



Epidemiology of Tuberculosis and HIV Co-Infection in Butembo, Democratic Republic of the Congo

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Authors' contributions

This work was carried out in collaboration between all authors. Authors JLB, FKS and JKK designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AKN and JBKM managed the analyses of the study. Authors JPMM and FKS managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: TB-HIV co-infection constitutes a real public health problem, and its control constitutes a challenge for African countries and their health services. The aim of this survey was to determine the epidemiological profile of TB-HIV co-infection in the town of Butembo, DRC.

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Methods: We undertook a retrospective survey which covered a period of nine years (1/2007-12/2015). We enrolled patients from Katwa referral hospital, Kitatumba referral hospital, MATANDA hospital and Makasi health centre; which are health facilities in charge of the detection and treatment of Tuberculosis in Butembo town.

Results: The prevalence of the co-infection TB-HIV was 18.3%. Female patients were the most co-infected with a sex ratio of 1.27. The age group of 25 to 44 years was the most concerned (20.3%); traders were more co-infected with 51,0% of all recorded cases; the fact single has been found as a risk factor of co-infection (22.1%). Most of the co-infected patients did not respond to tuberculosis treatment, and their Ziehl Neelsen test was negative. The death rate of the co-infection TB-HIV was 22.6%.

Conclusion: TB-HIV co-infection remains a major problem for public health. The reduction of its prevalence constitutes a challenge in Butembo.

Keywords: Epidemiology; tuberculosis; HIV; co-Infection; Butembo.

1. INTRODUCTION

Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) co-infection is a heavy burden which the control and the elimination constitute a challenge for the African countries and their health services. As if the impact of only one illness was not sufficient, their association is even more dangerous in terms of morbidity, mortality and transmission [1].

HIV infection constitutes a risk factor for increased incidence of tuberculosis in the world, and tuberculosis is the most frequent opportunist infection among HIV infected people [2].

Worldwide, 14 million people are affected with the TB-HIV co-infection; among them, 10 million live in Africa. This co-infection causes more than 4 million deaths every year [3].

According to the WHO report published in the media centre in May 2016, 1.1 million of 9.6 million suffering from tuberculosis in 2014 were HIV- positive and four death cases out of 5 occurred in Africa [4].

In France, among 7,000 of patients who recovered from tuberculosis, 6% of them were HIV infected [5].

In Africa, the prevalence varies from one country to another. In Cameroon, in 2011, 81% of patients suffering from TB had been tested for HIV [6]. The proportion of HIV patients affected with tuberculosis and who had a positive Ziehl Neelsen test was 31%. The prevalence of TB-HIV co-infected patients

was 63% in 2013 in Zambia [7]. In Tugela Ferry (South Africa), a blaze of tuberculosis was largely seen among people living with HIV; 44% of the patients were HIV positive and 34% of them died from TB complications [8].

WHO estimates that in Democratic Republic of the Congo (DRC), every year 105 of 100,000 cases of tuberculosis are attributable to HIV infection and 24% of new cases are HIV affected. DRC would be the eighth country in the world to carry a heavy burden of the HIV-TB co-infection [3]. It is estimated that 3,600 people die every year from TB complications and 28% of them has had HIV infection [9].

Considering the statements on TB-HIV co-infection found above, and taking into account its bad prognosis, we conducted this survey in order to determine the epidemiological profile of TB-HIV co-infection in Butembo city.

2. METHODOLOGY

This survey was conducted in Butembo, a town located in the Eastern part of the Democratic Republic of Congo where the war is ongoing since 1996. We enrolled patients from Health facilities in charge of tracking and treating tuberculosis: Katwa, Kitatumba Matanda and Makasi.

This is a retrospective study which covered a period of nine years: from 1/2007-12/2015. During this period 10,139 patients suffering from tuberculosis were enrolled in the aforesaid health facilities and 1851 patients had a TBC/HIV infection.



Photo 1. Map of the DRC, showing the study site

Tuberculosis was diagnosed using clinical symptoms (cough, fever, loss of weight, night sweats) and presence of Mycobacterium tuberculosis on sputum smear using Ziehl Neelsen staining.

All patients suffering from tuberculosis were tested for HIV, using three HIV test: Determine, Double check and Unigold.

The following parameters were screened: socio-demographics (gender; age; profession; marital status); Anatomical site of TB: Pulmonary (PT) or Extra Pulmonary (EPT); patient's type: New Case (NC), Interrupted treatment (I), Failure (F), Relapse (R), Lost to follow up (A); Issue: Recovery (R), finished Treatment (FT), Failure (F), Lost to follow up (A), Transfer out (T) and Death(D); Biological: positive or negative Ziehl Neelsen staining and the HIV test result (positive or negative).

Data were processed and analyzed using Epi-Info software, version 3.5.4 and Microsoft

Excel 2007. Association of variables was analyzed by using the odds ratio (OR), at a confidence interval of 95% (95% CI). We considered associations as significant when CI did not contain 1 or the P-value is less than 0.05.

This study was an archived patient review analysis without contact with human subjects. The research protocol was approved by the ethics committee of the Université Catholique du Graben; KATWA and BUTEMBO zones District offices authorized the conduct.

3. RESULTS

During our survey, the following results were found: among 10139 patients suffering from tuberculosis followed in aforesaid health facilities, 1851 patients had TB and HIV co-infection, either a prevalence of 18.3%.

The prevalence of TB-HIV co-infection rose from 13.1% in 2007 to 30.1% in 2013 and decreased to 11.1% in 2015. (Fig. 1).

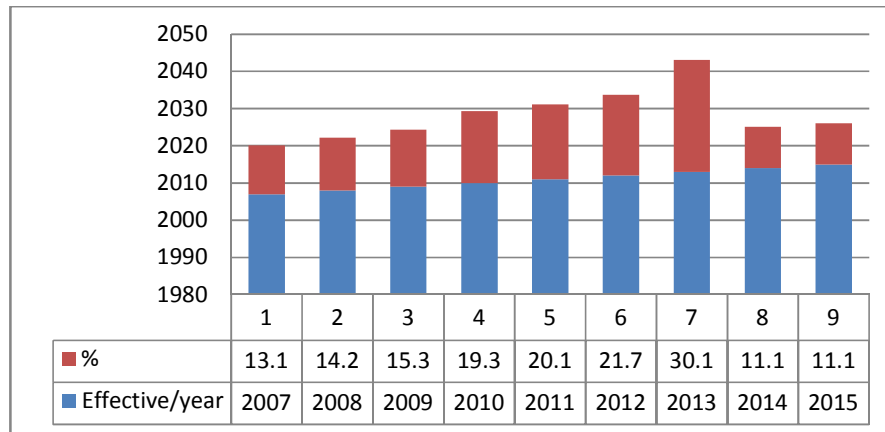


Fig. 1. Evolution of the co-infection TB-HIV from 2007 to 2015

Female patients were more concerned with TB-HIV co-infection than a male with a sex ratio of 1.27. The group age of 25 to 44 years old was the most concerned with this co-infection (20.3%); Traders was the professional group the most concerned mostly concerned first with 51.0% of all recorded cases; being single or unmarried was a risk factor of co-infection (22.1%) (Table 1).

Most of the co-infected patients have developed a failure to tuberculosis treatment and also has a negative smear for tuberculosis. They are the one who is more touched by the co-

infection comparing to those with smear-positive. The rates of Recovering and Death were consecutively 66.6% and 22.6% among TB and HIV co-infected patients (Table 2).

4. DISCUSSION

The prevalence of TB-HIV co-infection is 18.3% in Butembo town. This prevalence is not far from the one found by Agodokpesi et al. in Cotonou which was 24% [10].

Table 1. Distribution of TB and HIV co-infected patients by socio-demographic characteristics

Variables	Number	TB and HIV	Percent	OR	95% CI		p
Age							
15-24	1078	167	15.5	0.76	0.62	0.94	<0,001
25-44	6344	1288	20.3	1.36	1.22	1.51	<0,001
≥45	2717	396	14.6	0.69	0.55	0.87	<0,001
Gender							
Male	6341	1037	16.6	0.72	0.65	0.79	<0,001
Female	3798	814	21.4	1.40	1.26	1.55	<0,001
Profession							
Trader	1304	600	51.0	6.40	5.61	7.30	0,000
Barber	972	364	43.1	3.96	3.40	4.60	0,000
Soldier	161	14	39,1	2.89	1.15	7.10	0,000
Housemaid	1756	562	34.4	2.93	2.60	3.31	0,000
Physician	321	64	32.2	2.17	1.56	3.00	0,000
Officer	260	13	6.6	0.31	0.14	0.66	0,000
Student	970	50	5.4	0.24	0.17	0.33	0,000
Farmer	3962	163	4.1	0.19	0.10	0.35	0,000
Others	433	21	4.8	0.16	0.12	0.22	0,000
Marital state							
Single/unmarried	4089	902	22.1	1.52	1.37	1.69	0,000
Married	4812	842	17.5	0.91	0.83	1.01	0,000
Divorce	649	65	10	0.48	0.37	0.63	0,000
Widowed/widow	589	42	7.1	0.33	0.24	0.46	0,000

Table 2. Distribution of TB-HIV co-infected patients by anatomical site of TB, patient's type and issue of treatment

Variables	Number	TB-HIV	Percent	OR	95% CI		p
Patient's type							
New patients	9292	1742	18.7	1.56	1.26	1.93	<0,001
Lost to follow-up	38	13	34.2	2.34	1.13	4.77	<0,001
Treatment failed	119	28	23.5	1.38	0.88	2.16	<0,001
Relapse	635	55	8.7	0.41	0.30	0.54	<0,001
Not evaluated	55	13	23.6	1.39	0.71	2.68	<0,001
Anatomical site of TB							
Pul smear positive	7764	1080	13.9	0.34	0.30	0.37	<0,001
Pul smear negative	1526	552	36.2	3.19	2.83	3.60	<0,001
Extra pulmonary	849	219	25.8	1.63	1.38	1.93	<0,001
Issue							
Cured	8433	1234	66.6	0.30	0.27	0.34	<0,001
Treatment completed	917	130	7.0	1.19	0.96	1.47	<0,001
Treatment failed	55	34	1.8	7.37	4.14	13.17	<0,001
Not evaluated	69	26	1.4	2.73	1.63	4.57	<0,001
Transferred out	16	9	0.5	5.78	1.97	17.19	<0,001
Died	649	418	22.6	0.14	0.07	0.27	<0,001

From our study, it appears that the prevalence of TB-HIV co-infection rose from 13.1% in 2007 to 30.1% in 2013 and decreased to 11.1% in 2015. This raise from 2007 to 2013 can be explained by the wars occurring in the eastern part of the DR of the Congo. This leads to insecurity, starvation, jobless and to prostitution. Hence, the cases of tuberculosis are rising as the prevalence of HIV infection is going up [11].

According to our study, female patients are at risk of developing TB-HIV co-infection with a sex ratio of 1.27. The average range of age infected by the co-infection is 25 to 44 years old (20.3%) and traders are the most co-infected in 51.0%. Also being single or unmarried is among the big factors of being co-infected (22.1%). From Diallo's study done in Bamako, the prevalence of co-infection is 50.46% and patients aged 31 to 40 years old are more concerned. This prevalence is higher than the one we found in our study [12]. In Bangui, Breton noted a female predominance with 55% of co-Infected patients [13].

Traders are at risk in view of their mobility especially those who travel all over East African countries where the prevalence of HIV is reporting to be high.

According to marital status, we found that unmarried people and those who are single are more prone to be co-infected. But from Guedenon [14] and Diallo's studies [11], this prevalence was found to be elevated among married people respectively in 85.9%

and 56.6%. In our study, unmarried or single people are at risk in view of their sexual behaviour.

From our study, it appears that most of the patients co-infected with TB-HIV developed a failure to tuberculosis treatment and their smears were negative for Koch bacilli. The rates of recovering and death were consecutively 66.6% and 22.6% among TB-HIV co-infected patients. Our results are not higher than the one found by Mbena in Bamako: 54% of recovering and 18.1% of death [15]. Tuberculosis remains the most opportunistic infection in our area.

According to the WHO, tuberculosis is one of the major cause of mortality among HIV infected patients and the key-causer of the increasing of tuberculosis prevalence [9].

5. CONCLUSION

TB-HIV co-infection remains a major problem of public health. Its elimination constitutes a challenge in Butembo. All people are concerned, regardless of their age, gender or profession.

CONSENT

It is not applicable.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee

has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. La tuberculose et le VIH — une vue d'ensemble – Nouvelles CATIE; 2015. Available:<http://www.catie.ca/fr/vih-canada/3/3-5>
2. MSMGF. Tuberculose et coïnfection par le VIH. Was; 2012. Available:http://msmgf.org/files/msmgf/documents/TechBulletins/EN/Sec11MSMGF_TechBulletins2012.pdf
3. Organisation Mondiale de la Sante et partenariat stop tuberculosis, fight AIDS, fight tuberculosis. Fight NOW: TBC/VIH Information Pack. Genève; 2004.
4. AUBRY P, Actualités sur la tuberculose. Bull. Soc. Pathol. Exot. 2014;107:127-128.
5. Florian C, et al. Coïnfection TBC et VIH: En jeux thérapeutique; 2011. Available:<https://www.revmed.ch/RMS/2011/RMS-318/Co-infection-tuberculose-et-VIH-enjeux-therapeutiques>
6. Yumo HA, Kuaban C, Neuhann F. WHO recommended collaborative TB/HIV activities: Evaluation of implementation and performance in a rural district hospital in Cameroon. Pan Afr Med J. 2011;10:30. Available:<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3240931>
7. Joint tuberculosis and HIV. Investing for impact against TB and HIV; 2017. Available:www.theglobalfund.org/core-TB-VIH
8. Organisation Mondiale de la Sante. Questions prioritaire de recherche sur la coïnfection TBC/VIH dans les pays prévalent pour le VIH et disposant de ressource limitées; 2016. Available:http://www.who.int/tb/publications/global_report/high_tb_burden_country_lists_2016-2020.pdf
9. Organisation Mondiale de la Sante. La Tuberculose; 2014. Available:<http://www.who.int/mediacentre/news/notes/2014/global-tuberculosis-report/en/>
10. Agdokpesi G, Ade S, Wachinou P, Affalabi D, Anagonou S, et al. Aspect épidémiologique et évolutifs de la coïnfection tuberculose et VIH à Cotonou. Med Mal Infect. 2012;42(11):561-6.
11. Kamissoko A. Coïnfection VIH/TBC en commune N de la destruction de BAMAKO. Thèse de médecine Bamako. 2005;56. Available:<http://docplayer.fr/58759101-Etude-epidemioclinique-de-la-co-infection-vih-tuberculose-a-bacilloscopie-positive-faculte-de-medecine-de-pharmacie-et-d-odonto-stomatologie.html>
12. Hama Abdoulaye. Influence de VIH/SIDA sur l'épidémiologie de la TBC maladie dans les Six communes de BAMAKO. Thèse de médecine Bamako. 2005;56:22. Available:http://docplayer.fr/75445430-Annee-universitaire-titre-influence-du-vih-sida-sur-l-epidemiologie-de-la-tuberculose-maladie-dans-les-six-communes-de-bamako-tb-vih.html#show_full_text
13. Diallo HA. Influence du VIH SIDA sur l'épidémiologie de la TBC maladie dans le S4 commune de Bamako. Thèse de médecine Bamako. 2006;104:32.
14. Guedenon CIS. Evaluation de l'efficacité du traitement de la Tuberculose pulmonaire à bacilloscopie positive chez les patients infectés par le VIH au CNHPP de Cotonou (Bénin). A propos de 923 cas. Thèse de Médecine, Bamako. 2008;80:609.
15. Mbena CT. Aspects épidémiologiques, clinique et thérapeutique de la coïnfection VIH/tuberculose dans les centres de sante de reference des communes I,II,III du District de Bamako. Thèse de médecine Bamako. 2010;96:3. Available:<http://www.keneya.net/fmpos/theses/2010/med/pdf/10M359.pdf>

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