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PREVALENCE STUDIES OF HUMAN T-LYMPHOTROPIC VIRUS TYPE 1 AMONG PULMONARY TUBERCULOSIS PATIENTS IN DUTSE METROPOLIS, NORTH-WESTERN NIGERIA

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ABSTRACT

Human T-lymphotrophic virus type 1 (HTLV-1) is a causative agent of tropic spastic paraparesis and adult T-cell leukaemia, Information regarding the involvement of HTLV-1 in presentation of some subclinical immune suppression that may results in increased rate of HIV and TB infections has long been documented. Sixty (60) Confirmed Pulmonary TB subjects consisting of 41 males and 19 females were recruited in this study, Tuberculosis was confirmed by collecting their sputum samples and analysed using GeneXpert. The prevalence of HTLV-1 IgG antibodies among TB subjects was 6.6%, while that of IgM was 1.6%. Accordingly, sexually active couple group has the highest prevalence of 2.3% when compared to single and widow categories, age group 15-24 has the highest percentage of 3.3% for HTLV-1 IgG antibodies.

Key words: HTLV-1, Tuberculosis, IgG, IgM.

DES ÉTUDES DE PRÉVALENCE DU VIRUS HUMAIN T-LYMPHOTROPE HUMAIN DE TYPE 1 CHEZ LES PATIENTS ATTEINTS DE TUBERCULOSE PULMONAIRE EN MÉTROPOLE DUTSE, NORD-OUEST LE NIGERIA

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RÉSUMÉ

Les T-lymphotrope humain de type 1 (HTLV-1) est un agent causal de la paraparésie spastique tropicale et des profils à cellules T, de l'information au sujet de l'implication de l'HTLV-1 dans la présentation de certains suppression immunitaire subclinique qui peuvent se traduit par une augmentation des taux de VIH et tuberculose. Soixante (60) a confirmé la tuberculose pulmonaire (composé de 41 sujets de sexe masculin et 19 de sexe féminin ont été recrutés dans cette étude, la tuberculose a été confirmé par la collecte de leurs échantillons d'expectoration et analysées à l'aide d'GeneXpert. La prévalence des anticorps IgG HTLV-1 chez les sujets CT était de 6,6 %, tandis que celle d'IgM a été de 1,6 %. En conséquence, groupe couple sexuellement actifs a les taux de prévalence de 2,3 % par rapport à une seule et veuve, catégories d'âge 15-24 ans a le plus fort pourcentage de 3,3 % pour l'HTLV-1 anticorps IgG.

Mots clés: HTLV-1, la tuberculose, IgG, IgM

INTRODUCTION

The human T-lymphotropic virus, or human T-cell leukaemia-lymphoma virus (HTLV) belongs to the family of viruses that are known to cause a type of cancer called adult T-cell leukaemia/lymphoma and a diseases called HTLV-

I associated myelopathy/tropical spastic paraparesis (HAM/TSP). The HTLV-1 genome is diploid, composed of two copies of a single-stranded RNA virus whose genome is copied into a double-stranded DNA form that integrates into the host cell genome, at which point the virus is referred to as provirus (1).

Human T-cell lymphotropic virus type 1 (HTLV-1) is a human retrovirus that causes persistent infection in the host. While most infected persons remain asymptomatic carriers (ACs), 3–5% develop a T-cell malignancy termed adult T-cell Leukemia (ATL), and another 0.25–3% develop a chronic progressive inflammatory neurologic disease known as HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP) (2). An increased prevalence of the virus infection among individuals with active TB and higher mortality in co-infected individuals are described by several authors (3). However, contradictory results are reported in other studies (4,5). Furthermore, high frequencies of HTLV-1 infection among TB patients have been reported in Japan, Nigeria and Brazil (6,7,8). On the other hand, in studies conducted in Senegal and Papua New Guinea, few TB patients were HTLV-1 infected (9,10). Fewer studies started with HTLV-1-infected individuals and looked at the occurrence of TB. In one Japanese report, TB history was more frequent among HTLV-1-infected than among seronegative men (11) In another Japanese study, chest X-ray findings compatible with old pulmonary TB were more frequent among HTLV-1 carriers than among non-carriers (12). The present research aimed at reporting prevalence of HTLV-1 antibodies among patients infected with pulmonary Tuberculosis (PTB)

MATERIALS AND METHODS

Study Design

The present study is a cross-sectional study.

Study Population

Sixty (60) individuals infected PTB with no history of other chronic diseases were recruited in this study.

Specimen Collection

About 5mls of whole blood was collected aseptically from each subject using standard venepuncture. Samples were dispensed into appropriately labelled screw-capped containers and was left at room temperature for about an hour, after which it was spun at 3,000 rpm for 10 minutes to separate serum from blood clot. Serum were dispensed into corresponding labelled plain containers and was stored at -20°C until needed for assay

Determination of Tuberculosis

Tubercle bacilli was confirmed using GeneXpert as follows; 2 volumes of sample reagent was mixed with one part of sample (Ratio 2:1),

It was mixed vigorously 20 times, incubation at room temperature for 10 minutes and mixed again until sample liquefies. 2mls of sample was

transferred into the open port of Xpert MTB/RIF Cartridge and lid closed, after 30 minutes, cartridge Barcode was scanned using barcode reader of the machine. Instrument module door was opened with the blinking green light and load cartridge. And the result was recorded.

ELISA technique for HTLV-1 Determination

Fifty (50µl) of negative and positive controls were added to the negative and positive control wells respectively. In sample wells, 40µl Sample dilution buffer and 10µl sample were added. Samples were loaded onto the bottom without touching the well wall and mix well with gentle shaking. After 30 minutes of incubation at room temperature and sealed with closure plate membrane, diluted with buffer 30 times for 96T and washed 5 times. 50µl HRP-Conjugate reagent was added to each well except the blank control well, it was incubated for 30 minutes and washed. 50µl Chromogen Solution A and B were added to each well, mixed with gentle shaking and incubated at 37 °C for 15 minutes, light was avoided during colouring. Lastly, 50µl of stop solution was added to each well to terminate the reaction and colour in the well changed from blue to yellow. Absorbance was Read at 450nm using a Microtiter Plate Reader and OD value of the blank control well is set as zero.

Ethical Clearance

An ethical approval was obtained from Jigawa State Ministry of health ethical committee before the commencement of the study, and the consent/assent of the subjects was sought for during this study. The subject was giving an opportunity to accept or reject enrolment into the study.

Statistical Analysis

The results were entered in Microsoft Excel and later transferred in statistical software SPSS Version 20 and OpenEpi version 2.3 for analysis.

RESULTS

Table 1 shows the prevalence of HTLV-1 IgG and IgM antibodies among the Pulmonary Tuberculosis patients. Of the sixty screened patients 6.6% that is 4 tested positive to HTLV-1 IgG antibodies while 1.6% that is 1 patient tested positive to IgM antibodies. The statistical analysis shows that there is no significant difference between IgG and IgM antibodies among Tuberculosis patients enrolled in this study with p-value >0.005.

Table 2 shows relationship between HTLV-1 IgG and IgM antibodies and marital status of the Tuberculosis patients. Of the sixty study participants 3.2% and 1.6% of the married couples tested positive to HTLV-1 IgG and IgM antibodies respectively, single couples have 1.6% for IgG and 0% for IgM antibodies. However, all the participants in Divorce category have 1.6% for IgG antibodies

and 0% for IgM. Widow Categories tested negative to both IgG and IgM antibodies.

Table 3 shows age distribution with respect to HTLV-1 IgG and IgM antibodies among Pulmonary tuberculosis patients. Age group 5-14 and 55-64 all tested negative to both IgG and IgM antibodies.

Age group 15-234 has highest percentage prevalence of IgG antibodies with 3.3%, age group 25-34 and 45-54 have both 1.6%, while 55-64 have 0% prevalence. Age group 45-54 is the only group that have participant who tested positive to HTLV-1 IgM antibodies

TABLE 1: PREVALENCE OF HTLV -1 IGG AND IGM ANTIBODIES AMONG STUDY POPULATION

Sex	No. Screened	IgG (%)	IgM (%)
Male	41	04(6.6)	00
Female	19	00	01(1.6)
Total	60	04(6.6)	01(1.6)
$\chi^2 = 0.7013$		P - valve = 0.4017	

TABLE 2: MARITAL STATUS AND HTLV -1 IGG AND IGM ANTIBODIES AMONG STUDY POPULATION

Marital Status	No Screened	IgG (%)	IgM (%)
Married	32	02(3.2)	01(1.6)
Single	21	01(1.6)	0(0.0)
Divorce	05	01(1.6)	00(0)
Widow	02	00(0)	00(0)
Total	60	04(6.6%)	01(1.6%)
$\chi^2 = 1.068$		P - valve = 0.381	

TABLE 3: AGE DISTRIBUTION AND HTLV -1 IGG AND IGM ANTIBODIES AMONG PULMONARY TUBERCULOSIS PATIENTS

Age Range	No Screened	IgG (%)	IgM (%)
5 - 14	02	00(0)	00(0)
15 - 24	08	02(3.3)	00(0)
25 - 34	21	01(1.6)	00(0)
35 - 44	18	01(1.6)	00(0)
45 - 54	06	00(0)	00(1.6)
55 - 64	05	00(0)	00(0)
Total	60	04(6.6%)	01(1.6%)

DISCUSSION

According to the results obtained from the present study, a percentage prevalence of 6.6% for IgG and 1.6% IgM antibodies among TB patients were recorded, this is in accordance with work of Olaleye *et al.* 1994 (13) who reported a prevalence of 3.6%. Degree of subclinical immunosuppression caused by HTLV-1 infection has been documented by Goon *et al.*, 2004 (14) resulting to other maladies such as crusted scabies, strongyloidiasis and Tuberculosis (15,8). In this study the percentage prevalence of participants who are Tuberculosis and HTLV-1 co-infected was 6.6% for IgG antibodies. A study conducted in Salvador a city with highest prevalence of HTLV-1 in Brazil, found that 11% of patients hospitalised with Tuberculosis were infected with HTLV-1(16). Similarly, it was

documented that in Guinea Bissau a West African country infection with HTLV-1 alone is not sufficient enough to increase the risk of Tuberculosis, however HTLV-1 increase the risk of Tuberculosis among HIV patients (5). Many studies suggested an increase prevalence of HTLV-1 infection with active TB (17,1,3), this is in contrast to the findings of Norrgren *et al.*, 2008 (5). However, in Nigeria there is little or no information that showing the prevalence of HTLV-1 infection among Tuberculosis patients. Based on the results obtained from this study, PTB/HTLV-1 co-infection is higher among sexually active groups with 2(3.3%) compared to widow category which have zero percent prevalence

CONCLUSION

Conclusively, the present research revealed a 6.6% and 1.3% prevalence of HTLV-1 IgG and IgM antibodies respectively among patients with PTB. Also, a higher prevalence of 2.3% has been found among married couples unlike widow group which

has zero percent prevalence. Routine screening for HTLV-1 in TB patients may go a long way in exploring as well as better understanding of HTLV-1 infection in Nigeria and a such will provide sufficient tools for prevention and control of HTLV-1 infection.

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