Outcome of Self Efficacy of Tuberculosis- Infection Prevention Among Patients Recieveing Anti-Retroviral Therapy in Tertiary Hospitals in Ogun State, Nigeria

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Abstract: Tuberculosis (TB) is an infectious disease caused by the bacillus Mycobacterium tuberculosis Human Immunodeficiency Virus (HIV) infection stands out as the most significant risk factor for tuberculosis. Public health education intervention is effective preventive strategy against tuberculosis infection, improvement of people's knowledge of self-efficacy of tuberculosis infection risk factors led to a decrease in prevalence rate of the infection. The study was a descriptive survey utilizing 80-item validated questionnaire to collect information on Knowledge of tuberculosis prevention practices among people living with HIV currently enrolled in two facilities providing free comprehensive HIV care and treatment services in Ogun State Nigeria. Percentages, means and standard deviations analyses were conducted at $p=0.05$ significance level. The age range of participants was 20 to 56 years with a mean $\pm$ standard deviation (SD) of 42.73 ± 2.93 years. The finding from the study revealed that there was no significant differences in knowledge of preventive practices of TB among patients ($p=2.40\pm1.65$). In other to boost the influence of knowledge of HIV paitients prevention practices towards tuberculosis infection across target population , there is need for more awareness and health education intervention on prevention practices

Key words: Antiretroviral Therapy, HIV, HIV patients, Nigeria, Ogun, Prevention practices, Self-efficacy.

INTRODUCTION

Tuberculosis is a global treat and Nigeria is among the high TB, TB/HIV and DR-TB countries globally, along with India, China, Pakistan, Bangladesh, Philippines, Indonesia, and South-Africa (FMOH, 2017). Nigeria ranks 7th among the 30 high TB burden countries globally and first in Africa, accounting for 4% of the estimated incidence cases globally (FMOH 2017). Human

Immunodeficiency Virus (HIV) infection stands out as the most significant risk factor for tuberculosis, particularly in Nigeria where the burden of HIV has high prevalence. (WHO, 2020; Asaolu & Agbede, 2022).

At the end of 2019, about 10 million people fell ill with Tuberculosis (TB) disease accounting for a global incidence of 133 cases in a 100,000 population, prevalence was 27%, with a mortality of 39,933 people (Ogbo, et al 2018; Amballi et al., 2022). At the end of that same year, about three million of the estimated ten million cases were either not reported or not diagnosed (WHO, 2020). Research findings indicate that there is no interaction between IPT and ART regarding mortality, also IPT and ART had an additive effect such that receiving both treatments was a better option than receiving either therapy alone. Further finding from this study was that IPT be given to patients on ART irrespective of their CD4 cell count (Badje et al., 2017; Bamgboye et al., 2020). Public health education intervention is effective preventive strategy against tuberculosis infection, improvement of people's knowledge of tuberculosis infection risk factors led to a decrease in prevalence rate of the infection HIV has already put the patients at risk at increased risk for tuberculosis infection. As a results of this educating them about the bacterium is critical for prevention. Prevention about any diseases requires an adequate understanding of the associated behaviors or practices, similarly, modifying and health behavior or practices requires adequate knowledge of the underlying factors. The common behavior antecedent factors often investigated in this regard include the knowledge, attitude, and perception, and beliefs.

Research Questions

1. What is the effect of peer-supported health education intervention program on Mycobacterium tuberculosis infection-prevention practices among individuals receiving anti-retroviral therapy in tertiary health facilities in Ogun state?

2. What is the outcome of peer-supported health education intervention on mycobacterium tuberculosis infection prevention practices among participants in this study at 12th weeks follow-up.?

Specific Objectives

1. Determine the effect of peer-supported Health Education intervention on *Mycobacterium tuberculosis* infection prevention practices among the individuals in this study at 12th week follow-up

2. Evaluate the effect of outcome of peer-supported health education intervention program on *Mycobacterium tuberculosis* infection prevention practices of among participants in this study at 12th weeks follow-up.

Research Hypothesis

H_0: There will be a significant difference in the effect of peer-supported health education intervention program on *mycobacterium tuberculosis* infection prevention practices of participants in the experimental group between baseline and the 12th week follow-up.

MATERIALS AND METHODS

DESIGN AND STUDY POPULATION

This is a descriptive cross-sectional study of HIV patients between ages 20-59 years currently receiving HIV treatment in two comprehensive HIV treatment facilities in Ogun State, Nigeria

STUDY AREA AND STUDY LOCATION

Ogun State is in southwestern Nigeria. Created in February 1976 from the former Western State. It was carved out of the old western state of Nigeria and named after the Ogun River which runs across it

from North to south. Situated between Latitude 6.20N and 7.80N and Longitude 3.0oE, the state covers a total landmass of 16,409.26sqkm. Ogun State borders Lagos State to the south, Oyo State and Osun State to the north, Ondo State, and the Republic of Benin to the west. Abeokuta is both Ogun State's capital and most populous city, about 90 kilometers from lagos and 740 kilometers from Abuja. Other important cities in the state include Ijebu Ode, the former royal capital of the Ijebu Kingdom, and Sagamu, Nigeria's leading kola nut grower. Ogun state is covered predominantly by rain forest and has wooden savanna in the northwest. Ogun State had a total population of 3,751,140 residents as of 2006. Ogun State is predominantly Yoruba, with the Yoruba language serving as the lingua franca of the state. Ogun State is noted for being the almost exclusive site of Ofada rice production. Ogun is also home to many icons in Nigeria in particular and Africa in general. There are also significant numbers of Nigerians from other parts of the country as well as large quantities of mineral deposits, such as limestone, phosphate, granite stone, gypsum, bauxite, bitumen, feldspar, clay, glass sand, kaolin, quartz, tar sand, gemstones, and crude oil, are available in commercial quantities. The state is the largest producer of cement in the country with 13 million metric tons per annum. There are three tertiary hospitals in the State which are Babcock University Teaching Hospital (BUTH, The Federal Medical Centre (FMC) Abeokuta and Ogun State University Teaching Hospital (OSUTH).

SAMPLING TECHNIQUE

Three tertiary health institutions in Ogun State with DOTS programme-OOUTH Sagamu, BUTH llisan and FMC Abeokuta. Purposive sampling was used to select two of the three facilities

INSTRUMENT AND DATA COLLECTION

Systematic sampling was used to select the participants in selected facilities

The list of registered ART-patients was obtained from the Community Medicine Departmental ART register of the health facility. The participants were then approached by a trained interviewer to complete a structured questionnaire that lasted between 50 to 90 minutes. The 80-item pretested questionnaire (Cronbach's alpha of 0.76-0.80) was used to collect information about Knowledge prevention practices of tuberculosis. Informed consent was sought from all patients who accepted to participate. The study was carried out in NOV, 2022. The instrument was a structured questionnaire that sought information on the socio-demographic characteristics, knowledge of tuberculosis and preventive practices.

ETHICAL ISSUES AND CONFIDENTIALITLY

Ethical approval was obtained from selected hospital a letter of introduction from the hospital was presented at the community health department of the hospital to sought for permission to enter the clinic. The purpose of the study was explained alongside the criteria for participating in the study to the participants. The participants were informed that participation is entirely voluntary and they could opt-out at will.

DATA PROCESSING AND ANALYSIS

Descriptive statistics such as frequency distributions, means and standard deviation were used to summarize quantitative demographic characteristics while categorical variables were summarized with proportions and percentages. Pearson's chi-square test statistics were used to measure the association between categorical patient characteristics, knowledge and preventive practices of TB. The logistic regression model was used to obtain the odds of medication adherence given a particular variable, after adjusting for some important social and demographic variables. The results were presented in appropriate tables. The data analysis was conducted using IBM SPSS version 21.The significance level was set at ($p<0.05$) for all statistical procedure

RESULTS

The age range of participants was 20 to 56 years with a mean ± standard deviation (SD) of 42.73±2.93 years and there were 32 (40%) males and 48 (60%) females (male: female ratio of 1:1.5). In addition, 52 (65%) participants are married, while 1 (1.3%) are single, 27 (33.8%) are separated, likewise with divorce status, and non (0%) of the participants are widower. Participants of Yoruba and Hausa origin are 65 (81.3%) and 8 (10%), respectively, while 7 (10%) of the participants are of Igbo ethnicity. Concerning the nature of participants' occupation, majority (80%) are trader, while about 17.5% and 6.3% are housewife and farmer respectively. Only about 2.5% of the participants are civil servant. The prominent education level of the participants is secondary level education (85%) and this is followed by primary school education (8.8%). The participants who are Christian (60%) are more compare to those of Islamic faith (38.8%) category (See Table 1).

Table 1: Socio-demographic characteristics of the participants in the study

Variables	Control group (FMC)	Intervention group (BU)	Total		
	N=40(%)	N=40(%)	N =80	%	
Age					
<25	0	1(2.5)	1	1.3	
26-30	1(2.5)	3(7.5)	4	5	
31-35	1(2.5)	4(10)	5	6.3	
36-40	4(10)	8(20)	12	15	
41-45	13(32.5)	8(20)	21	26.3	
46-50	14(35)	11(27.5)	25	31.3	
51>	7(17.5)	5(12.5)	12	15	
Gender					
Female	14(35)	34(85)	48	60	
Male	26(65)	6(15)	32	40	
Ethnicity					
Yoruba	30(75)	35(87.5)	65	81.3	
Igbo	5(12.5)	2(5)	7	8.8	
Hausa	5(12.5)	3(7.5)	8	10	
Others	0	0	0	0	
Educational level					
No formal education	0	0	0	0	
Primary	6(15)	1(2.5)	7	8.8	
Secondary	32(80)	36(90)	68	85	
College	2(5)	3(7.5)	5	6.3	
Nature of Occupation					
Civil Servant	2(5)	0(0)	2	2.5	
Farmer	0(0)	5(12.5)	5	6.3	
Housewife	31(77.5)	33(82.5)	7	17.5	
Trader	31(77.5)	33(82.5)	64	80	
Student	0	1(2.5)	1	1.3	
Others	0	0	0	0	
Religion					
Christianity	22(55)	26(65)	48	60	
Islam	18(45)	13(32.5)	31	38.8	

Others	0	1(2.5)	1	1.3	
Marital Status					
Single	0	1(2.5)	1	1.3	
Married	29(72.5)	23(57.5)	52	65	
Divorced/separated	11(27.5)	16(40)	27	33.8	
Widower	0	0	0	0	

The outcome of the evaluations at the immediate post intervention evaluation for the intervention group revealed that all the main variables and outcome variables showed significance differences (p<0.05) when the mean scores of factors such as knowledge, preventive practice, efficacy (i.e. willingness to adopt TPT) are compared across baseline evaluation, and immediate post-interventions evaluation. The effect sizes of the variables are also large indicated in table 2. This changes in the mean scores are attributed to the education intervention sessions given the participants.

Scores for prevention practices of participants both of the same intervention group for baseline evaluation was $\overline{X}$ =3.98, SD= 0.73 compared with prevention practices of participants in follow-up evaluation ($\overline{X}$ =6.90, SD= 0.71). Using independent sample t-test to evaluate null hypothesis, showed that a significant difference (p=0.000<0.05) exist between scores for Baseline evaluation and follow-up evaluation and Effect size of 3.01(95%CI: -3.24 to -2.61).

Since p = 0.000 is less than the chosen significance level α = 0.05, we reject the null hypothesis, and conclude that the score for Baseline evaluation and follow-up evaluation in relation to peer-supported Health Education intervention program for Intervention group follow-up evaluation is significantly different (t-39 = 19, p <0.05)..

It can be said, based on these values provided on , there is a significant difference in the effect of the peer-supported health education intervention program on mycobacterium tuberculosis infection prevention practices of participants in the experimental group between baseline and at 12th weeks follow-up.

Table 2: Paired sample analysis for baseline and immediate evaluation for both groups in the study

Groups	Variables	Max points	Baseline (N=40) $\overline{X}$ ±SD	Immediate (N=40) $\overline{X}$ ±SD	Effect size (95%CI)	P-value
Intervention Group	**Knowledge**	13	2.40±1.65	11.75±0.59	-5.74(-9.87to -8.83)	0.000
	Preventive practice	9	3.98±0.73	6.90±0.71	-3.01(-3.24to -2.61)	0.000
	Efficacy (adopt TPT)	9	1.80± 1.71	8.00±0.00	-3.62(-6.75to -5.65)	0.000
Control Group	**Knowledge**	13	2.00±2.05	3.55±1.71	-1.19 (-1.97to-1.13)	0.000*
	Preventive practice	9	3.85±0.95	3.90±1.10	-0.23(-0.12to 0.02)	0.160
	Efficacy (adopt TPT)	9	1.63±0.87	2.35±1.71	-0.76(-1.03to -0.42)	0.000*

Discussion

In the intervention group, willingness to report if feeling bad or sick while on IPT increased from 12.5% to 90%. The willingness to ask the nurse/doctor about TB medications for prevention of TB (IPT) or about IPT increased from 17.5% to 87.5% in the intervention group. "Willingness to disclose

my HIV status to important people in my life" increased from 15% to 97.5%. While on IPT, the willingness to live a healthy lifestyle increased from 5% to 87%. There was a staggering 100% score for willingness to report any sign of TB while on IPT, up from 5% at the initial baseline phase. At the 12th week, the control group had a mean total efficacy score of 1.86, while the intervention group had a mean total efficacy score of 7.40. Given that efficacy was high following the peer-supported Health Education intervention program, we can conclude that the outcome of the scores validates the hypothesis stated earlier.

Several tactics have been used over time to enhance case identification and care. A community-wide chest X-ray screening effort, house-to-house active case search, Directly Observed Treatment, the Stop TB strategy, and the End TB strategy are some of them (Golub, Mohan & Comstock, 2005). Isoniazid preventive treatment (IPT) has also been included as a strategy to reduce the incidence of tuberculosis (TB) among HIV-positive people (HIV/TB: 2011).

IPT coverage among HIV patients who qualify, however, is subpar (Olabanjo et al,2019) Isoniazid preventative therapy (IPT) is a low-risk, safe medication that has the potential to lower TB-related disease and mortality, particularly in HIV-infected individuals (Balcells et al., 2006; Ayinde et al., 2022).

The high prevalence of TB in Nigeria has been attributed to a number of factors, including HIV, ignorance of TB prevention techniques, non-compliance with IPT, environmental and societal factors such poverty and inadequate nutrition (Ojewumi & Asaolu 2020; Okonkwo Ugwu et al., 2021). The prevalence rate of the infection has decreased as a result of improved public awareness of the risk factors for tuberculosis infection as HIV has already placed patients at elevated risk for tuberculosis infection. Thus, a peer-supported health education intervention program is a successful technique for preventing the spread of tuberculosis.

Research have demonstrated that despite widespread awareness and the availability of preventative interventions, tuberculosis prevention measures are still insufficient (Uchenna, Chukwu, Oshi, Nwafor, and Meka, 2014; Tolossa, Medhin, Legesse 2014; Esmael, Ali, Agonafir, Desale, Yaregal, Desta, 2013). One of the four basic strategies for TB prevention in both HIV-positive and HIV-negative patients is Isoniazid Preventive Therapy (IPT), which was developed after the development of Isoniazid Prophylactic Therapy (WHO 2013). Those who, due to the volume of contact, are at a high risk of developing TB disease, especially those under the age of six, should receive isoniazid preventative medication.

Conclusion

Finding showed that peer-support can be effectively used as change agents in national tuberculosis program, if provided with adequate training and supportive supervision. The human resources needed to implement tuberculosis infection prevention programmes can be found in most ART clinics in Nigeria. The researcher is therefore recommending that the module developed can be adopted by ART clinics as part of their guides since it was effective in improving knowledge, perception and preventive practices.

CONFLICT OF INTEREST

None

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