

PREVALENCE AND FACTORS INFLUENCING TUBERCULOSIS AMONG PEOPLE LIVING WITH HIV SEEKING HEALTH CARE AT THE ART CLINIC IN KAWAALA HEALTH CENTRE IV- KAMPALA DISTRICT. A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background

This study specifically assessed the prevalence of Tuberculosis among PLWHIV, the social and cultural factors, and the socio-economic factors contributing to the prevalence of Tuberculosis in HIV/AIDS in patients seeking health care in Kawaala Health Center IV in Kampala district.

Methodology

The study adopted a cross-sectional research design with a quantitative approach to data collection where 96 respondents were conveniently sampled and data was gathered from them using questionnaires and self-administration questionnaire method of data collection.

Results

The study established that out of 96 respondents, 10 (10.4%) had TB while 86 (89.6%) of the HIV patients studied did not have TB. Among the 10 who had TB, 07 (70%) were male and females were 03 (30%). The study further indicated that out of 96 respondents, 51 (53.1%) did not have a family history of TB however, 56 (58.3%) were active smokers and 63 (66%) did not drink alcohol but 50 (52.1%) of those who drank did so from the joints with their friends and 80 (83%) did not have any TB patient that they were closed to. The study also established that out of 96 respondents, 60 (62.5%) were unemployed of which 58 (60.4%) had an income level of below 200,000 shillings with 67 (70%) being rural residents.

Conclusion

The study therefore concluded that the prevalence of TB among HIV patients was high, most especially among male patients with the prominent socioeconomic factors being unemployment, income level of below 200,000 shillings, rural residency, and overcrowding while active smoking and drinking from the joints with friends were the prominent socio-cultural factors.

Recommendation

The study recommends the government establish collaboration between TB and HIV programs which should be strengthened by creating a coordinating body to ensure very close collaborative activities to avoid leakages in the referral system for both programs.

Keywords: Tuberculosis, HIV, Art Clinic

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Background

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis* and occasionally *Mycobacterium bovis* and *Mycobacterium africanum* (Alemu et al., 2021). *Mycobacterium bovis* is pathogenic mainly to cattle and sometimes found in other animals (WHO, 2020). The disease affects the lungs causing pulmonary tuberculosis and the bacilli can move to other parts of the body causing extra pulmonary tuberculosis. Tuberculosis spreads through the air when individuals who are sick with pulmonary tuberculosis expel the bacteria into the air by coughing.

According to the World Health Organization (WHO, 2020), about one-third of the world's population is

infected with the tuberculosis bacterium. About 10 million cases of active disease are estimated to occur each year and annually, about 3 million people die of tuberculosis.

Globally, there is an estimated 9 million tuberculosis cases worldwide, with 1.5 million deaths. The risk of developing tuberculosis is estimated to be between 16-27 times greater in people living with HIV than among those without HIV infection, which affects their survival (WHO 2018). Human immune deficiency (HIV)/AIDS has substantially altered the epidemiology of TB by increasing the risk of reactivating latent TB, increasing the chance of TB infection once exposed to tubercle bacilli

(re-infection), and increasing the risk of rapid progression soon after infection (Alemu et al., 2021).

According to (Kigozi et al., 2019) in sub-Saharan Africa, approximately 80% of HIV-related mortality cases are associated with TB. In South Africa, studies found that the burden of tuberculosis in the country remains unacceptably high with more than 60% of TB patients being HIV positive. Out of 318,193 TB cases that were detected, approximately 61% were HIV co-infected and over 72,000 HIV-positive TB cases died. In Zambia, HIV prevalence is 13.5% with 62% of patients co-infected with HIV. The annual TB incidence is 408 per 100 000 populations, with 239/100 000 TB cases among HIV-infected persons where the prevalence is higher in detainees than those just entering the prison (Telisinghe et al., 2019).

In East Africa, particularly Kenya, the prevalence of Tuberculosis cases was 39% in people living with HIV where over 53000 patients were co-infected with Tuberculosis /HIV and over 24000 people died. (Suleiman et al., 2019). The risk of developing TB is 10% during a lifetime but for persons co-infected with both TB and HIV, the annual risk of developing active TB disease exceeds 10%.

Uganda is one of the highest-burden twenty-two countries in Sub-Saharan Africa contributes 80% of the world's tuberculosis burden with an estimated TB incidence of 200 cases per 100,000 (Quality of Tuberculosis Services Assessment in Uganda 2020). The national TB prevalence is 7.3% with 54% of the population co-infected with HIV. Despite improvements in access to antiretroviral therapy (ART), mortality in People Living with Human Immunodeficiency Virus (PLHIV) is still high and primarily attributed to tuberculosis (TB) infection (Majigo et al., 2020). The National Tuberculosis and Leprosy Programme annual report of 2019 indicates that about 31% of all TB-notified cases had co-infection with HIV (UNTPS, 2020). The study aims to determine the prevalence of Tuberculosis among PLWHIV seeking health care in Kawaala Health Center IV, Kampala district

METHODOLOGY

Study design

A cross-sectional study design was used to conduct the study because it allowed the determination of independent and dependent variables at the same point in time with no follow-up of the participants.

Study area

The study was carried out at Kawaala Health Centre IV, Central Kampala, Kampala district. Kampala district is located in the central region of Uganda and is Uganda's capital city. The coordinates of the town are "0° 19" N, 32°35" E and the GPS of Kawaala Health Centre IV are 0.281379, 32.545525. This study area has been chosen because it receives a large number of HIV patients in the ART clinic hence sample population and size were obtained. The study was carried out from May to October 2023.

Study population

The study was conducted among people living with HIV/AIDS at Kawaala Health Centre IV, Kampala district and this was because people with HIV are at a higher risk of acquiring Tuberculosis.

Sample size determination

This was determined using the Kish Leslie formula for sample size determination, which states that.

$$N = \frac{z^2(PQ)}{d^2} D$$

Where n=required sample size

z=standard normal deviation (1.96) which corresponded to a 95% confidence level.

P=proportion of the target population was estimated to have TB and HIV/AIDS was assumed to be 50 % (0.5) to yield the highest sample size.

Q=1-p (proportion in the target population that did not have TB and HIV /AIDS=0.5 (1-P)

D=degree of precision desired

$$\text{Thus } N = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.1)^2} = 385$$

Sample size =96.04

A sample size of 96 subjects was included.

Sampling technique

A convenient sampling technique was employed in the study to select the participants. This was because the condition of interest was known among the target population making this sampling method to be easy to perform.

Sampling procedure

A convenient sampling procedure was employed in the study to select the participants, where patients who had attended the ART clinic on that day were explained the purpose of the study, and those who consented with the viral load nonsuppression results were sampled based on first come first serve.

Data collection method

Data was collected using an observation of the test results and a structured interviewer-administered questionnaire prepared. These were pretested before the study and ample time was provided to the respondents. This was because the use of interviewer-administered questionnaires removed the necessity of the respondent being literate, and allowed for clarification of questions and responses. This was done by both the researcher and trained research assistants.

Laboratory Investigation

TB LAM.

Urine was collected from HIV/AIDS patients with viral load nonsuppression results, a TB LAM strip was dipped into the urine and left to stand according to the standard operating procedure.

GENEXPERT

For all those who tested positive on samples on TB LAM, sputum containers were given to patients to collect the early morning sample sufficient enough for Gene Expert. Results obtained from the Gene Expert machine were tabulated in the data collection sheet.

Data collection tools

The data was collected using an observation checklist for the prevalence and questionnaires consisting of open-ended questions for socioeconomic and socio-cultural factors variables. Laboratory request forms were used during sample collection majorly to determine the prevalence of TB.

Data collection procedure

Urine was collected from HIV/AIDS patients with viral load non suppression results, a TB LAM strip was dipped into the urine and left to stand according to the standard operating procedure that was available. For the positive samples on TB LAM, sputum containers were given to patients to collect the early morning sample sufficient enough for Gene Xpert, and results obtained from the Gene Xpert machine were tabulated in the data collection sheet.

A questionnaire was then administered to the participants that met the inclusion criteria.

Dependent variable

Prevalence of TB among HIV patients.

Independent variables

The socio-cultural and socio-economic factors associated with TB among HIV patients.

Quality control

Piloting the study: A similar study was carried out on HIV-positive individuals at Kibuli Muslim Hospital Kampala district. A sample of 5 participants was interviewed and necessary corrections were made to the questionnaire before data collection.

STUDY FINDINGS

Socio-demographic characteristics of the respondents

Pretesting: Questionnaires were pretested on 05 randomly picked respondents in Kisenyi Health Center IV to find out if respondents would easily understand and answer questions as required and the mistakes identified were corrected before actual data collection.

Training of the researcher assistants: The research assistants were trained by the researcher on the right and correct procedure of data collection which involved probing the respondents in line with the subject matter under investigation before they were given a go-ahead.

Time for data collection: Data was collected within a period of four weeks and the interviewing of each respondent took about 10 to 15 minutes.

Selection criteria

All HIV/AIDS with viral load nonsuppression attending Kawaala Health Centre IV at the time of the study and consented were included while All HIV/AIDS patients who were critically ill and those who failed to consent were excluded from the study.

Data analysis and presentation

Data was cleaned, sorted, and checked for completeness and then entered into Microsoft Office Software (Excel) and were analyzed manually using a scientific calculator. It was presented in the form of frequency distribution tables, charts, and figures.

Ethical considerations

The research supervisor and the research committee of Medicare Health Professionals College -Kampala, approved this research proposal.

An introductory letter from the school of Diploma in Clinical Medicine and Community Health was issued by the principal, which was used to introduce a researcher to the DHO Kampala district.

The purpose of the study was first explained to the participants and consent was sought first from them or their parents or caretakers. Information obtained from the study was kept with strict confidentiality.

Table 1: Shows the distribution of the respondents by social-demographic characteristics (n=96)

| Variable | Category | Frequency (n) | Percentage (%) |
|--------------------|----------------------|---------------|----------------|
| Gender | Female | 32 | 33.3% |
| | Male | 64 | 66.7% |
| Age group | 18-30 years | 24 | 25% |
| | 31-40years | 28 | 29.2% |
| | 41 and above years | 44 | 45.8% |
| Marital status | Single | 20 | 20.8% |
| | Married | 48 | 50% |
| | Others | 28 | 29.2% |
| Level of education | None | 13 | 13.5% |
| | Primary level only | 29 | 30.2% |
| | Secondary level only | 45 | 46.9% |
| | Tertiary level | 09 | 9.4% |
| Employment status | Civil servant | 09 | 9.4% |
| | Self-employed | 27 | 28.1% |
| | PeasaNT | 60 | 62.5% |

According to socio-demographic characters, the findings found that the majority of the respondents 64 (66.7%) were male while the females were 32 (33.3%), those aged 41 and above years were 44 (45.8%) making them the majority while those aged 18-30 years were the minority 24 (25%), in regards to marital status, half were 48 (50%) were married and the single ones being the least 20

(20.8%). Those who attained at least secondary education dominated 45 (46.9%) while those who never attained any formal education were the least 13 (13.5%) with peasants being the majority 60 (62.5%) followed by those who were Self-employed 27 (28.1%) and the civil servants were the least 09 (9.4%).

Prevalence of TB among HIV patients

Table 2: Showing respondents by the TB test results and by its distribution by gender (n=96)

| TB test results | Frequency (n) | Percentage (%) |
|-------------------------------|---------------|----------------|
| Negative | 86 | 89.6% |
| Positive | 10 | 10.4% |
| Distribution by gender | | |
| Male | 07 | 70% |
| Female | 03 | 30% |
| Total | 10 | 100% |

The majority of the respondents 86 (89.6%) were negative for TB while 10 (10.4%) were positive for TB.

According to gender distribution, the majority of TB-positive respondents 07 (70%) were male while the minority 03 (30%) were female

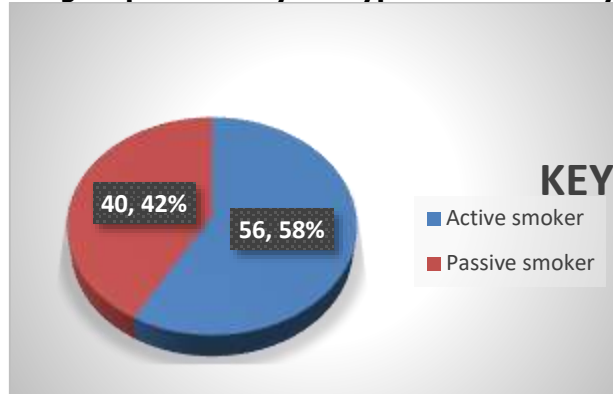
Socio-cultural factors associated with TB among HIV patients

Table 3: Showing respondents by whether they had a family history of TB (n=96)

| Response | Frequency (n) | Percentage (%) |
|--------------|---------------|----------------|
| No | 51 | 53.1% |
| Yes | 45 | 46.9% |
| Total | 96 | 100% |

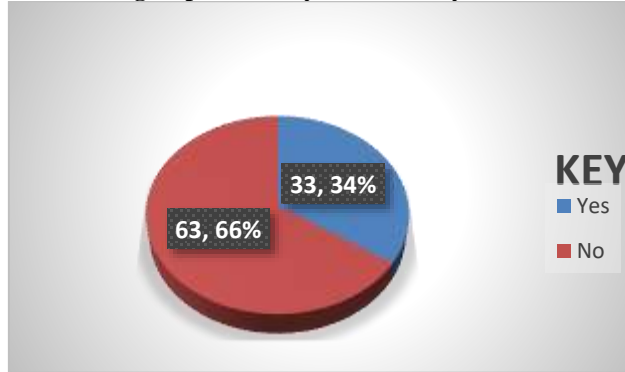
More than half of the respondents 51 (53.1%) did not have a family history of TB while less than half 45 (46.9%) had a family history of TB.

Figure 1: Showing respondents by the type of smoker they were (n=96)



The majority of the respondents 56 (58%) were active smokers while the minority 40 (2%) were passive smokers.

Figure 2: Showing respondents by whether they drink alcohol (n=96)



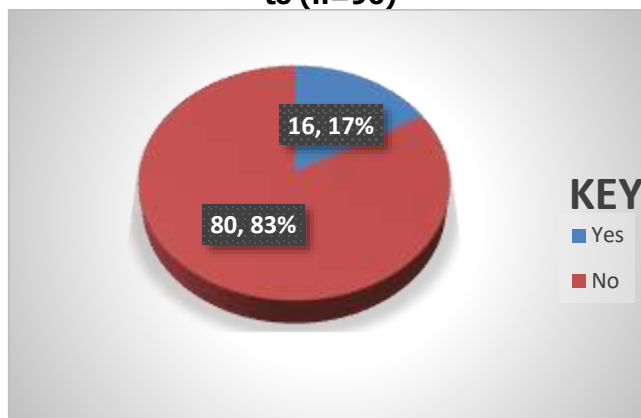
The majority of the respondents 63 (66%) reported that they did not drink alcohol while the minority 33 (34%) reported that they drank alcohol.

Table 4: Showing respondents by where they drank alcohol from (n=96)

| Where alcohol is taken from | Frequency (n) | Percentage (%) |
|-----------------------------|---------------|----------------|
| In a joint with people | 50 | 52.1% |
| At home alone | 22 | 22.9% |
| Along the road | 22 | 22.9% |
| In the bush | 02 | 2.1% |
| Total | 96 | 100% |

The majority of the respondents 50 (52.1%) drank alcohol from joints with people, another 22 (22.9%) drank from home alone and along the road respectively while the minority 02 (2.1%) drank from the bush.

Figure 3: Showing respondents by whether they had any TB patient that they were close to (n=96)



The majority of the respondents 80 (83%) did not have any TB patients that they were close to while the minority 16 (17%) had.

Socio-economic factors associated with TB among HIV patients

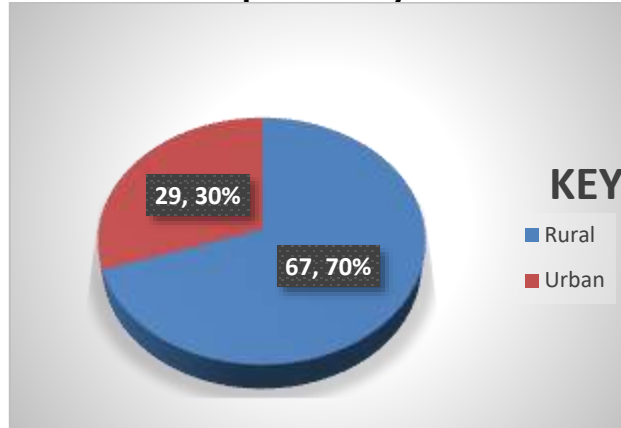
Table 5: Distribution of the respondents by what they do for a living and by their level of income (n=96)

| Source of living | Frequency (n) | Percentage (%) |
|---------------------------------------|---------------|----------------|
| Unemployed | 60 | 62.5% |
| Business person | 16 | 16.7% |
| Professional (teacher healthy worker) | 12 | 12.5% |
| Farmer | 06 | 6.3% |
| Pupil/student | 02 | 2.1% |
| Total | 96 | 100% |
| Level of income | | |
| Below 200,000 shillings | 58 | 60.4% |
| 200,000-500,000 shillings | 30 | 31.3% |
| Above 500,000 shillings | 08 | 8.4% |
| Total | 96 | 100% |

The majority of the respondents 58 (60.4%) had an income level of below 200,000 shillings a significant number of respondents 30 (31.3%) had an income level of 200,000-500,000 shillings while the minority 08 (8.4%) had an income of level of above 500,000 shillings.

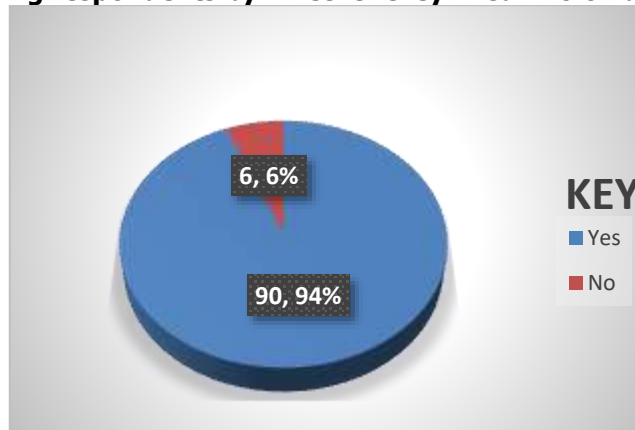
The majority of the respondents 60 (62.5%) were unemployed, 16 (16.7%) were business persons, 12 (12.5%) were professionals, 06 (6.3%) were farmers while the minority 02 (2.1%) were pupils/students.

Figure 4: Distribution of the respondents by their area of residence (n=96)



More than three-quarters of the respondents 67 (70%) were rural residents while less than half 29 (30%) were urban residents.

Figure 5: Showing respondents by whether they lived in crowded areas (n=96)



Almost all respondents 90 (94%) lived in overcrowded areas while a few respondents 06 (6%) did not live in overcrowded areas.

Discussion

Prevalence of Tuberculosis in people living with HIV/AIDS

The findings found that the prevalence of TB among HIV patients was 10 (10.4%) while it was not prevalent among 86 (89.6%) of the HIV patients studied. The findings of this study imply that TB-HIV co-infection was common among the respondents and that there was a very high probability of these respondents contracting TB. This is probably because of their weakened immunity which makes them susceptible to TB and other opportunistic diseases coupled with poor health practices that may keep on predisposing them to TB bacteria hence resulting in infection. The findings of this study are consistent with a study conducted by (Pang et al., 2018) which reported an 11.5% tuberculosis prevalence among the respondents.

According to gender distribution, the majority of TB-positive respondents 07 (70%) were male while the minority 03 (30%) were female. This study's results

indicated that male HIV patients were more likely to contract TB than female HIV patients and it could be due to poor health and risky behaviors which increasingly predispose male patients to TB bacteria. The findings of this study correlate with a study by (Nduba et al., 2015) which found that 73% of male HIV patients had TB compared to 27% of female patients.

Social and cultural factors contributing to the prevalence of tuberculosis in people living with HIV/AIDS

The findings found that more than half of the respondents 51 (53.1%) did not have a family history of TB while less than half 45 (46.9%) had a family history of TB. This study finding indicates a lower likelihood of these respondents falling sick of TB. This is probably because of good health behaviors and practices observed by these family members that shielded them from contracting TB. The findings of this study disagree with a study conducted by WHO, (2019) which reported that (63%) of their respondents had a family history of TB and accounted for 6% of total TB cases in HIV patients.

The majority of the respondents 56 (58.3%) were active smokers while the minority 40 (41.9%) were passive smokers. These study findings imply that most respondents were predisposed to TB by smoking. This is probably because of stressful life vents coupled with poverty which results in people smoking in a bid to minimize stress. The findings of this study correspond with a study conducted by K-Lonnroth *et al.*, (2020) which implicated smoking as a cause of TB among HIV patients where 69.1% were active smokers with males who were active smokers accounting for 37.1% and females 32 %.

The majority of the respondents 63 (66%) reported that they did not drink alcohol while the minority 33 (34%) reported that they drank alcohol. The findings of this study imply that the majority of these respondents were not predisposed to TB infection through alcoholism. This is probably because these respondents adhered to the guidelines given to them by the health facility during health education sessions regarding the prevention of TB infection in HIV, it may also be due to the good attitudes towards medication where an individual chose to perform activities which protects them from contracting diseases. These study findings contradict a study by Poudyal *et al.*, (2020) which reported that 69.8% of the respondents who had TB were alcohol users.

The majority of the respondents 50 (52.1%) drank alcohol from the joints with people while the minority 02 (2.1%) drank from the bush. This study's results implied that most of the respondents who drank alcohol from the bars were at a high risk of contracting TB and this is probably because of overcrowding and sharing of the drinking dishes with a lot of people whose TB status is unknown. Drinking from joints may be a result of seeking company from friends who may be providing free alcoholic drinks to them. The results of this study correlate with a study by Duko *et al.*, (2019) which reported that the majority 52.8% of their respondents drank alcohol from joints and in the company of friends.

The majority of the respondents 80 (83%) did not have any TB patients that they were close to while the minority 16 (17%) had. The findings indicated that most of the respondents were not exposed to TB bacteria those who already have it showed minimal chances of contracting TB. This is probably due to a limited number of patients suffering from TB which could have resulted from the government's efforts in identifying and treating TB cases in most communities. This study's findings disagree with the findings of the study by (Mbuthia *et al.*, 2018) which indicated that the majority (64%) of the participants were living close to or with a TB patient but believed that TB was not caused by natural causes alone but also by bad omens, evil spirits, and witchcraft.

Socio-economic factors contributing to the prevalence of Tuberculosis in HIV/AIDS

The majority of the respondents 60 (62.5%) were unemployed while the minority 02 (2.1%) were pupils/students. This study finding indicates a high level of poverty among the majority of these respondents which

may probably predispose them to poor health behavior leading to them contacting TB. Being unemployed is probably due to little or no education attained which makes them lack the suitable skills and knowledge required for employment. These study findings correlate with a study conducted by G-Reniers *et al.*, (2018) which found that unemployment and poverty accounted for a 58.2% increase in TB cases among HIV patients.

The majority of the respondents 58 (60.4%) had an income level of below 200,000 shillings while the minority 08 (8.4%) had an income level of above 500,000 shillings. This implied that most of the respondents were living under low household incomes and it could prevent them from timely seeking health care services. A low level of income could be a result of lack of a decent employment which could probably provide a high amount of income to the family. The results of this study correlate with a study by Tadokera *et al.*, (2018) which reported that TB prevailed in 62.9% of HIV patients with an income level of < 250,000 shillings.

More than three-quarters of the respondents 67 (70%) were rural residents while less than half 29 (30%) were urban residents. The results of this study indicated that rural residents were more likely to contract TB than their urban counterparts and it could be attributed to cultural practices such as sharing cups, plates, and beddings. It could also be a result of distance and lack of health care services in lower health facilities that provide TB screening services leading to the delay in detection and a likelihood of spreading it to others unknowingly. This study's findings agree with the findings of the study by Aturinde *et al.*, (2019) which reported that the place of residence was closely associated with the occurrence of TB among HIV patients where more rural residents (67.6%) had TB compared to their urban counterparts 22.3%.

The findings found that almost all respondents 90 (94%) said that they lived in overcrowded areas while a few respondents 06 (6%) said that they did not live in overcrowded areas. These findings indicate that TB spreads more in very crowded areas. The respondents could have probably lived in very crowded places due to the nature of their work or when socializing with others which then predisposes them to TB infection since there may be high concentration and accumulation of TB bacterial droplets in the air around the places where people are overcrowded. The findings of this study agree with a study conducted by (Tavares *et al.*, 2019) which reported that living in overcrowded places or overcrowding accounted for 91% of TB cases among HIV patients.

Conclusion

The study established that out of 96 respondents, 10 (10.4%) had TB while 86 (89.6%) of the HIV patients studied. Among the 10 who had TB, 07 (70%) were male and females were 03 (30%).

The study further indicated that out of 96 respondents, 51 (53.1%) did not have a family history of TB however, 56 (58.3%) were active smokers though 63 (66%) did not

drink alcohol but 50 (52.1%) of those who drank did so from the joints with their friends and 80 (83%) did not have any TB patient that they were closed to.

The study also established that out of 96 respondents, 60 (62.5%) were unemployed of which 58 (60.4%) had an income level of below 200,000 shillings with 67 (70%) being rural residents and 90 (94%) living in overcrowded areas.

Given these findings, it is therefore concluded that the prevalence of TB among HIV patients was high most especially among male patients with the prominent socioeconomic factors being unemployment, income level of below 200,000 shillings, rural residency, and overcrowding while active smoking and drinking from the joints with friends were the prominent socio-cultural factors.

Recommendations

Based on these findings, the study recommends the government through the Ministry of Health offer provider-initiated HIV counseling and testing strategy which should be strengthened and implemented at the district level, in addition to this, voluntary counseling and testing should be offered to all TB patients to allow the detection of HIV infection among the TB patients.

Health education for prevention with a focus on care and treatment for TB/HIV infections should be strengthened at the health facility level by health educators and health workers.

The government should establish collaboration between TB and HIV programs which should be strengthened by creating a coordinating body to ensure very close collaborative activities to avoid leakages in the referral system for both programs.

The Ministry of Health should increase and strengthen the implementation of preventive programs such as male circumcision targeting young people in the sexually active and reproductive age group.

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LIST OF ABBREVIATIONS

| | |
|----------------|---|
| CQI: | Continuous Quality Improvement |
| DHIS: | District Health Information System |
| H/C: | Health Centre |
| HIV: | Human Immunodeficiency Virus |
| MOH: | Ministry of Health |
| PLWHIV: | People Living with Human Immunodeficiency Virus |
| TB: | Tuberculosis |
| WHO: | World Health Organization. |

Source of funding

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Conflict of interest

No conflict of interest.


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