**PREVALENCE OF TUBERCULOSIS IN HIV CLIENTS ATTENDING NIPRD CLINIC**

**BY**

**Dodo Samuel Justin**

**Afe Babalola University Ado-Ekiti**

**Supervised by**

**Mr. Abarike M.C.**

**Department of Microbiology and Biotechnology, National Institute for Pharmaceutical Research and Development (NIPRD)**

 **MAY 2020**

**Table of Contents**

Title Page…………………………………….1

Table of contents…………………………2

Chapter One

Introduction……………………………….3-5

Aim and objective………………………...6

Chapter Two

Literature Review………………………...7-8

Chapter Three

Materials and Method……………………9

Chapter Four

Result…………………..........................10-12

Chapter Five

Discussion……………………………………….13

Chapter Six

Conclusion and Recommendation……..14

References…………………………………………15

**INTRODUCTION**

Tuberculosis (TB) is a contagious disease that can spread from person to person. TB is caused by bacteria called Mycobacterium tuberculosis. (AIDSinfo, 2019) The TB bacteria spread in the air.TB usually affects the lungs. But TB-causing bacteria can attack any part of the body, including the kidneys, spine, or brain. If not treated, TB can cause death. (AIDSinfo, 2019).

Consumption, phthisis and the White Plague are all terms used to refer to tuberculosis throughout history. It is generally accepted that Mycobacterium tuberculosis originated from other, more primitive organisms of the same genus Mycobacterium. In 2014, results of a new DNA study of a tuberculosis genome reconstructed from remains in southern Peru suggest that human tuberculosis is less than 6,000 years old. Even if researchers theorize that humans first acquired it in Africa about 5,000 years ago, (Carl, 2014) there is evidence that the first tuberculosis infection happened about 9,000 years ago. (Hershkovitz et al., 2008)It spread to other humans along trade routes. It also spread to domesticated animals in Africa, such as goats and cows. Seals and sea lions that bred on African beaches are believed to have acquired the disease and carried it across the Atlantic to South America. Hunters would have been the first humans to contract the disease there. (Carl, 2014).

Scientific work investigating the evolutionary origins of the Mycobacterium tuberculosis complex has concluded that the most recent common ancestor of the complex was a human-specific pathogen, which underwent a population bottleneck. Analysis of mycobacterial interspersed repetitive units has allowed dating of the bottleneck to approximately 40,000 years ago, which corresponds to the period subsequent to the expansion of Homo sapiens sapiens out of Africa. This analysis of mycobacterial interspersed repetitive units also dated the Mycobacterium bovis lineage as dispersing approximately 6,000 years ago, which may be linked to animal domestication and early farming. (Wirth et al., 2008) Human bones from the Neolithic show presence of the bacteria. There have also been a claim of evidence of lesions characteristic of tuberculosis in a 500,000 years old Homo erectus fossil, although this finding is controversial. (Roberts et al., 2009)Results of a genome study reported in 2014 suggest that tuberculosis is newer than previously thought. Scientists were able to recreate the genome of the bacteria from remains of 1,000-year-old skeletons in southern Peru. In dating the DNA, they found it was less than 6,000 years old. They also found it related most closely to a tuberculosis strain in seals, and have theorized that these animals were the mode of transmission from Africa to South America. (Carl, 2014) The team from University of Tübingen believe that humans acquired the disease in Africa about 5,000 years ago. (Carl, 2014) Their domesticated animals, such as goats and cows, contracted it from them. Seals acquired it when coming up on African beaches for breeding, and carried it across the Atlantic. In addition, TB spread via humans on the trade routes of the Old World. Other researchers have argued there is other evidence that suggests the tuberculosis bacteria is older than 6,000 years. (Carl, 2014) This TB strain found in Peru is different from that prevalent today in the Americas, which is more closely related to a later Eurasian strain likely brought by European colonists.(National Public Radio, 2014) However, this result is criticised by other experts from the field, (Carl, 2014) for instance because there is evidence of the presence of Mycobacterium tuberculosis in 9000 year old skeletal remains. (Hershkovitz et al., 2008) Although relatively little is known about its frequency before the 19th century, its incidence is thought to have peaked between the end of the 18th century and the end of the 19th century. Over time, the various cultures of the world gave the illness different names: phthisis (Greek), consumptione (Latin), yaksma (India), and chakyoncay (Incan), each of which make reference to the "drying" or "consuming" effect of the illness, cachexia.In the 19th century, TB's high mortality rate among young and middle-aged adults and the surge of Romanticism, which stressed feeling over reason, caused many to refer to the disease as the "romantic disease".

In 2008, evidence for tuberculosis infection was discovered in human remains from the Neolithic era dating from 9,000 years ago, in Atlit Yam, a settlement in the eastern Mediterranean. (Hershkovitz and Donoghue, 2008) This finding was confirmed by morphological and molecular methods; to date it is the oldest evidence of tuberculosis infection in humans.Evidence of the infection in humans was also found in a cemetery near Heidelberg, in the Neolithic bone remains that show evidence of the type of angulation often seen with spinal tuberculosis. (Madkour, 2004) Some authors call tuberculosis the first disease known to mankind.Signs of the disease have also been found in Egyptian mummies dated between 3000 and 2400 BC. (Zink, 2003) The most convincing case was found in the mummy of priest Nesperehen, discovered by Grebart in 1881, which featured evidence of spinal tuberculosis with the characteristic psoas abscesses. (Madkour, 2004) Similar features were discovered on other mummies like that of the priest Philoc and throughout the cemeteries of Thebes. It appears likely that Akhenaten and his wife Nefertiti both died from tuberculosis, and evidence indicates that hospitals for tuberculosis existed in Egypt as early as 1500 BC. (Madkour, 2004) The Ebers papyrus, an important Egyptian medical treatise from around 1550 BC, describes a pulmonary consumption associated with the cervical lymph nodes. It recommended that it be treated with the surgical lancing of the cyst and the application of a ground mixture of acacia seyal, peas, fruits, animal blood, insect blood, honey and salt.The Old Testament mentions a consumptive illness that would affect the Jewish people if they stray from God. It is listed in the section of curses given before they enter the land of Canaan. (Deuteronomy 28:22)

**AIM AND OBJECTIVES**

**AIM:** The aim is to determine the prevalence of tuberculosis among HIV clients attending NIPRD clinic

**OBEJECTIVES:**

* To examine the prevalence of tuberculosis in HIV clients that come to NIPRD from June to August, 2019.
* To compare tuberculosis prevalence in HIV clients between sex and age.

**LITERARTURE REVIEW**

**OPPORTUNISTIC INFECTION (OIs)**

Opportunistic infections (OIs) are infections that occur more often or are more severe in people with weakened immune systems than in people with healthy immune systems. (AIDSinfo, 2019) People with weakened immune systems include people living with HIV.HIV damages the immune system. A weakened immune system makes it harder for the body to fight off HIV-related OIs.HIV-related OIs include pneumonia, Salmonella infection, candidiasis (thrush), toxoplasmosis, and tuberculosis (TB).OIs are caused by a variety of germs (viruses, bacteria, fungi, and parasites). OI-causing germs spread in a variety of ways, for example in the air, in body fluids, or in contaminated food or water. (AIDSinfo, 2019)

**TUBERCULOSIS AS AN OPPORTUNISTIC INFECTION**

TB is an opportunistic infection (OI). OIs are infections that occur more often or are more severe in people with weakened immune systems than in people with healthy immune systems. HIV weakens the immune system, increasing the risk of TB in people with HIV.Infection with both HIV and TB is called HIV/TB coinfection. (AIDSinfo, 2019) Latent TB is more likely to advance to TB disease in people with HIV than in people without HIV. TB disease may also cause HIV to worsen.Treatment with HIV medicines is called antiretroviral therapy (ART). ART protects the immune system and prevents HIV infection from advancing to AIDS. In people with HIV/TB coinfection, ART reduces the chances that latent TB will advance to TB disease.Worldwide, TB disease is one of the leading causes of death among people with HIV.

**SPREAD OF TUBERCULOSIS**

A person with TB disease of the lungs or throat can spread droplets of TB bacteria in the air, particularly when they cough or sneeze. People who breathe in the TB bacteria can get TB.Once in the body, TB can be inactive or active. Inactive TB is called latent TB. Active TB is called TB disease.The image below shows the difference between latent TB and TB disease.



**SYMPTOMS OF TUBERCULOSIS**

People with latent TB don’t have any signs of the disease. But if latent TB advances to TB disease, there will usually be signs of the disease. Common symptoms of TB disease include:

* A persistent cough that may bring up blood or sputum
* Chest pain
* Fatigue
* Loss of appetite
* Weight loss
* Fever
* Night sweats

**TREATMENT FOR TUBERCULOSIS**

In general, TB treatment is the same for people with HIV and people without HIV. TB medicines are used to prevent latent TB from advancing to TB disease and to treat TB disease. The choice of TB medicines and the length of treatment depend on whether a person has latent TB or TB disease.People with HIV/TB coinfection should be treated for both diseases; however, when to start treatment and what medicines to take depends on a person’s individual circumstances. Taking certain HIV and TB medicines at the same time can increase the risk of drug-drug interactions and side effects. People being treated for HIV/TB coinfection are carefully monitored by their health care providers.

**MATERIALS AND METHOD**

STUDY AREA- this work was carried out in the virology laboratory of the department of microbiology and biotechnology NIPRD (National Institute for Pharmaceutical Research and Development).

STUDY POPULATION- 250 HIV clients that came to virology laboratory for sample collection for viral load were recruited for this study.

**MATERIALS**

* Cotton wool
* 75% alcohol
* Centrifuge
* HIV client’s blood plasma
* Detection of TB antigen by rapid test kit

**PROCEDURE**

The samples were collected through the vein using vacutainer tubes. The plasma was separated using the centrifuge at 1000 rpm for 15 minutes. The strip for the test was properly labelled according to the samples. The strip was dipped into the plasma and allowed for 10 minutes. The results were read as follows; a color at control line only is a negative sample, while a color at both control and sample line is a positive sample.

**RESULT**

|  |  |  |  |
| --- | --- | --- | --- |
| ***OCCUPATION*** | ***TOTAL SCREENED*** | ***POSITIVE*** | ***PREVALENCE (%)*** |
| ***Farmer*** | 15 | 5 | 33.3 |
| ***Business*** | 130 | 5 | 4 |
| ***Civil Servant*** | 80 | - | - |
| ***Housewife*** | 10 | 5 | 50 |
| ***Artisans*** | 15 | 5 | 33.3 |
| ***Total*** | **250** | **20** |  |

**PREVALENCE BY OCCUPATION**

|  |  |  |  |
| --- | --- | --- | --- |
| ***AGE*** | ***NO SCREENED*** | ***POSITIVE*** | ***PREVALENCE (%)*** |
| ***≤10*** | - | - | - |
| ***11-20*** | - | - | - |
| ***21-30*** | 20 | - | - |
| ***31-40*** | 120 | - | - |
| ***41-50*** | 95 | 15 | 15.78 |
| ***51-60*** | 10 | 5 | 50 |
| ***≥61*** | 5 | - | - |
| ***TOTAL*** | **250** | **20** |  |

**PREVALENCE BY AGE**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***AGE*** | ***MALE******SCREENED*** | ***MALE POSITIVE*** | ***PERCENTAGE POSITIVE*** | ***FEMALE SCREENED*** | ***FEMALE POSITIVE*** | ***PERCENTAGE POSITIVE %*** |
| ***≤10*** | - | - | - | - | - | - |
| ***11-20*** | - | - | - | - | - | - |
| ***21-30*** | - | - | - | 20 | - | - |
| ***31-40*** | 20 | - | - | 80 | - | - |
| ***41-50*** | 35 | 5 | 14.2 | 60 | 10 | 16.6 |
| ***51-60*** | 5 | 5 | 100 | 5 | - | - |
| ***≥61*** | 5 | - | - |  |  |  |
| ***TOTAL*** | 65 | 20 |  | 165 |  |  |

**PREVALENCE BY GENDER**

**DISCUSSION**

The result shows that TB is more prevalent in housewives than other occupations. In recent study, only 18 occupational groups reported five or more TB exposure events over the decade studied. Therefore, only a small number of occupations were at risk of TB exposure on a regular basis; most other reported exposures are rare, sporadic and hence unpredictable. (occupational medicine, 2016). The main occupation at risk are healthworkers.

The result shows that there is an increase in prevalence of TB in age 51-60. In a recent study, it was shown that an extremely high rate of acquisition of LTBI in childhood and adolescence in poor African townships of Cape Town. The combination of high prevalence and force of infection in adolescence before the acquisition of HIV infection may be a key factor underlying the explosive HIV-associated TB epidemic in South Africa. HHS public access, (2010).

The result shows that TB is more prevalent in males from age 51-60. Some worldwide studies have shown that males are having higher risk factors like smoking, alcoholism and drug addiction to get tuberculosis than females. In one of the study from Hong Kong, Leung *et al*, (2004). Therefore, the result is in agreement to this study.

**CONCLUSION**

Mostly men smoke and are alcoholics which also weaken the immune system and expose them to tuberculosis. Some women smoke and are also alcoholics. Health workers are the ones mostly exposed to tuberculosis.

**RECOMMENDATION**

* I recommend that there be awareness that smoking and alcoholism leads to the TB disease as a result of the immune system being weakened
* Health workers should be provided with equipment for protection from various viruses, infections, etc.

**REFERNCES**

* Carl Zimmer, "Tuberculosis Is Newer Than Thought, Study Says", New York Times, (2014).
* Hershkovitz, Israel; Donoghue, Helen D.; Minnikin, David E.; Besra, Gurdyal S.; Lee, Oona Y-C.; Gernaey, Angela M.; Galili, Ehud; Eshed, Vered; Greenblatt, Charles L., (2008). "Detection and Molecular Characterization of 9000-Year-Old Mycobacterium tuberculosis from a Neolithic Settlement in the Eastern Mediterranean“.
* Wirth T.; Hildebrand F.; et al. (2008). "Origin, spread and demography of the Mycobacterium tuberculosis complex“
* AIDSinfo (2019). ‘’HIV and opportunistic infections, coinfections and conditions
* Roberts, Charlotte A.; Pfister, Luz-Andrea; Mays, Simon (2009). "Letter to the editor: Was tuberculosis present in Homo erectus in Turkey?".