



Prevalence of Tuberculosis and Human Immunodeficiency Virus (HIV) in Ikere-Ekiti, Ekiti State Southwestern Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author CAO designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors COA and VOO managed the analyses of the study. All authors read and approved the final manuscript.

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ABSTRACT

Tuberculosis (TB) and human immunodeficiency virus (HIV) are major devastating infectious diseases African countries and other regions of the world. TB is a potentially serious infectious bacterial disease that mainly affects the lungs. While HIV is a virus that attacks the body's immune system; which if left untreated, can lead to acquired immunodeficiency syndrome (AIDS). Thus, this study was carried out to monitor the prevalence of tuberculosis and human immunodeficiency virus (HIV) situation in Ikere-Ekiti, Ekiti State Southwestern Nigeria. A total of 191 participants were enrolled in this study. Blood and sputum samples were used in screening of HIV and *Mycobacterium tuberculosis* respectively. 102(53.4%) participants were confirmed HIV positive cases and 89(46.6%) participants were confirmed as *M. tuberculosis*-positive cases. The rate of tuberculosis was higher among women than among men and prevalence of HIV was slightly higher among men than among female. The study shows that age group 26 – 30 years have the highest rate of tuberculosis and age group 36 – 40 years have the highest rate of HIV cases while the highest number of TB with HIV co-infection 34 (17.8%) were gotten from the age group 36 – 40years. The rate at which the prevalence of tuberculosis, HIV and their co-infection are rising is

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due to various challenges facing its eradication. Adequate resource mobilization and effective spending is needed to achieve success. In addition, efforts should be made to improve the surveillance system.

Keywords: Co-infection; HIV; prevalence; tuberculosis.

1. INTRODUCTION

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis*. Tuberculosis typically attacks the lungs but can be affect other parts of the body. The disease has become rare in the developed countries but is still a major public health problem in under no space developed countries. Tuberculosis spread through the air from one person to another [1]. The bacteria are put into the air when a person with tuberculosis disease of lungs or throat coughs, sneezes, speaks or sings. It is estimated that in year 2018, nearly ten million around the world developed tuberculosis and approximately 1.5 million people die from the disease including 251,000 people who also had HIV.

World health organization (WHO) report showed that Nigeria ranked fourth in terms of incidence. The TB epidemic in Nigeria is closely linked to HIV. Nigeria is one of the ten countries that have 80% of people living with HIV and TB co-infection [2]. In adults, tuberculosis is the second leading cause of death due to an infectious disease (after AIDS) with 95% of deaths occurring in under developed countries [2]. The risk factors of developing active tuberculosis are persons with a weakened immune system, persons who developed the infection in the past (2 – 5 years), older adults and young children, people with used injected recreational drugs, and people without appropriate treatment for tuberculosis in the past.

Acquired Immune Deficiency Syndrome (AIDS) is a serious condition that weakens the body's immune system, leaving it unable to fight off illness. AIDS is the last stage in a progression of diseases resulting from a viral infection known as the Human Immunodeficiency virus (HIV or AIDS virus) [3].

The alarming rate at which tuberculosis with HIV kills people in Nigeria has become a worrisome problem, it is therefore necessary to monitor the prevalence of tuberculosis and HIV situation in Nigeria using Ikere-Ekiti, Ekiti State as case study.

2. MATERIALS AND METHODS

2.1 Study Area and Population

One hundred and ninety-one participants between the ages of 15 years and above attending Comprehensive Health Center, Ikere Ekiti, Ekiti State were enrolled in this study and comprised suspected and newly diagnosed HIV and tuberculosis cases.

2.2 Sample Collection and Processing

Sputum samples obtained from the participants were screened for the presence of *Mycobacterium tuberculosis* using standard culture and phenotypic biochemical techniques. Blood samples were used in screening of HIV participants using start pack TM and unigold TM KITS.

2.3 Retroviral Screening (RVS)

The patient's thumb was swabbed with methylated spirit and pricked with a sterile lancet. Thirty 30 µl of blood was collected with sterile serological pipette. A new sterile Stat pack was detached and the sample was dropped into the sample port. Three (3) drops of Stat pack chase buffer solution was added to the sample for quick and easy flow into the test window (T) and control window (C). A distinct red line appearing only in the control window indicates a negative result while two distinct red lines appearing at both control (C) and test (T) windows indicate a positive result.

2.4 Statistical Analysis

Data obtained from this study were analyzed by descriptive statistical methods.

3. RESULTS AND DISCUSSION

3.1 Results

A total of 191 participants were enrolled in this study, of which 102 (53.4%) participates were confirmed HIV positive cases and 89 (46.6%)

participants were confirmed as *M. tuberculosis*-positive cases based on culture and biochemical testing. The rate of tuberculosis was higher among women than among men as shown in Fig. 1.

The prevalence of HIV was slightly higher among men than among female as shown in Fig. 2. In Table 1, the Prevalence of TB and HIV according to gender and age groups shows that ages ranging from 26 – 30 years have the highest rate of tuberculosis and ages ranging from 36 – 40

years have the highest rate of HIV cases. In addition, ages ranging from 51 above shows the least in both TB and HIV cases in the study.

The overall study population in the age difference shown that, the highest number of TB with HIV patients 34(17.8%) were gotten from the age group of 36 – 40years, followed by age group of 31 – 35 with 31(16.2%) and least in the age group of 51-above with 6(3.1) as indicated in Table 1.

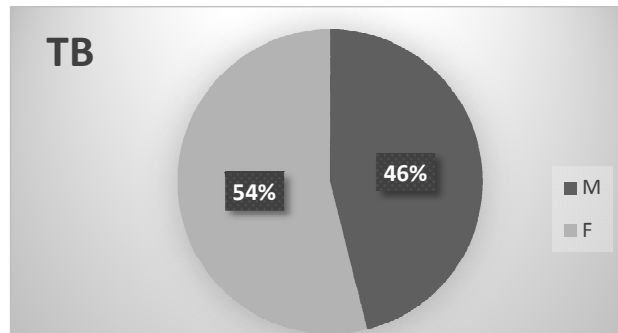


Fig. 1. Distribution of Tuberculosis according to sex

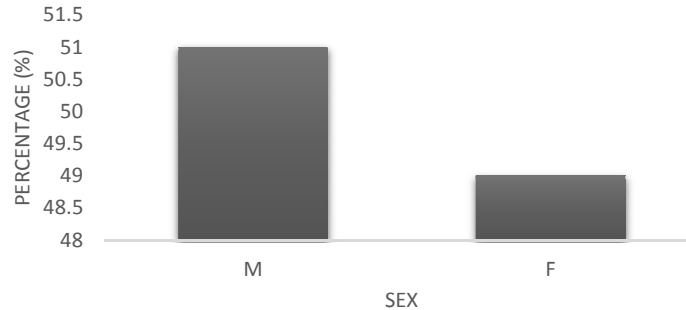


Fig. 2. Distribution of HIV according to sex

Table 1. Prevalence of TB and HIV according to gender and age groups

Ages (Yrs.)	TB n (%)	HIV n (%)	Female n (%)	Male n (%)	TB/HIV co-infection n (%)
15 – 20	12(13.5)	10(9.8)	10(10.6)	12(12.4)	22(11.5)
21 – 25	13(14.6)	16(15.7)	09(9.6)	20(20.6)	29(15.2)
26 – 30	14(15.7)	13(12.7)	13(13.8)	14(14.4)	27(14.1)
31 – 35	12(13.5)	19(18.6)	15(16.0)	16(16.5)	31(16.2)
36 – 40	13(14.6)	21(20.6)	21(22.3)	13(13.4)	34(17.9)
41 – 45	10(11.2)	15(14.7)	09(9.6)	16(16.5)	25(13.1)
46 – 50	09(10.1)	08(7.9)	14(14.9)	03(3.1)	17(8.9)
51 >	06(6.8)	00(0.0)	03(3.2)	03(3.1)	06(3.1)
Total	89(100)	102(100)	94(100)	97(100)	191(100)

n(%) – number and percentage
 TB – tuberculosis; HIV – Human immunodeficiency virus

3.2 Discussion

The frequency of isolation of *Mycobacterium tuberculosis* from patients attending Health Center mentioned in this study was 47% which agrees with a similar study such as Gyar et al. [4] reported 69 were positive for AFB showing a prevalence of 34.5%. The report of Adebisi et al. [5] indicated high incidence of tuberculosis in West Africa, especially considering the high rate of risk factors, which propagate its spread. This is higher than the findings in other Nigerian studies [6,7] and this may be because there is still great fear of tuberculosis due to poor understanding of the disease process in the rural area, even among the healthcare providers. This study shows that women have high rate of tuberculosis than men counterpart with 48(54 %) and 41(46 %) respectively belonging to productive age group (26 – 30) which contradicts Otokunefor et al. [8] who report showed high rate of tuberculosis in male with 399 (65.5 %). In contrast, Gyar et al. [4] reported the majority, 42 (34.4 %) were females and 31 (43.7 %) of them males belonging to the socio-economically productive age group (31 – 40).

Results obtained from this study showed high prevalence of HIV in patients attending Comprehensive Health Center, Ikere-Ekiti with 53% and is most prevalent among the male patients with 51% compared to female patients with 49% which may be as a result of inadequate knowledge about the disease in the general population, even among health care professionals. This is in agreement with the review report of Awolaye and Thron [9]. The highest number of HIV (21 (20.6 %)) were seen from the age group of 36 – 40 years. However, the result contradicts the report of Badru et al. [10], who showed that HIV prevalence among young adolescents was 0.6 % due to their perception of not to be at risk of HIV.

This study showed high prevalence rate of HIV-TB co-infection which did not agreed with a study findings that showed 3.5 % (95 % CI: 2.7 % – 4.4 %) of HIV patients had active tuberculosis within the study period [11]. In addition, studies recognized that being co-infected with HIV and TB potentially increases the risk of a poorer TB treatment outcome compared with if the patient with TB is HIV negative which agree with the studies of Ofoegbu and Odume [12] and Musa et al. [13]. This study also indicated that the highest number of TB with HIV patients 34 (17.8 %) were gotten from the

age group of 36 – 40years and the least TB with HIV co-infection 51 -above age group 6(3.1 %) which closely related to a study by Anochie et al. [14] that showed TB/HIV Co-infection was highest among 23 – 34 age groups (21.7 %) who are of child bearing age and the least TB/HIV co-infection was 66 – 74 age groups (0.2 %).

4. CONCLUSION AND RECOMMENDATIONS

The rate at which the prevalence of tuberculosis, HIV and their co-infection are increasingly rising is due to various challenges facing its eradication such as poverty, endemic of the causative agents, drug resistant tuberculosis, and inefficient diagnostic methods, among others. The challenges need to be addressed by selecting the most appropriate strategy for the area and the country whole, and efforts should be made to improve the surveillance system. Leveraging on the public-private partnership and cost-effectiveness evaluation should also be encouraged. Adequate financial support and political will is needed from local, state and federal governments with effective spending in order to achieve success. If most of those infected are detected early and provided effective treatment, they will go back to the community and society, and be economically productive.

CONSENT AND ETHICAL APPROVAL

Ethical permission was obtained from the Research Review and Ethical Committee of Comprehensive Health Center, Ikere Ekiti, Ekiti State, Nigeria. The objectives as well as the nature of the study were explained to the individual participants for the purpose of their consent.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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