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Research Article

RISK FACTORS OF HIV-TUBERCULOSIS CO-INFECTION IN GOMA TOWN, DEMOCRATIC REPUBLIC OF THE CONGO

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ABSTRACT

Introduction: Tuberculosis and HIV form a lethal associationcombination in the world. In case so far HIV affects the immune. System system, a seropositive person has a 10% of risk to develop tuberculosis every year whereas a seronegative person has a risk of 10 times higher all his life long. Therefore, the objective of the present work is to analyseis socio-demographic, clinic, therapeutic and evaluative profile of TB/-HIV co-infection in Goma town.

Material and methods: The method study is retrospective and transversal. It looks into examines 1789 patients affected with tuberculosis including 208 co-infected by tuberculosis and HIV aged or 15 years old or more and monitored either as out patients or hospitalized in the services of taking care of HIV-AIDS and tuberculosis in Goma town. Calculation of percentage or the O.R helped us to analyze the data.

Results: Co-infection TB-HIV prevalence is 11.6%. Women have got a higher rise are of high risk (multiplied by 1.57 versus 0.64 for men). The risk is multiplied by 1.99 for the age group between 31 and 45 years. The risk of tuberculosis with negative bacilloscopy is multiplied by 3.77 in case of co-infection. The systemic inflammatory response syndrome SRIS remains the reaction to the treatment highly observed to co-infected patients. Whereas, jaundice icterus was the mostly observed to the non-co-infected. The risk of death is multiplied by 6.34 at the end of the most co-infection TB-/HIV co-infection.

Conclusion: The prevalence of co-infection HIV-TB is high in GOMA town. Co-infection is more common toin women and characterized by negativity of basilloscopy to Zhieh-Nielsen coloration in 11.6% of cases.

INTRODUCTION

HIV and tuberculosis,; which mutually speed up their progression form a lethal association combination in the world [1]. In case so for HIV affects the immuno-system, seropositive people persons have 10% chance to develop active tuberculosis every year whereas immuno-competence persons have only 10% of chance during their whole life [2]. On the world scale, 14 millions of people persons are infected with both HIV and tuberculosis of which 10 million live in Africa [3]. Tuberculosis is one of the three main death causes after HIV and heart attack of peoplersons aged between 15 to 59 years old. It is responsible for 13% of AIDS death in the world [4]. At least one third of 36 million of peoplersons living with HIV are affected with tuberculosis bacilli [6, 7].

In 2012, an estimated 1.1 million or 13% of the 8.6 million who contracted TB were HIV seropositive. [8]. In the USA, the increasing number of cases was first reported (3% in 1986 ; 6% in 1990) and HIV/-AIDS role appeared likely in this resurgence. In sub-Sahara Africa and South East Asia, the importance of endemic tuberculosis pendemy and the high prevalence of HIV/-AIDS infection have made this association more frequent than elsewhere. From the first studies in the central and East Africa, a rate of co-infection tuberculosis-HIV equal or superior toat 30% was noticed. In 2010 the prevalence of co-infection TB/-HIV varied between 16 to 80% depending on sub-Saharan Africa countries, an average of 36% versus 3 to 6% in western countries [8].

China reports 70,000 new cases of HIV infection between January and September 2013 on a total number of 434 .000 People living with HIV (PLHIV). Up to the end of september about 209 000 people were receiving an antiretroviral therapy

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[9]. In Africa, as like the impact of a single disease was not sufficient enough, the co-infection TB-HIV is even more dreadful daunting in terms of morbidity, and mortality and transmissibility. HIV is the main determinant of the TB increase in the incidence of TB that has been observed over the last decade. Thus 70% of all cases are in sub-Saharan Africa respectively in Swaziland, Lesotho, Botswana, and Zimbabwe finally in South Africa [10]. In these Sub-Saharan areas up to of 70% TBC infected patients are HIV carriers. The mortality rate is about 50% of all the cases. Both All together HIV-TBC 552 causes 4 millions of deaths every year [11].

Fatoma O, in a study of co-infection HIV-TB smear-positive done in Mali, found a frequency of 55.8% of cases toin men with a sex ratio of 1.3 and their ages ranged from 21 to 40 years [12, 13].

A carried out study conducted in five hospitals in Cambodge between 2006 -2010 has shown that the introduction of antiretroviral therapy two weeks after the beginning of anti-tuberculosis treatment helped to reduce the morbidity-mortality of TB-HIV in patients co-infected patientsTBC/HIV [14].

This situation of co-infection TB-HIV remains a concern in the DRC which remains up today tiel now the fourth country in Africa and the 11 th among 22 countries mostly affected in the word by TB. Eleven of these 22 countries are not on the way to reduce the incidence, the prevalence and mortality in the foreseen expected proportion in 2015 millenium. The reasons for this situation are such as mainly financial constraints, the presence for conflicts, instability as well as HIV generalized epidemy [8].

This rapid in aeaseunease is also related to HIV outbreak. Among the new cases, about 24% are infected with and about 3600 peoplersons die every year from tuberculosis in DRC that 28% are due to HIV-AIDS [16]. The sex ratio of PLHIV increased from 1.11 in 1990 to 1.25 in 2005.This was due to sexual violence on women especially mainly in the context of socio-conflicts and repeated armed conflicts in the country from 1996, could largely explain this state of situations. [16].

The main objective of this study is to find out socio-demographic clinical therapeutic and evolutionary TB-HIV profile in health structures caring for tuberculosis in Goma town.

A careful analysis of data shows that the mastery of factors related to the occurrence of tuberculosis in the first twelve months of antiretroviral therapy in our study environment will allow the clinician to carry out a more specific monitoring of these categories of patients. This knowledge will allow to anticipate them especially that the ways of as the diagnostic of this disease remain very limited in the advanced stage of HIV-AIDS in DRC in general and in particular in Goma town.

MATERIAL AND METHODS

Study Framework

This study was carried out conducted in two major health facilities taking care of co-infection HIV-TB in Goma town. In the two health structures, there is department in charge of caring for all people living with HIV-/AIDS (SHIV) and a center of screening and treatment of TBCTB and HIV co-infection The paraclinical examinations realized are chest X-rays of face, staining sputum Ziehl-Nelseen, the CD4 cell count, biochemical tests for liver and kidney balance sheet, electrolytes and bacteriological and serological tests.

MATERIALS

The study focuses on 121 patients whose 41 male and 80 female. The age varies between 20 and 59 with average age of 39. During this study we examined 1789 patients affected with Tuberculosis including 208 co-infected by Tuberculosis and HIV aged 15 years old or more and monitored either as out patients or hospitalized in the services of taking care of HIV/AIDS and tuberculosis in GOMA town. Calculation of percentage or the O.R helped us to analyze the data.

METHODS

It deals with descriptive sectional study it consisted of restoring biological and clinical history of patients followed in the service. It covered on a 2 years'period of 2 years from January 15th, 2014 to December 31st, 2015

Our sample is exhaustive. It takes into account male TBC patients whose serology is known to HIV and having been admitted and monitored in both Centers of treatments and/or both SHIV for TB treatment. Were included in this study all adults and adolescents of both sexes whose age is equal or superior to 15 years who were followed as outpatients or hospitalized for TB and whose research for HIV antibodies was performed. Were excluded from the study all TB patients whose serology was not known, all co-infected with HIV and TB whose age was less than 15 years old which were not hospitalized.

The reports of the Center of TB treatment and Services of HIV treatment (SHIV) have served us in the collection of data. In these reports, we collected:

From the reports, we collected:

- Socio-demographic data including age, sex, occupation
- Clinical and paraclinical data consultation including pattern, clinical form of TB and HIV serology.
- Data concerning the undertaking on the management and evolution of patients including a following up treatment of the diet, side effects from treatment.

Data analysis is were archived thanks tousing the Microsoft and excel developed by center for disease control (CDC, Atlanta, USA and WHO since 1993).

In the result interpretation, we have used the percentage calculation and "ODDS RATIO" (OR) test in order to determine the level of risk attributable to each in the development of HIV-TB co-infection. An association between the factor and the presence of the TB-HIV co-infection is established when there is an association between the factor and the presence of the TB-HIV co-infection the OR superior to 1.
The OR was calculated using the method of Woolf. This association is described as significant when the confidence interval (CI) is different from 1. If the ICI is one, i.eis that there is no significant association. If the OR is greater than 1, there is a positive association between the factor and the development of co-infection i.e the more one is exposed to the factor, the more one runs the risk of developing the desease. is to say that the more exposed to the factor most disease is likely to

develop. If OR is less than 1, i.e the association is that the association is negative, so the exposure is a protective factor. If the OR is superior to 1, there is a positive association between the factor and the development of co-infection that is to say the more one is exposed to factor the more risk to develop the disease . If OR is inferior to 1, this means that the association is negative before the exposure is a protection factor.

RESULT

Socio-Demographic Caracteristic of Patients

We do present the following Table chart I according to socio-– demographic characteristics of patients. Analysis of this Table I shows that the risk of being co-infected is multiplied by 1.99 in the age group from 31 years to 45 and the average age is that of 40.3 ±1, 56 years. For females, the risk of being co-infected is multiplied by 1.57 versus 0.64 for men. For the profession, the risk of co-infection is higher in professional traders and drivers respectively at 7.66 and 6.77 and more than 2.7 for most household.

co-infected 12% against 9.9 and the risk of the TP in case of co-infection remains multiplied by 1.24.

In reviewing this table, we find that the proportion of patients with pulmonary tuberculosis is higher among co infected 12% against 9.9 and the risk of the TP in case of co-infection remains multiplied by 1.24.

These results indicate that the rest Immune reconstitution syndrome reaction to the most frequently observed treatment in co-infected patients while jaundiceicterus was the most among non co-infected.

The results show that the proportion of patients with smear-negative tuberculosis is higher among co-infected 21.5% against 6.8% and the risk of smear-negative TB is multiplied by 3.77 times versus 0.26 for the positive tuberculosis.

These results show that the risk of death in cases of co-infection is multiplied by 6.34 while the failure is multiplied by 3.42 and that of lost sight remains high at 21.04.

Table au I Socio- demographic Features of patients Patients

Features	Co-infected	No co-infected [2]			ICI to 95			
	N	%	N	%	Total	OR	Limited inferior	Limited superior
Age (years)								
15-30	53	10	480	90	533	0.78	0.56	1.10
31-45	110	16,1	571	83,9	681	1.99	1.47	2.68
46-60	35	9,4	337	90,6	372	0.75	0.50	1.11
>60	10	4,9	193	95,1	203	0.36	0.18	0.72
Sex								
Male	120	10	1070	90	1190	0.64	0.48	0.85
Female	88	17	511	83	599	1.57	1.17	2.11
Profession								
Bureaucrat	2	7,69	24	92,31	26	0.63	0.10	2.77
Driver	37	43	49	56,98	86	6.77	4.19	10.92
Trader	45	45	55	55	100	7.66	4.90	11.98
Cultivators	31	4,38	677	95,62	708	0.23	0.15	0.35
Student	7	4,61	145	95,39	152	0.34	0.15	0.77
Nurse	3	15	17	85	20	1.35	0.31	4.91
Mechanic	6	6,25	90	93,75	96	0.49	0.19	1.18
House hold	56	22,8	190	77,24	246	2.70	1.89	3.85
Military	8	9,76	74	90,24	82	0.81	0.36	1.78
functionless	13	4,76	260	95,24	273	0.34	0.18	0.62

Analysis of this Table I shows that the risk of being co-infected is multiplied by 1.99 in the age group of 31 years A45 and the average age was 40.3 ± (SD) years. For females, the risk of being co-infected is multiplied by 1.57 versus 0.64 for men. For the profession, the risk of co-infection is higher in professional traders and drivers respectively at 7.66 and 6.77 and more than 2.7 for most household.

DISCUSSION

Prevalence of Co-Infection TB/-HIV

The prevalence of co-infection TB/-HIV is 11.63% during the past two years in both health facilities.

Table II Distribution of patients according to case the location of the TB

	Cco-infected	Non co-infected	Total	OR		ICI to 95	
Cclinicalform	N	%	N	%	n	Limited inferior	Limited superior
PT	175	12	1282	88	1457	1.24	0.82	1.87
EPT	33	9,9	299	90,1	332	0.81	0.54	1.18
Total	208	11,6	1581	88,4	1789			

PT: pulmonary Tuberculosis EPT: Extrapumonary Tuberculosis

Clinic and Biological Feature of the Patients

In looking into this table II, we find that the proportion of patients with pulmonary tuberculosis is more important among

This result is superimposed on these Watta C and all. in In an evaluation of TB-/HIV co-infection study in Djibouti where the experts had found a prevalence of coico-infection TB/-HIV

increased from 13.6% in 2007 to 11.8% in 2008 [4]. Moreover, Fiogbe A [6] in a study carried out in rural area in India from 2012 to- 2013 is over 2 years result remains below the 26.77% found in our figure is still lower than that found by Agodokpessi and all. Reporting a prevalence of 24% in Cotonou, another observational cohort study carried out conducted over 2 years in Kenya had reported a prevalence of 68.1%, more a study by Dean GL *et al* [2, 7, 8].

infection TB /- HIV in hospital of Saint Dennis Centre including 21 men against 15 women without taking into account the relative risk would be linked to female and be co-infected [16, 17].

The feminization of co-infection found in our study is due to the fact that women are beneficiaries of much consultation like as men.

Table III Distribution of cases according coico-infected side effects

	Co-infected	Non co-infected	Total		
Side effect to treatment	N	%	N	%	N
No side effect to treatment	173	10,1	1547	89,9	1720
Icterus	7	31,8	15	68,2	22
Peripheralneuropathy	7	30,5	16	69,5	23
Skin rash	3	50	3	50	6
Immune reconstitution syndrom	18	100	0	0	18
Total	208	11.6	1581	88.4	1789

Table IV Distribution of patients according to the Bacilloscopy

	Co-infected	Non co-infected	Total	OR		CI to 95	
Bacilloscopy	**N**	**%**	**N**	**%**	**N**	**Limited inferior**	**Limited superior**
Negative	127	21,5	464	78,5	591	3.77	2.77	5.15
Positive	81	6,8	1117	93,2	1198	0.26	0.19	0.36
Total	208	11,6	1581	88,4	1789			

Table V Distribution of cases by the end of treatment

	Co-infected	Non co-infected	Total	OR		CI to 95	
TreatmentOutcome	**N**	**%**	**N**	**%**	**N**	**Limited inferior**	**Limited superior**
Improved/completed	121	9,1	1199	90,9	1320	0.44	0.33	0.60
Death	45	40,5	66	59,5	111	6.34	4.11	9.76
Failure	4	30,7	9	69,3	13	3.42	0.88	12.27
Recovered	30	8,1	304	91	334	0.71	0.46	1.08
Lostview	8	72,7	3	27,3	11	21.04	5.05	100.76
Total	208	11,6	1581	88,4	1789			

In Malawi and Uganda, Badri M *et al* respectively had reported a prevalence of 28% and 68.8% [9]. This prevalence that we report in this study is less than that found elsewhere sign that there would be other factors predisposing patients to our tuberculosis other than HIV. We quote from poverty, under nutrition and low living standards. In a study conducted by WHO in 2013 in the fight against tuberculosis, it was reported a high prevalence in developing countries is justified by financial constraints, the presence of armed conflict and instability in these regions [12].

Co-Infection and Sex

Women were more represented than men to co-infection or by 17% against 10% a majority against tuberculosis remains for men. In addition to this feminine trend the risk of co-infection is multiplied by 1.57 for women versus 0.64 for TB men. These arguments are in favor of a positive and significant relationship between being co-infection and the female as the OR and the ICI is greater than 1. These results converge with those reported by Morris L and all in South Africa who had found a sex ratio Female / Male equal to 1.21 [3,14].

In a study in Rabat, Hussen M found a feminine trend is 52.9% against 47.1%. It is the same for Rusiga M [13].

In Mali, Hama SD [10] in a study done in the six communes of Bamako reporting a much higher standard for women is at 64.47% versus 34.53%. Moreover, Poupard and al lavaient found a male tendency in a study of the gravity of the co-

Moreover In most women through the PTME program on a submitted systematically to HIV test therefore HIV would be early during the mother and children program against HIV transmission are systematically subjected to HIV testing, and HIV is early diagnosis to among women whereas while it is often late to in men who not only often go after multiple attempts to self-medicate or even failure failure to treatment but also are sometimes anxious to frequent chronic disease centers lest they be indexed carriers holders of one or another serious illness. The concepts of smoking, alcoholism followed by malnutrition in their number are factors in favor of for development of tuberculosis disease to in men. Furthermore More The higher risk of co-infection is higher to in women is and finds an explanation in the fact that HIV prevalence remains higher among women because the latter are subject not only of to sexual violence in our regions full of open armed conflicts, but also their anatomic constitution in view of the genitals predisposes to increased HIV infection [18, 19].

Co-Infection TBCTB /- HIV AND AGE

The most affected age group by co-infection TB /- HIV is from 31-45 years followed by that between 15 and- 30 years, respectively 16.15 and 9.94. So even for TB prevalence is high in the same age group but this time to non equalnon-equal proportions is 36.1% and 28.8%. For coico-infection closer you get the more you get closer to the 3rd age the more prevalence becomes zero whereas the TB alone when the only CPC does not take any distance.

Furthermore this percentage, the risk of being co-infected is multiplied by 1.99 in an ICI between 1.47 and -2.68. The OR and ICI exceeds 1 remains in favor of a positive relationship is significant. [21].

What justifies the infringement age group consists of a workforce. Our results are very similar to those of Richard E [19] whose the most affected age group remains between 31 and- 45 in a following-up by proportion of followed by that of between 16 and -30% and is respectivelyment 49.4 and 25.3%. This age is also majority for both men and women. The same trend was observed by Harrim AD [20], whose average of age the was most concerned was between 21 and- 40 years; a portion of which the average of age remains ours that is 40, 328. [19].

Co-Infection and Patient Proffession

Traders, drivers and housewives, are the most affected populations by TB- / HIV association with a respective proportion of: 43.02%, 45.00% and 22.75%. Tuberculosis meanwhile remains versatile and was found among farmers, patients who were not household functions and either 42.8% respectively, 13.6% and 12.8%. Also in our study, professions traders, drivers and housewives have a risk of being co-infected respectively multiplied by 7.66, 6.77 and 2.70 which signs a positive and significant relationship because in all cases the OR is greater than 1 and with a CI superior to 1.higher **IC in** figure 1**.** Our results are very similar to those observed by Girardi E where housewives and merchants were the most affected professions in the respective proportions of 31.3% and 16.9% [(20].). Master SS [21, 22] had found a co -Infection TB/-HIV in the same social strata, but in different proportions. Karen Brudney, meanwhile, had found a higher proportion 71.3% in household compared to traders and drivers [22]. Regarding merchants and drivers, their high mobility in connection with numerous trips and travel outside the city to the eastern countries considered highly endemic countries expose them more to HIV disease they transmit to their wives who are mostly housewives.

For housewives, other factors could explain their vulnerability to co-infection including low decision-making power in relation to the socio-cultural context and their genetic makeup more exposing them to HIV infection.

Co-Infection and Form Clinical Tuberculosis

TB pulmonary location in one case as in the other either for TB- / HIV against 81.1 against 18.9% for the only TB. Our results are very similar to those reported in other studies including observation of Egger M, which reported 94.2%; Brenda E 75%;, Dean and all 96.2% and Fiog be 85% [22].

All these findings support and confirm once again that patients are infected with HIV as HIV-negative pulmonary TBC.

Besides these percentages, we found a risk of pulmonary tuberculosis in an ICI equal 1.24 between 0.82-1.87.

This result signs that there is a relationship between to get pulmonary tuberculosis and to be co-infected but this relationship is not significant because in CI equal 1HF there are also the figure 1. The La occurrence of tuberculosis in any stage of HIV better explains this rise because the forms of extrapulmonary tuberculosis extra are often the most usually observed in the course of stage the most advanced stage of the disease or the 4th is s stage IV of WHO whereas as pulmonary tuberculosis remains observable in stage III [12, 13].

CO-Infection and Results of Bacilloscopy

The tuberculosis associated to HIV is essentially a tuberculosis negative bascilloscopy either on a proportion of 61.06% against 38.84% versus 23.35% against 70.65% for TB alone. The HIV-associated TB is smear-negative TB is essentially a proportion of 61.06% against 38.94% versus 29.35% against 70.65% for TBC alone. These results are very similar to those found in other lands including that of Arnold [23] who found the same trend and suggesting that the diagnosis is still a real problem definitive diagnosis for cases of TB in patients HIV especially in peripheral areas where the only diagnostic tool remains sputum looking bacilli alcolo-acid-fast, as is the case of the support structures of TB in Goma.

Co-Infection and After Treatment

The death rate from TB- / HIV is 21.6% against only 4.2% of cases by TBC alone. This rate remains high in comparison compared to the with the millennium goal set by the WHO Stop TB. However, it remains lower than that of a national survey effectuéeeffectuate en in DRC in 2012 or mortality touches 50%, a rate superior to ours higher than our own. Mortality remains high to among patients who were put under regime of integrated TB and antiretroviral treatment program applied in the Democratic Republic of Congo. This is due to the setting of patients on antiretroviral therapy ART and anti-tuberculosis at the same time. Our results are very similar to those reported by WHO in 2013 known global statistics reported that nearly 25% of deaths among people living with HIV are due to TB. [1]. Another study in Cambodia betweenentre2006 and 2010 showed that the introduction of antiretroviral therapyARVs within two weeks of harsh treatment TB effective in reducing mortality whereas while the opposite entailed instant death [2].

Co-Infection TBCTB /- HIV AND Side Effects

In our study, we found that the rest systemic inflammatory response syndrome SIRS remains response of to treatment to in co-infected patients since it was identified to in 18 co-infected patients as jaundiceicterus or 68.2% of the 22 cases recruited against 31.8% in co-infected is most often found in non co-infected. As it were secondary to treatment effects are most often observed during the antiretroviral therapy treatment PATIARV. Our results are similar to those found in a study carried out conducted in five hospitals in Cambodia between 2006-2010 after which the experts found that the introduction of antiretroviral therapy ARV ARV concomitantly was a consequence of the implementation installation of the systemic inflammatory response syndrome SIRS although afterwards they found that the absence of the setting up installation of this syndrome this scheme reduces morbidity and mortality in patients co-infected TB- / HIV patients [2].

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