ORIGINAL RESEARCH

Health workers' knowledge and practice of Isoniazid preventive treatment guidelines in health facilities in Ebonyi State, Nigeria

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Abstract

Background

Isoniazid preventive therapy is recommended as part of a comprehensive HIV and AIDS care strategy. IPT is used as prophylaxis to reduce the incidence of TB in HIV-infected persons. However, its implementation has been very slow and has been influenced by several factors. This study assessed health workers' knowledge and adherence to Isoniazid Preventive Therapy guidelines.

Methods

This was a cross-sectional study in six health facilities providing HIV care in Ebonyi State using a semi-structured, self-administered questionnaire. Data were collected from 85 health workers working in the HIV clinics. Data were also extracted from 200 patient treatment cards. Data analysis was carried out using SPSS version 20 software. Chi-square statistics and logistic regression were carried out to determine the association between socio-demographic characteristics and knowledge as well as self-reported practice of the guideline.

Result

Slightly over half of the respondents (58.8%) had good knowledge of the guideline, and the majority (75.3%) self-reported that they practiced the guideline. Only 17% of the treatment cards had isoniazid prescribed and only 11% of these had patient adherence assessed. The most common challenges to implementation of the guideline cited by health workers were unavailability of isoniazid, poor awareness, patient non-adherence, poor resources, high pill burden, and lack of training. Being a doctor and more than 3 years duration of work in the clinic were predictors of good knowledge. There was no predictor of practice.

Conclusion

There was good knowledge and practice of the guideline from health worker self-reports, however, review of treatment card showed prescription was low. Further studies to explore and understand why there is such low prescription of INH/IPT to HIV patients despite good knowledge of healthcare professionals are recommended.

Key Words: Tuberculosis prevention; Health provider; Implementation; Guideline; Nigeria

Introduction

Isoniazid preventive therapy(IPT) is the use of Isoniazid in HIV-positive patients with latent Tuberculosis (TB) infection to prevent the development of active TB disease[1]. Isoniazid Preventive Therapy(IPT) is one arm of the World Health Organization's (WHO) recommended 'Three I's' strategy in the control of TB, which also includes intensified case finding and improved infection control measures[2]. In Nigeria, tuberculosis is a major public health problem and ranked seventh among the 30 high TB burden countries and second in Africa[3]. Some of the major advantages of IPT include: prevention of progression of latent TB to active TB, improvement in the quality of life, reduction of mortality of children, and prevention of further transmission of TB in the community at large[4]. Isoniazid preventive therapy is an important part of the collaborative tuberculosis and HIV activities to reduce the TB burden in people living with HIV[5]. For TB to be eradicated by 2050, one of the important strategies is treatment of latent TB infection (LTBI)[6].

The WHO recommends IPT for all people living with HIV (PLHIV) in countries that have a >30% prevalence of latent TB infection, and for all PLHIV with documented latent TB infection or who have exposure to an infectious TB case[7,8].The national guidelines for implementing the 3I's for TB/HIV control in Nigeria states that IPT services should be provided at HIV service delivery points[1]. Studies have shown that IPT is effective in preventing active TB among HIV patients[9–12]. The TB/HIV in Rio (THRio) study revealed a 76% reduction in TB incidence among patients on highly active antiretroviral therapy (HAART) and IPT[13]. A retrospective cohort study carried out in Ethiopia showed that incidence of TB was higher among patients with no prophylaxis as compared to patients with IPT prophylaxis[14]. Isoniazid prophylaxis significantly reduced mortality in

children with HIV who were living in an area with a high prevalence of tuberculosis and the incidence of tuberculosis was reduced by about 70%[15].

In Nigeria, studies have shown varying levels of Isoniazid preventive therapy use. A study carried out in northern Nigeria showed a high completion rate of IPT[16], while another in the same region showed that only 35% of clients were initiated on IPT[17]. Another study in the eastern region also revealed that only 30% of clients were started on IPT[18]. Physicians and health workers in general have a role to play in improving adherence through proper education of patients on the importance of IPT[9]. Studies have shown that individuals who were educated about the reasons for taking IPT by their doctors/nurses were more likely to be adherent than those who were not informed[6,19]. The aim of this study was to assess the health workers' knowledge and adherence to isoniazid preventive therapy guidelines in health facilities providing comprehensive HIV care in Ebonyi State, Nigeria. It is part of a larger intervention study aimed at determining the effect of mobile phone messaging on knowledge and implementation of the tuberculosis preventive therapy guideline.

Methods

Study area

The study was carried out in six health facilities providing comprehensive care for HIV patients in Ebonyi State. There are thirteen Local Government Areas (LGAs) in the state grouped into three senatorial zones. HIV prevalence in the State is 0.8% according to the 2018 Nigerian HIV/AIDS Indicator and Impact Survey (NAIIS) which is low compared to the National prevalence of 2.2%[21]. A study carried out among patients attending various clinics in hospitals in Ebonyi state showed that 19.7% of participants were presumptive TB cases. Among these, 55.1% submitted sputum samples for microscopy, and 3.2% had smear positive TB[22]. Health service delivery in Ebonyi State is structured into a three tier system with the primary health care at the base, supported by the secondary and tertiary health care levels. There are two tertiary health facilities in the state (Alex Ekwueme Federal University Teaching Hospital Abakaliki and National Obstetric Fistula Centre), owned by the Federal Government. Currently, there are about 555 registered private and public health facilities in the state with a general hospital in each local government area and several primary health centres, private, and faith-based hospitals[23]. Public, private and mission hospitals provide comprehensive HIV care in the state. Comprehensive HIV care includes voluntary and confidential counselling and testing, prevention of HIV transmission, including mother to child transmission, prophylaxis against opportunistic infections, diagnosis and treatment of HIV related conditions including opportunistic infections, and antiretroviral treatment[24]. Medical Doctors, Nurses, Pharmacists, and Community health extension workers (when they are available in secondary and tertiary health facilities) are all involved in providing care. However, the doctors are the major prescribers of IPT in these facilities while non-physician health workers participate routinely in health education, dispensing of drugs, monitoring appointments, adherence counseling and drug refill.

Study Population

The study population comprised of health care workers who had been rendering HIV care for not less than 6 months

at the selected health facilities. Healthcare workers who declined consent were excluded from the study.

Study design

This was a cross-sectional study which was part of a larger quasi-experimental study. The quasi-experimental study focused on improving the knowledge and adherence of health workers to the IPT guideline, however, only the baseline data is presented here.

Sampling technique and sample size

Facility sampling was restricted to only facilities recording more than 100 HIV patients currently enrolled at the time of the study. These facilities were selected because of their high patronage and patient load and also higher number of health care workers. Among the health facilities providing comprehensive HIV care in Ebonyi state, only eight had patient load of greater than 100 at the time of the study. Six health facilities were then selected from the eight facilities using a simple random sampling method. The health facilities selected include two specialist/referral facilities and four secondary level health facilities (both public and private).

The sample size formular for comparing two proportions at significance level of 5% and desired power of 80% with attrition rate of 20% was used in line with the quasi-experimental study. Only 85 health workers rendering HIV care in these health facilities were eligible and all were selected for this study. In addition, 200 treatment cards of 200 patients (only those eligible to receive IPT) were included in the study. The sample size determination and recruitment of these 200 patients have been previously reported[25]. Proportionate allocation was used to determine the number of treatment cards per facility. This was based on the number of patients enrolled in each facility.

Data collection

A pre-tested semi-structured, paper based, self administered questionnaire was used for this study. The questionnaire for health workers was adapted from a previous study.4 Pre-testing of the questionnaire was done in a health facility outside the selected facilities and findings of the pre-test were used to modify the questionnaire. The questionnaire was in English language since it was administered to health workers who are educated. The health worker questionnaire was used to collect information on socio-demographic characteristics of the respondents, their knowledge of guidelines for IPT, healthcare worker self-reported practices for prescribing IPT and educating patients on the same, and barriers to implementation of the IPT guideline. Data was abstracted from patient treatment cards using a proforma to corroborate healthcare workers' self-reports of practice. Information extracted from patient treatment card were: IPT prescription, adherence grading and refill frequency. Data collection was carried out by trained research assistants who are also resident doctors in the Department of Community Medicine. Data collection was carried out between October 2017 and July 2018.

Measurement of variable

The independent variables include: Socio-demographic and work characteristics of health workers such as age, gender, marital status, professional level, and duration of service in the ART clinic.

Dependent variables include

Health worker knowledge of IPT: There were nine questions that assessed the knowledge of healthcare providers on IPT eligibility criteria, IPT provision and its management. The questions covered the following: IPT reduces the risk of TB infection for HIV positive patients, patients with active TB should not be given IPT, knowledge of TB symptoms, knowledge about eligibility for IPT, chest radiography requirement for screening TB, current pregnancy as a contraindication for starting IPT, IPT as secondary prophylaxis for people with past history of TB, Best TB preventive treatment drug, and Isoniazid drug dose. A correct answer for each close ended question was scored one while 0 score was given for a wrong answer. The total score ranged from 0 to 9 points and was classified into: Good: 5 - 9 and Poor: 0 – 4. This classification has been used in previous studies[26].

Self-reported practice of IPT guidelines: Five questions included in this part were; "Do you use the TB screening tool (algorithm) to identify PLHIV eligible for IPT?" , "Do you encourage PLHIV to start IPT once they are eligible?" ,

Table 1: Socio-demographic and work characteristics of health workers

Variable		
Mean age (mean ±SD)	36.92±8.6	
	Frequency n=85	Percent
Gender		
Male	36	42.4
Female	49	57.6
Marital status		
Married	55	64.7
Others†	30	35.3
Professional level		
Medical Doctor	30	35.5
Other health workers‡	55	64.7
Duration of work in HIV clinic		
6-11 months	19	22.4
1-3 years	24	28.2
>3years-5 years	19	22.4
>5 years	23	27.1
Training on TB/HIV activities		
Yes	53	62.4
No	32	37.6
Training on IPT		
Yes	32	37.6
No	53	62.4
Ever read guideline		
Yes	52	61.2
No	33	38.8

†: Single, Separated, Divorced, ‡: Nurses, Pharmacists,

CHEWS(community health extension workers)

"Do you provide Isoniazid for eligible HIV+ patients?", 'Do you counsel clients on IPT & on the need to adhere to their treatment?", and "do you monitor and manage clients with INH drug toxicity?"

The questions had three options (always, sometimes, and No). The rating scale of responses was measured as follows: always- 2, sometimes- 1, No- 0.

The total scores in measuring the practice of healthcare providers towards IPT provision and its treatment management ranged from 0 to 10, and was classified into two levels.

The levels of self-reported practice were:

Good: 5-10

Poor: 0-4

This classification has been used in previous studies[26]

Barriers to implementation of IPT guideline

One open ended question was used to assess the barriers to IPT implementation in the state (the question asked respondents to mention the barriers they face in implementing the IPT guideline). Frequencies and proportions were then calculated for each barrier mentioned.

Statistical analysis

Data analysis was carried out using the Statistical Package for Social Sciences (IBM-SPSS) for Microsoft Window version 20 software. Data was first entered using SPSS and then screened for completeness. Data cleaning was done where necessary. Variables were then coded using numbers and the codes noted in a code notebook. . Frequency tables were used to present the descriptive statistics of the variables, and relevant means, standard deviations, and proportions were calculated. The chi-square test was carried out to test for observed associations between variables. The level of significance was set at $p < 0.05$ and confidence interval at 95%.

Multivariate analysis using binary logistic regression was done and the level of statistical significance was determined by a P value of less than 0.05. In order to determine the predictors of knowledge and self-reported practice of IPT guideline, variables were entered into the logistic regression model. The results were reported using adjusted odds ratios (AOR) and 95%conidence interval.

Ethical Consideration

Ethical approval was obtained from the research and ethics committee of Alex Ekwueme Federal University Teaching Hospital with REC approval number: 18/01/2017-09/03/2017. Permission to carry out the study was obtained from the management of health facilities that were selected for the study. Written informed consent was obtained from the healthcare workers after explaining fully the purpose of the study and their rights as participants. Confidentiality was ensured and participation in the study was voluntary.

Results

Table 1 shows that mean age of respondents was 36.9±8.6. A higher proportion of the respondents were females and the majority of the health workers were married. The majority had been trained on TB/HIV activities (62.4%) and had ever read the guideline (61.2%), but less than 50% had received training on IPT alone. Table 2 shows the overall knowledge and self-reported practice of IPT guideline among the health workers.

Table 2: Knowledge and Self-reported Practice of IPT guideline

Knowledge Question	Frequency n=85 Yes (%)	No (%)
IPT reduces the risk of TB infection for HIV positive patients	81 (95.3)	4 (4.7)
Patients with active TB should not be given IPT	67 (78.8)	18 (21.2)
Knowledge of TB symptoms	76 (89.4)	9 (10.6)
Knowledge about eligibility for IPT	18 (21.2)	67 (78.8)
Is chest radiography a requirement for screening#	49 (57.6)	36 (42.4)
Is current pregnancy a contraindication for starting# IPT	22 (25.9)	63 (74.1)
IPT as secondary prophylaxis for people with past history of TB	59 (69.4)	26 (30.6)
Best TB preventive treatment drug	77 (90.6)	8 (9.4)
Isoniazid drug dose	69 (81.2)	16 (18.8)
Practice Items	**Yes**	**No**
Use of TB screening tool (algorithm) to identify PLHIV eligible for IPT	72 (84.7)	13 (15.3)
Encourage PLHIV to start IPT once they are eligible	77 (90.6)	8 (9.4)
Provide INH for eligible HIV+ patients	76 (89.4)	9 (10.6)
Counsel clients on IPT & on the need to adhere to their treatment	79 (92.9)	6 (7.1)
Monitor and manage clients with INH drug toxicity	68 (80)	17 (20)
Knowledge level	**Frequency**	**Percent**
Good	50	58.8
Poor	35	41.2
Practice level		
Good	64	75.3
Poor	21	24.7
Prescription from treatment card review		
Proportion of cards with IPT prescribed		
Yes	35	17.5
No	165	82.5
Proportion of cards with adherence assessment		
Yes	4	11
No	31	89

For these questions, No is the correct option.

Slightly more than half of the health workers (58.8%) had good knowledge of the IPT guideline, and the majority (75.3%) reported practicing the IPT guideline. Table 2 also shows that only 35 (17.5%) of the treatment cards of patients (those eligible to receive IPT) had IPT prescribed, and only 11% of these treatment cards had patient adherence assessed by health workers. Table 3 shows the relationship between socio-demographic characteristics and knowledge. Being a doctor and having worked in the clinic for more than three years were associated with good knowledge of the guideline. Table 4 shows the relationship between socio-demographic characteristics and self-reported practice. Older age was found to be associated with good practice of the guideline.

Table 3: Relationship between socio-demographic characteristics and knowledge

Variable	Poor Knowledge n (%)	Good Knowledge n (%)	χ^2 (p value)
Age			
≤35 year	20(42.6)	27(57.4)	0.08(0.77)
>35 years	15(39.5)	23(60.5)	
Gender			
Male	13(36.1)	23(63.9)	0.66(0.42)
Female	22(44.9)	27(55.1)	
Marital Status			
Married	22(40.0)	33(60.0)	0.89(0.77)
Others	13(43.3)	17(56.7)	
Professional level			
Doctors	7(23.3)	23(76.6)	6.09(0.01*)
Other health workers	28(50.9)	27(49.1	
Duration of work in Clinic			
6months to 3 years	25(58.1)	18(41.9)	10.34(0.001*)
>3 years	10(23.8)	32(76.2)	
Ever trained on IPT			
Yes	12(37.5)	20(62.5)	0.27(0.59)
No	23(43.4)	30(56.6)	
Ever read IPT guideline			
Yes	22(42.3)	30(57.7)	0.07(0.79)
No	13(39.4)	20(60.6)	

Table 4: Relationship between socio-demographic characteristics and self-reported practice

Variable	Practice level Poor n (%)	Good n (%)	χ^2 (p value)
Age			
≤35 year	17(36.2)	30(63.8)	7.43(0.006*)
>35 years	4 (10.5)	34(89.5)	
Gender			
Male	11(30.6)	25(69.4)	1.15(0.28)
Female	10(20.4)	39(79.6)	
Marital Status			
Married	17 (30.9)	38(69.1)	3.22(0.07)
Others	4(13.3)	26(86.7)	
Professional level			
Doctors	11(36.7)	19(63.3)	3.57(0.06)
Other health workers	10 (18.2)	45(81.8)	
Duration of work in Clinic			
6months to 3 years	7(16.3)	36(83.7)	3.32(0.07)
>3 years	14 (33.3)	28(66.7)	
Ever trained on IPT			
Yes	7(21.9)	25(78.1)	0.22(0.64)
No	14(26.4)	39(73.6)	
Ever read IPT guideline			
Yes	11(21.2)	41(78.8)	0.91(0.34)
No	10(30.3)	23(69.7)	

Table 5: Predictors of Knowledge and Self-reported Practice of IPT guideline

Variable		Poor	Good	AOR	CI Lower	CI Upper	p-value
Knowledge		n(%)	n(%)				
Duration of work in clinic)	≤3 years	25(58.1)	18(41.9)	0.17	0.06	0.51	0.002*
	>3years	10(23.8)	32(76.2)	1			
Age(in years)	≤35	20(42.6)	27(57.4)	2.29	0.69	7.56	0.17
	>35	15(39.5)	23(60.5)	1			
Gender	Male	13(36.1)	23(63.9)	1.42	0.51	3.95	0.50
	Female	22(44.9)	27(55.1)	1			
Marital Status	Married	22(40.0)	33(60.0)	0.79	0.25	2.53	0.69
	Others	13(43.3)	17(56.7)	1			
Professional level	Doctors	7(23.3)	23(76.6)	3.15	1.05	9.46	0.04*
	Others	28(50.9)	27(49.1)	1			
Practice							
Duration of work in clinic	≤3 years	7(16.3)	36(83.7)	1.56	0.51	4.89	0.43
	>3years	14 (33.3)	28(66.7)	1			
Age	≤35	17(36.2)	30(63.8)	3.74	0.97	14.39	0.06
	>35	4 (10.5)	34(89.5)	1			
Gender	Male	11(30.6)	25(69.4)	0.99	0.32	3.06	0.98
	Female	10(20.4)	39(79.6)	1			
Marital Status	Married	17(30.9)	38(69.1)	0.73	0.19	2.85	0.66
	Others	4(13.3)	26(86.7)	1			
Professional level	Doctors	11(36.7)	19(63.3)	0.43	0.14	1.30	0.13
	Others	10 (18.2)	45(81.8)	1			

Table 6: Challenges to implementing Isoniazid preventive therapy guideline

Challenges	Frequency	Percent
Unavailability of Isoniazid	33	77.6
Poor awareness	28	65.7
High pill burden	17	39.1
Patient Non-adherence	21	48.9
Poor resources	19	44.5
Lack of training	13	30
Lack of personnel	10	23.2
Culture	8	18.3
Lack of reminders	3	6.8
Patient refusal	4	9.6
Lack of supervision	3	7.2
Fear of resistance	4	9.6

Predictors of good knowledge of IPT guideline were being a doctor (AOR:3.15, 95%CI:1.05-9.46) and having worked in the HIV clinic for more than 3 years (AOR: 0.17, 95%CI: 0.06-0.51)(Table 5). There were no predictors of self-reported practice of IPT guideline (Table 5). Table 6 reveals that the most common challenges to implementation of the guideline cited by health workers were unavailability of isoniazid, poor awareness, patient non-adherence, poor resources, high pill burden, and lack of training.

Discussion

This study assessed the knowledge and practice of the isoniazid preventive therapy guideline among health workers. Results showed that the majority of the respondents had been trained on TB/HIV collaborative activities, had also read the guideline for Isoniazid preventive therapy although the majority had not been trained specifically on isoniazid preventive therapy. Training has a role to play in improving knowledge among health workers. A study that identified factors affecting implementation of isoniazid preventive therapy(IPT) in HIV/AIDS clinics in Dar es Salaam region of Tanzania revealed that, training had significant effect on knowledge where duration of training determined retention of IPT knowledge: the more the training duration the

more the knowledge retention[27]. A similar study carried out in South Africa revealed that training was associated with doctor's IPT implementation[26]. Frequent training of health workers is of essence in HIV care especially as the guidelines keep being revised. This will ensure that health care workers are abreast of the most current information on treatment guidelines.

Slightly over half (58.8%) of the health workers had good knowledge of the guideline. This agrees with findings of similar studies carried out in South Africa and Ethiopia although the proportions of health workers reported in these studies were higher (66.5% & 71% respectively) than the present study[4,26]. This good knowledge can be explained by the fact that the majority of the respondents had received training on TB/HIV collaborative activities and had also read the guideline. However, there still remains a gap in knowledge since only 58.8% of the health workers have good knowledge. Re-training of health workers is of essence to ensure that all health workers have good knowledge of the guideline. It may also be necessary for program implementers to identify more effective strategies for delivering the training. This will aid in proper implementation. A good number of the health workers (75.3%) reported good practice of the guideline. This also agrees with previous studies[4,26–28]. The proportion of health workers with good practice in this study was higher than the proportion with good knowledge. This may be because health workers are provided with standard guidelines which may be made available on their consulting tables, thereby making them follow the guideline without necessarily having the required information about such guideline. However, there was a disparity in the health worker's responses and the result from treatment cards as regards proportion of patients placed on IPT and adherence assessment done.

Although the majority of the health workers reported that they practiced the guideline, only few of the treatment cards had IPT prescribed and adherence was not assessed for the majority of these treatment cards. The discrepancy between self-reported practice and what is shown by the treatment cards could be as a result of reporting bias and is a cause for concern. Self-reported practice should be viewed with extreme caution as they are unlikely to reflect actual practice. A better way to assess practice for more accurate result is by observation. This mismatch between self-reports and actual practice is a big gap and shows the need for interventions such as education and reminders that will improve practice of the guideline. There is also a need for supportive supervision, regular auditing with records review, and monitoring and evaluation with active staff involvement. Additionally, other information education communication materials such as posters placed in conspicuous areas, walk through reminders by pharmacists and nurses, empowerment of patients to demand for and remind the health provider about IPT should be explored.

Furthermore several challenges to implementing isoniazid preventive therapy were identified notably unavailability of isoniazid, poor awareness, patient non-adherence, poor resources, high pill burden, and lack of training among others. The predictors of knowledge of the guideline include duration of work in the clinic and professional level. Health workers who had worked in the clinic for less than 3 years were less likely to have good knowledge of the guideline. This could be because those who have spent more time in the clinic may have received more training and have also gotten well acquainted with the day to day activities in the clinic. This further highlights the need for regular trainings and updates as new health workers are transferred to the clinic. Doctors were found to be more likely to have good knowledge of the guideline. This finding is expected since doctors are the major prescribers of IPT and are more likely to read the guideline for in-depth knowledge. One of the limitations of this study is that practice was assessed through self reports of the health workers. Health workers gave reports of what they do which could be true or not. However some aspects of the questions were further assessed using the patient treatment cards which shows the actual practice of the guideline. Again, this study was carried out in only one state and therefore may not be generalisable to other contexts in the country. It is also important to note that although there was high proportion of health workers with good knowledge, some of those labeled "good" could have significant gaps in their knowledge because of the cut-off point that was used for knowledge, thus we recommend higher cut-off point for future studies.

Conclusions

It can be concluded from this study that the knowledge of IPT guideline among health workers was good but not optimal. The practice of IPT guideline by health workers was commendable based on self-reports, however a lot more needs to be done to improve the actual practice of the guideline. Being a doctor and higher number of years of practice in the clinic were predictors of good knowledge. We therefore, recommend that training and re-training of all clinical staff working in the relevant clinics be done on a regular basis especially after guidelines are reviewed. Constant reminders in form of text messages should also be included in the routine activities of the clinic to ensure proper implementation.

Acknowledgements

Conflict of Interest

Authors declare that they have no conflict of interest

Reference

1. Federal Ministry of Health Department of public health, Nigeria. Guideline for isoniazid preventive therapy. 2014.

2. Isoniazid Preventive Therapy (IPT) for the Prevention of Tuberculosis in People Living with HIV (e-course) | FHI 360 [Internet]. Available from: https://www.fhi360.org/resource/isoniazid-preventive-therapy-ipt-prevention-tuberculosis-people-living-hiv-e-course. Accessed July 2017

3. TB in Nigeria - Funding, children, diagnosing TB, HIV/TB-Fact sheets . 2019. Available from: https://www.tbfacts.org/tb-nigeria/. Accessed April 2019

4. Tikuye AM, Tikuye AM. Knowledge, attitudes and practices of health care providers towards isoniazide preventive therapy (IPT) provision in Addis Ababa, Ethiopia. 2013; [Dissertation]. University of South Africa; 2013

5. Alarcon E, Bissell K, Boillot F, Caminero JA, Chiang C, Clevenbergh P, et al. Isoniazid preventive therapy for people living with HIV : public health challenges and implementation issues. Int J Tuberc Lung Dis. 2015;13(8):927–35.

6. Berhe M, Demissie M, Tesfaye G. Isoniazid Preventive Therapy Adherence and Associated Factors among HIV Positive Patients in Addis Ababa , Ethiopia. Adv Epiemiology. 2014;2014.

7. Wesen A, Mitike G. Provision and awareness for isoniazid preventive therapy among PLHIV in Addis Ababa , Ethiopia. BMC Int Health Hum Rights. 2012;12(2):12-2.

8. Getahun H, Granich R, Sculier D, Gunneberg C, Blanc L, Nunn P, et al. Implementation of isoniazid preventive therapy for people living with HIV worldwide: barriers and solutions. AIDS. 2010;24(5):57–65.

9. Aquino DS De, Paula A. Factors associated with treatment for latent tuberculosis in persons living with HIV / AIDS Fatores associados ao tratamento da tuberculose latente em pessoas vivendo com HIV / AIDS Factores asociados al tratamiento de la tuberculosis latente en personas. Cad saúde pública. 2015;31(12):2505–13.

10. Antonucci G, Girardi E, Raviglione M, Vanacore P, Angarano G, Chirianni A, et al. Guidelines of tuberculosis preventive therapy for HIV-infected persons : a prospective , multicentre study. Eur Respir J. 2001;18:369–75.

11. Rangaka MX, Wilkinson RJ, Boulle A, Glynn JR, Fielding K, Cutsem G Van, et al. Isoniazid plus antiretroviral therapy to prevent tuberculosis : a randomised double-blind placebo-controlled trial. Lancet. 2015;384(9944):682–90.

12. Yirdaw KD, Jerene D, Gashu Z, Edginton ME, Kumar AM V, Letamo Y, et al. Beneficial Effect of Isoniazid Preventive Therapy and Antiretroviral Therapy on the Incidence of Tuberculosis in People Living with HIV in Ethiopia. 2014;9(8). Available from: www.plosone.org. Accessed July 2017

13. Saraceni V, Antonio G, Jonathan G, Victoria V, Bonnie K, Solange C, et al. Physician adherence to guidelines for tuberculosis and HIV care in Rio de Janeiro , Brazil. Brazilian J Infect Dis. 2011;15(3):249–52.

14. Assebe LF, Reda HL, Wubeneh AD, Lerebo WT, Lambert SM. The effect of isoniazid preventive therapy on incidence of tuberculosis among HIV-infected clients under pre-ART care , Jimma , Ethiopia : a retrospective cohort study. BMC Public Health. 2015;15:1–9.

15. Zar HJ, Cotton MF, Strauss S, Karpakis J, Hussey G, Schaaf HS, et al. Effect of isoniazid prophylaxis on mortality and incidence of tuberculosis in children with HIV: randomised controlled trial.BMJ. 2007; 334(7585): 136.

16. Lawan BM, Agu KA. Assessment of short term Isoniazid Preventive Therapy (IPT) in people living with HIV / AIDS. West African J Pharm. 2018;29(1):46–58.

17. Suru KU, Chiegil JE, Adeyemi SO, Martins OFM. Isoniazid preventive therapy implementation among people living with HIV/AIDS enrolled in care at specialist hospital, Yola, Nigeria. Texila Int J Public Heal. 2017;5(4):1–10.

18. Nwokeukwu IH, Okorie O, Emma-ukaegbu U, Ukegbu A, Nwogu K, Eno A, et al. Use of Isoniazid Preventive Therapy on HIV / AIDS Patient in a Tertiary Health Facility South Eastern Nigeria. Sci J Public Heal. 2015;3(2):265–8.

19. Mindachew M, Deribew A, Tessema F, Biadgilign S, Smoll M, Shafer F, et al. Predictors of adherence to isoniazid preventive therapy among HIV positive adults in Addis Ababa, Ethiopia. BMC Public Health. 2011;11(1):916.

20. Federal University Ndufu Alike I. About Ebonyi State | FUNAI [Internet]. . Available from: http://www.funai.edu.ng/about-ebonyi-state/. Accessed Jan 2016.

21. Nigeria HIV/AIDS Indicator and Impact Survey (NAIIS) . 2019. Available from: https://afenetnigeria.net/Documents/HIV_AIDS_FACT_SHEET/NAIIS-SOUTH-EAST-ZONE-FACTSHEET.pdf. Accessed November 2020

22. Oshi DC, Omeje JC, Oshi SN, Alobu IN, Chukwu NE, Nwokocha C, et al. An Evaluation of Innovative Community - based Approaches and Systematic Tuberculosis Screening to Improve Tuberculosis Case Detection in Ebonyi State , Nigeria. Int J Mycobacteriol. 2017;6:246–52.

23. Overview of Ebonyi State Ministry of Health. 2018. Available from www.ebonyistate.gov.ng/Ministry/Health/. Accessed April 2018

24. Kitahata MM, Tegger MK, Wagner EH, Holmes KK. Comprehensive health care for people infected with HIV in developing countries. BMJ. 2002;325:954–7.

25. Akamike IC, Okedo-Alex IN, Agu AP, Alo C, Ogbonnaya LU. Knowledge and adherence to isoniazid preventive therapy among people living with HIV (PLHIV) in multilevel health facilities in South-East, Nigeria: baseline findings from a quasi-experimental study. Pan Afr Med J. 2020;36(261).

26. Abdulrazaak AT, Govender I, Nzaumvila D, Group F. Knowledge , attitudes and practices of doctors regarding isoniazid preventive therapy in HIV / AIDS patients at Odi District Hospital , Gauteng province , South Africa. South African J Infect Dis. 2018:1-11. https://doi.org/10.1080/23120053.2018.1548726. Accessed Dec 2018.

27. Ngombo AM. Factors affecting implementation of isoniazid preventive therapy in HIV/AIDS clinics in Dar Es Salaam Region, Tanzania. 2013; [Dissertation]. Muhimbili University of Health and Allied Sciences.

28. Denegetu AW, Dolamo BL. Tuberculosis case finding and isoniazid preventive therapy among people living with HIV at public health facilities of Addis Ababa , Ethiopia : a cross-sectional facility based study. BMC Public Health. 2014;14:52.