IPT before February 2018 at ODCH and to identify factors contributing to TB incidence among CLHIV who completed IPT before February 2018 at ODCH.

The following research questions were answered in the study what is the effect of IPT on incidence of TB among CLHIV who completed IPT before February 2018 at ODCH? What are the perceptions of caregivers on the effect of IPT to quality of life of CLHIV who completed IPT before February 2018 at ODCH? What is the effect of IPT on mortality rate among CLHIV who completed IPT before February 2018 at ODCH? What are the factors contributing to TB incidence among CLHIV who completed IPT before February 2018 at ODCH?

Cross sectional survey design was adopted in the study where data was collected using self-administered semi structured questionnaires and Key informant interviews with the paediatric specialists. Consent letter and Ethical Review letter was sought from Sierra Leone Institutional Review Board before undertaking actual data collection. Data analysis was conducted using descriptive statistics that include frequencies and percentages. Multivariable logistic regression analysis was performed to determine factors significantly associated with TB incidence, mortality and quality of life among CLHIV who have completed IPT. Key informant interview data collected from pediatric specialists was transcribed, summarized into themes and analyzed using latent content analysis.

It was noted that female respondents comprised the majority at 228 [70.6%] and were biological mothers to the children on care and treatment at the facility. The study determined that the children brought at the facility were in school [282, 87.3%] and majority of the children were in primary schools [159, 49.2%] while 68[21.1%] were in junior secondary schools as presented.

It was established that majority of the children at the facility weighed between 11-20 kg[200, 61.9%] while 20.4% weighed between 5-10 kgs while those who weighed more than 21 kgs were 48[14.9%]. On the WHO HIV staging, most of the children were in stage II [176, 54.5%] while a third [101, 31.3%] were in the third stage. Most of the children were on 3TC drugs regime [184, 57.7%] compared to 80[25.1%] with three drugs ART regime and all of the facilities used Septrin as presented.

5.2.1 Incidences and prevalence of tuberculosis before the IPT in CLHIV

Assessing on the Incidence of TB among CLHIV, it was evident that majority [313, 96.9%, $x^2=284.24$, $p<0.05$] of the children were not diagnosed with TB since February and further most of these children were not under treatment [313, 96.9%, $x^2=284.24$, $p<0.05$] and this was attributed to Septrine use. Further, HIV positive children aged less than 12 weeks compared to HIV positive children aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old are more likely to TB prevalence and poor quality of life (OR=2.777, $p<0.05$). The probability of CLHIV aged less than 12 weeks TB prevalence and poor quality of life with respect to children aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old was 2.777 times higher. The results are in line with Sade and Sade (2013) who conducted a study to assess the impact of INH in the incidence of TB among CLHIV in Addis Ababa and established that IPT reduced the chance of developing TB among CLHIV and that age of the patient is a factor associated with tuberculosis incidence.

Tuberculosis is a leading cause of CLHIV disease and death. About nine million new cases of TB are identified worldwide per year and 13 percent are co-infected with HIV (Ayalaw *et al.*, 2015). The WHO reports that the HIV prevalence in children with TB varies from 10 to 60 per cent in countries with low to high prevalence (WHO, 2016). The mechanisms promoting susceptibility of people with HIV to TB disease are incompletely understood, being likely caused by multifactorial processes (Ebonyi, *et al.*, 2016).

5.2.2 Perceptions of care givers Quality of life of CLHIV

Under physical health of CLHIV receiving Isoniazid Preventive Therapy (IPT) treatment, the quality of life improved to transformed score 63/100 interpreted as good. The physical health improved later after IPT. Under Psychological Health as a measure of quality of life of CLHIV receiving IPT, the transformed score was 50/100 interpreted as fair. For level of independence as measure of quality of life, the transformed score was 56/100 interpreted as fair.

Further Social Relationships had transformed score of 50/100 interpreted as fair. Social reinforcement is really necessary to develop the communication skills and raise PLWHA 's confidence to conform, while greatly increasing PLWHA's quality of life. Environment had transformed score of 56/100 while spirituality and religion had transformed score of 38/100. According to WHO Quality of Life table, the higher the transformed scores, the higher the quality of life.

5.2.3 Mortality among CLHIV who completed IPT at ODCH, Sierra Leone

Mortality rate among CLHIV and it was established that a total of 323 children who completed IPT from August 2017 to January 2018 and 10 of those who completed IPT and developed TB and were put under IPT. Further nine (9) developed TB post IPT and were initiated on anti TB treatment and one (1) developed TB and died and this is a clear indication that the use of IPT was effective.

CLHIV aged less than 12 weeks compared to CLHIV aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old are more likely to experience higher mortality and poor quality of life (OR=1.287, $p<0.05$). The probability of CLHIV aged

less than 12 weeks experiencing mortality and poor quality of life with respect to children aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old was 1.287 times higher. Further, CLHIV aged less than 12 weeks compared to CLHIV aged 1-4 years old, 5-8 years old, 9-13 years old and more than 13 years old are more likely to experience higher mortality and poor quality of life (OR=2.623, $p<0.05$).

Important improvement in minimizing morbidity and mortality among people living with HIV / AIDS has been made worldwide. Adults and children in diverse environments have shown the effects of ART and IPT to inhibit TB (Abossie & Yohanes, 2017). The leading and most common opportunistic infection and cause of PLHIV mortality is tuberculosis. It is a leading cause of PLHIV morbidity. A reported 1.2 million new cases of TB in 2014 worldwide were PLHIV, 74% in Africa. (WHO, 2015).

The consistent trend towards fewer death in children treated with IPT may likely be attributed to improved exposure to these children, including better access and greater attention from parents to alternative types of care. (WHO, 2010). This will however be unlikely to understand why mortality among the children not obtaining IPT decreased more than anticipated. This could indicate that not all TB-related fatalities are specifically attributed to clinical TB illness, but to encounters with other pathogens. If the frequency or seriousness of certain other infections declines, as in Sierra Leone, TB exposure mortality will also decrease.

5.2.4 Factors contributing to TB incidence among CLHIV who completed IPT at ODCH, Sierra Leone

Socio-economic factors

Majority of the respondents were self-employed [258, 79.9%] while unemployed respondents comprised 55[17%] [$\chi^2=324.26$, $p<0.05$]. Further, on their average monthly income, the study found that 131[40.6%] earned between 31-45 USD while 121[37.5%] earned between 15-30 USD and this was reflection of their occupation [$\chi^2=221.59$, $p<0.05$]. HIV positive children from lower income level background compared to HIV positive children from higher level income background more likely to experience higher mortality and poor quality of life (OR=1.213, $p<0.05$).

Socio-cultural factors and TB Incidence

It was noted that most of the respondents thought that TB was curable [281, 87%] [$\chi^2=176.84$, $p<0.05$] and that TB was not a curse [271, 83.9%] [$\chi^2=148.48$, $p<0.05$]. It was evident that majority [205, 63.5%, $\chi^2=23.43$, $p<0.05$] of the children were diagnosed with TB since February 2018 and further most of these children were under treatment [287, 88.9%] [$\chi^2=195.05$, $p<0.05$].

5.3 Conclusions

5.3.1 Incidences and prevalence of tuberculosis before the IPT in CLHIV

Majority of the children were not diagnosed with TB since February and further most of these children were not on treatment and this was attributed to Septrine use. The odds of CLHIV less than 12 weeks of TB incidence and reduced quality of life in children 1 to 4 years of age, 5 to 8 years of age, 9 to 13 years of age and above is 2,777 times

greater than 13 years of age. Tuberculosis is a leading cause of CLHIV disease and death. Worldwide, about nine million new cases of TB are found annually and 13 percent are co-infected with HIV. The WHO reports that the HIV prevalence in children with TB varies from 10 to 60 per cent in countries with low to high prevalence (WHO, 2016). The mechanisms promoting susceptibility of people with HIV to TB disease are incompletely understood, being likely caused by multifactorial processes.

5.3.2 Perceptions of care givers Quality of life of CLHIV

The respondents were worried to moderate extent on their child's pain or discomfort and they had moderate in difficult in handling any pain or discomfort in this child. Assessing energy and fatigue on how the child gets tired, they indicated to little extent and the respondents were bothered to very much while they indicated that the children did not have [little] difficulties with sleeping and thus not worried on sleep problems in their children. The respondents were very much bothered by any unpleasant physical problems related to the child's HIV infection.

Psychological Quality Of Life

The children experienced positive feelings to a little extent and the parents of the children concentrated little and they were bothered by fears of this child developing any physical problem to moderate extent.

Level of Independence Quality of Life

The children had difficulty in performing routine activities to little extent and needed little medical treatment to function in daily life while the respondents indicated that their children were able to do their daily activities very much.

Social Relationships Quality Of Life

The children had personal and social relationship with other children to moderate extent and respondents were bothered by the child's future sex life to moderate extent and the respondents felt that their children discriminated against because of their health condition slightly.

Environment factors to Quality of Life

The children's physical safety and security was very much important to the respondents while they further indicated that their children were living in a safe and secure environment. The respondents moderately agreed that they have financial difficulties to support their children. The respondents indicated that their children feel accepted by their community moderately while they agreed that their children were healthy in physical environment and they moderately indicated that their children have difficulties with transportation services that restrict the child's life.

Spirituality, Religion on Quality of Life

The respondents agreed that spirituality, religion and personal beliefs very important to the child and forgiveness to the children was very much important while they indicated that the future of their children was very important to them and they further indicated that thoughts of death and dying were very important to them.

5.3.3 Mortality among CLHIV who completed IPT at ODCH, Sierra Leone

In contrast to those who have completed IPT in Ola During Children's Hospital, Sierra Leone, mortality among CLHIV who have not started or finalized IPT was large until IPT intervention. The leading and most common opportunistic infection and cause of PLHIV mortality is tuberculosis. It is a leading cause of PLHIV morbidity. The clear tendency to minimize mortality among IPT-treated children can be related to improved exposure to these children, with easier access for children to other types of care and greater parental attention. This will however be unlikely to understand why mortality among the children not obtaining IPT decreased more than anticipated. This could indicate that not all TB-related fatalities are specifically attributed to clinical TB illness, but to encounters with other pathogens. If, as is the case in Sierra Leone, the occurrence or seriousness of these other diseases declines, mortality from TB exposure often decreases.

5.3.4 Factors contributing to TB incidence among CLHIV who completed IPT at ODCH, Sierra Leone

Majority of the respondents were self-employed while unemployed respondents comprised mere 17%. Further, on their average monthly income, the study found that less than half earned between 15-30 USD while slightly more than a third earned between 31-45 USD and this reflected their occupation.

Most of the respondents thought that TB was curable and that TB was not a. It was evident that majority of the children were diagnosed with TB since February and further most of these children were under treatment.

5.4 Recommendations

5.4.1 Incidence of TB among CLHIV who completed IPT

It is evident that majority of children in Sierra Leone as highlighted in Ola During Hospital do not have adequate access to IPT treatment against high incidence of TB.

IPT treatment can significantly reduce incidence of TB in CLHIV if it is made available and administered properly. IPT is effective in reducing the incidence of TB and death in CLHIV. There is benefit in providing TB preventive therapy to CLHIV. The study recommends for adequate allocation of funds in the acquisition of adequate IPT treatment alongside proper coordination in the administration of the treatment by health workers. The study recommends that the National TB control program of Sierra Leone needs to prioritize capacity building for caregivers working on child TB programs and IPT, by raising their skills towards child TB diagnosis and IPT treatment. Improve case diagnosis of TB in children by regularly combining TB surveillance, preventive isoniazid medication, and HIV care.

Recognizing that TPT PLHIV is an essential aspect of quality HIV treatment is the first phase that national services and their collaborators take. Significant commitments can however continue to be made to cope meaningfully with expected hurdles and TBT scale-up. It is inexcusable that TB appears to be the leading cause of death in PLHIV if we have a preventive approach which is focused on facts and which has not been enforced. There is need for proper coordination of TB programs that places

sufficient emphasis on TPT treatment and follow up among HIV positive children in Ola During Hospital, Sierra Leone.

This study largely informs policy makers at the national level, at the Ministry of Health of Sierra Leone, through the National HIV/AIDS Control Programme of the need to raise awareness among child health practitioners on risks and magnitude of childhood TB prevalence among CLHIV who completed IPT. These children should be prioritized in IPT programs.

The National TB control program of Sierra Leone should begin to cascade contact screening and IPT to all congregate settings to further support existing child TB prevention strategies, and eventually to roll it out to all areas countrywide. The National TB control program of Sierra Leone should advocate for the in-cooperation of TB control interventions in the public health act, such as contact tracing and IPT for all vulnerable exposed persons, through enacting of relevant health legislations in parliament.

5.4.2 Perceptions of care givers Quality of life of CLHIV

The research showed that physical fitness, antiretroviral treatment, psychological well-being, networks of social care, coping mechanisms, Moral Well-being and medical comorbidities are primary predictors of the quality of life. After the administration of IPT treatment, quality of life of CLHIV improved significantly. There is need for effective management of symptoms so as to improve quality of life among CLHIV. Stress management interventions through social interventions like children fun games are a promising approach in enhancing quality of life for CLHIV.

5.4.3 Mortality among CLHIV who completed IPT

IPT is a standard and critical feature of HIV treatment for children but has remained widely underutilized in Sierra Leone despite being actively promoted as an international model of care over a decade. While there are valid areas of risk, especially the hepatotoxic consequences of INH and the ability to produce resistance, IPT was found to be a cost efficient solution to minimizing CLHIV morbidity and mortality.

Early mortality techniques including rigorous screening and treatment of opportunistic infections are required before ART is started. The immediate introduction of the IPT in children should be followed by early detection strategies of CLHIV in Sierra Leone under the existing plan for "test and care." Early initiation of IPT treatment among CLHIV is thus required to prevent any deaths/mortalities.

5.4.4 Factors contributing to TB incidence among CLHIV who completed IPT

In order to optimize effectiveness of IPT, the National TB control program needs to adopt a multi-sectoral approach. One key sector that needs to be brought on board is the division of child based on socio demographic factors like income level of caregivers, which needs to work towards improving child health status and nutrition status linking routine growth monitoring, food supplementation programs to IPT program activities. The factors need to be identified and marked according to criticality before an intervention action is undertaken so as to reduce TB incidence among CLHIV.

Ola Hospital ought to improve and enhance surveillance and assessment of TB and HIV programmes, in cooperation with the population, government and other agencies, to make sure gender-related obstacles are established and resolved, and that gender , age, divided data on TB and HIV programs are gathered and used in full for enhancing IPT administration.

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APPENDICES

January 21st, 2019

Chair of the Committee

Office of the Ethics and Scientific Review Committee

Ministry of Health and Sanitation

Directorate of Policy, Planning & Information (DPPI)

Youyi Building, Fifth Floor, East Wing

Freetown, Sierra Leone

Dear Chair of the Committee

I am submitting the following research proposal for review by the Office of the Ethics and Scientific Review Board, entitled **“Evaluation of the effect of Isoniazid Preventive Therapy among Children Living with HIV in Ola During Children’s Hospital-Freetown, Sierra Leone.** The Investigator is Dolphine Anyango Buoga a Masters student at Kenya Methodist University, Nairobi Campus-Kenya. The study will take place at Ola During Children’s Hospital.

The overall objective of this research is to evaluate the effect of Isoniazid Preventive Therapy (IPT) where total enumeration of CLHIV in Ola During Children’s Hospital (ODCH), Sierra Leone was conducted. The objective will be achieved through the following aims: 1) to determine the incidence of TB among CLHIV who completed IPT at ODCH, Sierra Leone. 2) to assess the perceptions of caregivers on the quality of life of CLHIV who completed IPT at ODCH, Sierra Leone. 3) to determine the mortality among CLHIV who completed IPT at ODCH, Sierra Leone. 4) to identify

factors contributing to TB incidence among CLHIV who completed IPT at ODCH, Sierra Leone.

The outcomes from this research will guide the management of Ola During Children's Hospital in formulating integrated health guidelines under HIV continuum of care in order to improve the healthcare offered to CLHIV in ODCH. The study will also support the Sierra Leone Ministry of Health and Sanitation to understand the challenges faced by in the implementation of IPT at ODCH and other health facilities call for more support in health systems strengthening techniques hence support policy recommendation on the use of IPT in paediatric age group.

Thank you for your attention and consideration. I will be happy to provide further information as requested or you may contact Dolphine Buoga BSN, RN at the following email: dolphineanyango@yahoo.com or phone number: +232 78358556.

Respectfully,

Dolphine Buoga

Student number **PHT-3-1225-2/2017**



GOVERNMENT OF SIERRA LEONE
Office of the Sierra Leone Ethics and Scientific Review Committee
Directorate of Training and Research
5th Floor, Youyi Building Brookfields, Freetown
Ministry of Health and Sanitation

20th February 2019

To: Buoga Dolphine Anyango (MPH Student) **Principal Investigator**
Kenya Methodist University
Nairobi Campus, Kenya
dolphineanyango@yahoo.com
+23278358556

Study Title: Evaluation of the Effect of Isoniazid Preventive Therapy: A Census of HIV-Positive Children in Ola During Children's Hospital- Freetown, Sierra Leone

Version: 21 January 2019

Supervisor: Dr Job Mapesa
Department of Public Health Human Nutrition and Dietetics
Kenya Methodist University
Nairobi, Kenya
job.mapesa@kemu.ac.ke

Study Site: Ola During Children's Hospital, Freetown

Submission Type: First protocol version submitted for review

Committee Action: Expedited Review

Approval Date: 20 February 2019

The Sierra Leone Ethics and Scientific Review Committee (SLESRC) having conducted an expedited review of the above study protocol and determined that it presents minimal risk to subjects, **hereby grants ethical and scientific approval for it to be conducted in Sierra Leone.** The approval is valid for the period, **20 February, 2019 – 19 February, 2020.** It is your responsibility to obtain re-approval/extension for any on-going research prior to its expiration date. The request for re-approval/extension must be supported by a progress report.

For further enquiries please contact: efoday@health.gov.sl



GOVERNMENT OF SIERRA LEONE
Office of the Sierra Leone Ethics and Scientific Review Committee
Directorate of Training and Research
5th Floor, Youyi Building Brookfields, Freetown
Ministry of Health and Sanitation

Review Comments:

- **Amendments:** Intended changes to the approved protocol such as the informed consent documents, study design, recruitment of participants and key study personnel, must be submitted for approval by the SLESRC prior to implementation.
- **Termination of the study:** When study procedures and data analyses are fully complete, please inform the SLESRC that you are terminating the study and submit a brief report covering the protocol activities. Individual identifying information should be destroyed unless there is sufficient justification to retain, approved by the SLESRC. All findings should be based on de-identified aggregate data and all published results in aggregate or group form. A copy of any publication be submitted to the SLESRC for its archive.



Professor Hector G. Morgan
Chair

For further enquiries please contact: efoday@health.gov.sl

Appendix I: Child-Caregiver Information and Consent Form

My name is Buoga Dolphine Anyango and am undertaking a masters study titled *Evaluation of the effect of Isoniazid Preventive Therapy among Children Living with HIV in Ola During Children's Hospital-Freetown, Sierra Leone*

This consent form is designed to give you information on whether or not to participate in the study. Informed consent is the procedure. Please read this material closely and pose questions regarding the analysis with which you are confused, or request clarity about certain matters.

Study procedure: we are kindly requesting the participants to render the questions and fill in the replies correctly for 15 minutes after which they have been issued a questionnaire. Participants that are competent who choose to fill themselves. The analyst then studies the infant and the medical history of the child.

Benefits: If the child is IPT eligible and has not received the IPT treatment, arrangements have been made to register and start treatment. Care has been started for children living with active TB. The research results in Sierra Leone and other provinces were used by health workers, policy makers, and program managers to inform the implementation of the IPT.

Risks: You or the child had no risks during the study. Risks: During the research, there was no intrusive procedure which could damage your infant. The refusal to take part does not in any way jeopardize your child's care.

Voluntary: The research was absolutely voluntary. With your research there have been no financial incentives. One may join at any time or cancel the report. Refusal to take part would not in any way affect the treatment of your kid.

Privacy: the details you and your child have got is private. Without your permission, no specific information was disclosed to anyone. However, we will review broad results with all enrolled children but nothing particular about your child has been addressed. During these conversations, we would not disclose your or your child's name.

Problems or questions: If you have any questions about the study or about the use of the results you can contact the principle investigator, **Buoga Dolphine Anyango on +23278358556.**

If you have any questions on your rights as a research participant you can contact **Ola During Children's Hospital** Ethics and Research Committee.

Please sign or put your thumb print in the space provided below to indicate that you understand the conditions of this study and that you consent to participate in it.

I, _____ confirm that the study has been fully explained to me and I give full consent to participate in it.

Care giver' signature/thumb print: _____

Investigators signature: _____

Date: / / 2019

Appendix II: Research Questionnaire

1. Identification Information		
	Variable	Write response below
	Unique ID Number of patient	
	Tel. No. of Caregiver	
	District of birth	
	Chiefdom	
	Address/Village	
	Name of interviewer	
	Tel. No. of interviewer	
	Date of interview	

2. Demographic Information		
	Variable	Write response below
	Date of Birth	
	Age	Years
		Months
	Sex	1. Male
		2. Female
	What is your relationship to the child/children?	1. Biological mother
		2. Biological father
		3. Sister
		4. Brother
		5. Relative
		Others (Specify)
	Child's level of Education	Is the child in school? YES..... NO.....
		If YES, what level
		1. Nursery
		2. Primary
		3. Junior Secondary school
		4. Senior Secondary school
	Religion	Muslim <input type="checkbox"/> <small>The picture can't be displayed.</small> Christian <input type="checkbox"/> <small>The picture can't be displayed.</small>

Incidence of TB among CLHIV who completed IPT at ODCH, Sierra Leone

1. Has the child been diagnosed with TB since February 2018?

YES NO

2. If YES, what date was TB diagnosis made?

3. Is the child on treatment?

YES NO

4. If YES, when was treatment started?

Perceptions of care givers Quality of life of CLHIV who completed IPT at ODCH, Sierra Leone

Instructions

This section asks how the Parent/guardian/caretaker feels about the child's Quality of Life (QOL), health, and other aspects of life. Please answer all the questions and if unsure, help the care giver to choose the one that appears most appropriate.

Circle the digit that is most appropriate and best fits his or her response.

Please sign or put your thumb print in the space provided below to indicate that you understand the conditions of this research and that you consent to participate in it.

Please circle the most appropriate answer.

	QUALITY OF LIFE DOMAINS					
1	PHYSICAL	Not at all	A little	A moderate amount	Very much	An extreme amount
		1	2	3	4	5
	<i>Pain & discomfort</i> Do you worry about the child's pain or discomfort?					
	How difficult is it for you to handle any pain or discomfort in this child?					
		Not at all	Slightly	Moderately	Very	Extremely
		1	2	3	4	5
	<i>Energy & fatigue</i> Does the child easily get tired?					
	How much are you bothered by the child's fatigue?					
		Not at all	A little	A moderate amount	Very much	An extreme amount
		1	2	3	4	5
	<i>Sleep & rest</i> Does the child have any difficulties with sleeping?					
	How much do any sleep problems in the child worry you?					
	<i>HIV symptoms</i> How worried are you about any unpleasant physical problems associated with HIV infection in your child?					
2	PSYCHOLOGICAL	Not at all	A little	A moderate amount	Very much	An extreme amount
		1	2	3	4	5
	<i>Positive feeling</i> Does the child experience positive feelings in his/her life?					
	<i>Cognitive performance</i>					

	Is the child able to concentrate well?					
	<u>Self-body image & appearance</u> To what extent are you bothered by fears of this child developing any physical problem?					
3	LEVEL OF INDEPENDENCE	Not at all	A little	A moderate amount	Very much	An extreme amount
		1	2	3	4	5
	<u>Mobility and Daily life activities</u> To what extent does the child have difficulty in performing routine activities?					
	<u>Dependence on treatment</u> How much does the child need any medical treatment to function in daily life?					
	<u>Working ability</u> Is the child able to do his daily activities?					
4	SOCIAL RELATIONSHIPS	Not at all	Slightly	Moderately	Very much	Extremely
		1	2	3	4	5
	<u>Personal relationship Social support.</u> Does the child have personal and social relationship with other children					
	<u>Sexual activity</u> Are you bothered by the child's future sex life?					
		Never	Seldom	Quite often	Very often	Always
		1	2	3	4	5
	<u>Social inclusion</u> How often do you feel the child is discriminated against because of his/her health condition?					

5	ENVIRONMENT	Not at all	Slightly	Moderately	Very much	Extremely
		1	2	3	4	5
	<u>Physical safety</u> How important to you is the child's physical safety and security?					
	<u>Home environment</u> Is the child living in a safe and secure environment?					
	<u>Financial resources</u> Do you have financial difficulties to support the child?					
	<u>Health /social care</u> To what extent does the child feel accepted by his/her community?					
	<u>Leisure opportunities</u> Does the child have opportunity for leisure activities?					
	<u>Physical environment</u> How healthy is the child's physical environment?					
	<u>Transport</u> Does the child have difficulties with transportation services that restrict the child's life?					
6	SPIRITUALITY, RELIGION	Not important	A little important	Moderately important	Very important	Extremely important
		1	2	3	4	5
	<u>Spirituality religion, personal beliefs</u> How Are spirituality, religion and personal beliefs important to the child?					
	<u>Forgiveness and blame</u> How important is forgiveness to the child?					
	<u>Concerns about the future</u>					

Is the future of this child important to you?					
<i>Death and dying</i> Are thoughts about death and dying of this child important to you?					

Effect of IPT on mortality rate among CLHIV who completed IPT at ODCH,

Sierra Leone

Information on this section was retrieved from ART and appointment registers as follows:

Total number of children who completed IPT from August 2017 to January 2018			
Total number of children who completed IPT and developed TB			
Total Number of children who developed TB post IPT and were initiated on anti TB treatment			
Total number of children who completed IPT, developed TB and died			

Factors contributing to TB incidence among CLHIV who completed IPT at ODCH, Sierra Leone

This section was answered by the health care workers on KIIs and Interviews these are interview questions not needing in-depth interrogation therefore you use KII

	Is there a designated personnel managing TB/HIV clinic	YES	NO
	Is there a consistent IPT supply chain	YES	NO
	Do you get IPT stock outs	YES	NO
	What is the total number of staffs in HIV/TB clinic		
	What is the staff to patient ratio		
	How many staffs are trained on IPT/TB services		

Appendix III: Check List

Section A: Inputs injected into the IPT program

Inputs used to run the IPT Program

DOMAIN	Jan-Dec 2017	Jan-Dec 2018	Target
Health workers involved in IPT			
TB/IPT screening algorithms			
TB screening tools			
INH available for the period			
Pyridoxine available for the period			
IEC materials (pamphlets)			

Section B: Outputs of the IPT Program

INDICATOR	Jan-Dec 2017	Jan-Dec 2018	Target
OI clinic burden (cumulative for repeat visits)			
Number of ART children			
Number of ART children screened for TB			
Number eligible for IPT			
Number started on IPT			
Proportion of eligible children started on IPT			
Number of dropouts due to toxicity			
Number of children who developed TB during IPT			
Number of children who completed IPT			
Number of children who developed TB after IPT completion			
Duration of TB diagnosis post IPT completion			
Number of HW trained on IPT (formal training)			

Number of VHWs sensitized on IPT			
Number of IEC materials on IPT distributed			
Number of IPT advocacy and sensitization meetings			
Number of facilities doing advocacy and community sensitizations			

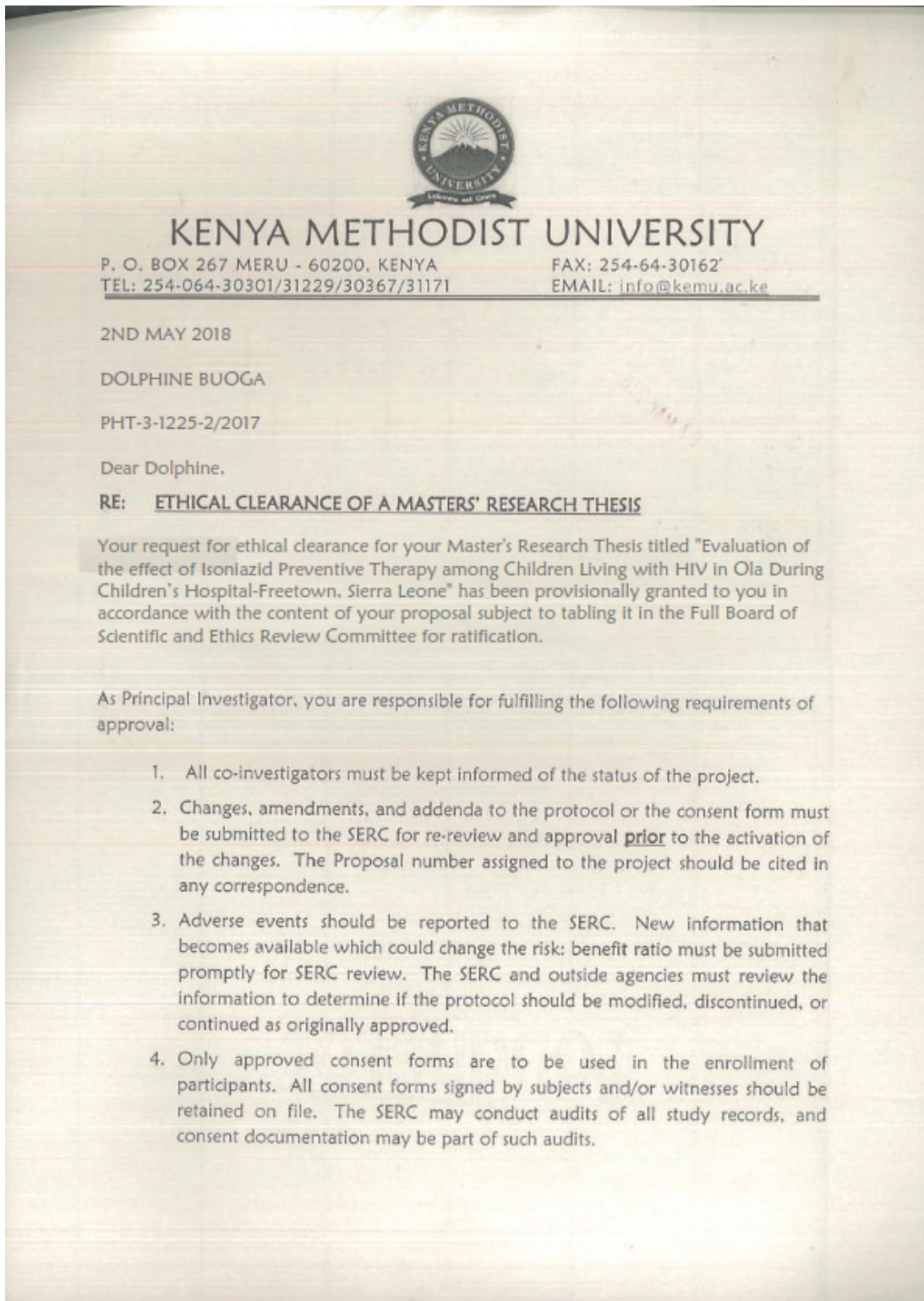
Appendix VI: Map of Ola During Hospital

Source : Google





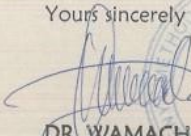
Appendix VII: KEMU Authorisation letter



5. SERC regulations require review of an approved study not less than once per 12-month period. **Therefore, a continuing review application must be submitted to the SERC in order to continue the study beyond the approved period.** Failure to submit a continuing review application in a timely fashion will result in termination of the study, at which point new participants may not be enrolled and currently enrolled participants must be taken off the study.

Please note that any substantial changes on the scope of your research will require an approval.

Yours sincerely


DR. WAMACHI
Chair, SERC



cc: Director, RI & PGS