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Research Article

Factors favoring the appearance of multidrug-resistant tuberculosis: Case of Burundi

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Abstract

Objective: Identify risk factors for multidrug-resistant tuberculosis (MDR-TB) in Burundi

Materials and Methods:

This is a prospective analytical case-control type study carried out from August 1, 2019 to January 15, 2020 on patients admitted during the period from January to December 2019 at CNPEC in Burundi for cases and those diagnosed and treated for drug-sensitive tuberculosis at CATB for controls during the period of our study. Several factors were analyzed: socio-demographic, accessibility to care, clinics, risky habits and co-morbidities. Case and control data were analyzed using a logistic regression model to identify risk factors for MDR-TB. The association between the studied variables and the MDR-TB was estimated by odds ratio (OR) with 95% confidence interval (95% CI). The analysis was performed by R.

Results:

We collected 180 predominantly male patients in both groups with an average age of 36 years. The risk factors for MDR-TB found are: place of residence (OR = 1.31), number of people living under the same roof (OR = 4.15), personal history of TB (OR = 2.16), relapse (OR = 15.3), the contact subject with TBMR (OR = 6.03) and smoking (OR = 3.17).

Conclusion:

The place of residence, the personal history of TB, relapse, the contact subject with MDR-TB and tobacco are the risk factors for MDR-TB found in our study. **Keywords:** multidrug resistant tuberculosis, risk factors, Burundi

Introduction

Tuberculosis remains a public health problem today despite the implementation of many strategies to control it. The World Health Organization (WHO) estimated in 2015 at 10.4 million the number of new cases of tuberculosis and 1.8 million the number of deaths from this disease [1].Multi-resistant tuberculosis represents one of the serious threats to the control of tuberculosis because the treatment calls for so-called second-line drugs which are less effective, more toxic and more expensive [2]. In addition, the treatment lasts longer compared to standard tuberculosis treatment [2]. The patients with multidrug-resistant tuberculosis (MDR-TB) [4]. The relative risk of death from a form of MDR-TB compared to drug-sensitive tuberculosis is estimated to be 2.36 [5].

Multidrug-resistant tuberculosis is often suspected in a patient with treatment failure or relapse. It may also be epidemiologically suspected when a person has been exposed to a confirmed case of multidrug resistant tuberculosis [6].

Our study aims to identify the risk factors for MDR-TB in Burundi

Patients and Methods:

This is a prospective analytical case-control type study carried out value du test de Wald from August 1, 2019 to January 15, 2020 on patients admitted during the period from January to December 2019 at CNPEC in Burundi for cases and those diagnosed and treated with low socioeconomic status and poor hygiene are the ideal ground pharmacological tuberculosis. sensitive to CATB for controls during the period of our study. Several factors were analyzed: socio-demographic, accessibility to care, clinics, risky habits and co-morbidities. Case and control data were analyzed using a logistic regression model to identify risk factors for MDR-TB. The association between the studied variables and the MDR-TB was estimated by odds ratio (OR) with 95% confidence interval (95% CI). The analysis was performed by R.

Results:

During the study period, we collected 180 cases of tuberculosis, including 60 patients with multidrug-resistant tuberculosis (cases) and 120 patients with drug-sensitive tuberculosis (controls). The mean age is 36.39 ± 14.18 with extremes of 15 years and 82 years and a male predominance at 68.33% (n = 123) of the study population with a sex ratio (M / F) of 2.16.

Smoking is found in 37% of cases and 12.5% of controls. The majority of patients in both the case group and the control group smoked 20 pack-years or less, ie 86.36% of cases versus 86.67% of controls. Alcohol users are found in 80% of cases and in 65% of controls and it is consumed regularly by 27% of patients in the case group and by 18% of patients in the control group. Cannabis is little used, ie 5% for both cases and witnesses, and injecting drugs are fortunately little used, ie in 1.67% of cases.The comorbidities that may have favored the reactivation of tuberculosis were seropositivity found in 17% of cases and 17.5% of controls, diabetes in 7% of cases and 2% of controls and digestive disorders that may have favored malabsorption of antituberculosis drugs found in a single case, ie 1.67%.

The bivariate analysis shows that the MDR-TB is significantly associated with the place of residence (p = 0.008), community residence (p = 0.009), occupation (p = 0.024), the number of bedrooms per house (p = 0.003), persons per household (p<0.001), history of TB (p <0.001), contact subject with MDR-TB (p <0.001) and tobacco (p <0.001).

N: Effectif, **OR**: Odds ratio, **IC**: intervalle de Confiance, **p**: p

Discussion:

Tuberculosis is considered as a precarious disease: overcrowding, for the spread of the disease. Likewise, MDR-TB should be mentioned in any patient in a precarious situation.

In our study, the majority of our patients come from urban areas (65% for cases and 84.17% for controls). These patients mainly live in the working-class neighborhoods of the city of Bujumbura where they live in promiscuity at an average of 5.4 ± 1.5 per 2bedroom house in the majority of cases. Several studies carried out in Burundi report similar results. Kamamfu G. [7], Ciza F. [8], Murhula B. [10] find in their series a predominance of patients living in Bujumbura City.In our study, the place of residence was identified as a risk factor for MDR-TB (p = 0.020 with an OR = 1.31 and CI = [1.12-1.80]) with a risk multiplied by 4 in people living in the same household more than six and a risk multiplied by 2.69 for people living in a house with less than 2 bedrooms. These results are similar to those of other authors who report that subjects living in urban areas are more exposed to TB than those living in rural areas [11]. This is explained by a high population density in urban areas and consequently an increased risk of contagiousness.

Patient history (history of hospitalizations, personal and / or family history of TB), lifestyle (incarceration, malnutrition), patient habits such as smoking, alcohol, drug addiction, comorbidities of patient are involved in the onset of MDR-TB. In our series, a history of incarceration was found in 8.33% of cases and in 2.50% of controls and was not identified as a risk factor for MDR-TB .Other authors have found similar results: this is notably the case of a study on risk factors for MDR-TB in Brazil [12], but also of R. Soad [13] in Morocco who in his series on risk factors for MDRT-TB in the Casablanca region had the same conclusion. In a study carried out in Kazakhstan [14], the concept of imprisonment was associated with the development of multidrug resistance following stockouts of anti-tuberculosis drugs in prison and in that carried out in South Africa on the risk factors of MDR-TB imprisonment during treatment for TB has been identified as a risk factor for MDR-TB [15]. The concept of imprisonment is not directly linked to the onset of TBMR but results in noncompliance with treatment and this leads to multidrug resistance.

The history of previous treatment for TB is described in the literature as a risk factor for the onset of MDR-TB. In our study, history of TB treatment was found in 31.67% of cases (first-line treatment failure in 16.66%, relapse in11, 67%, 1.67% for retreatment failure and 1.67% for lost to follow-up) and 10.83% of controls (relapse in 10% and 0.83% for lost to follow-up).

The study done in Hong Kong [18] on risk factors for MDR-TB showed that 61.54% of cases had a previous history of treatment for TB and 59.62% in controls. In Burundi, Ciza F. [8] in her series found that 59.11% of her patients had a history of previous treatment for TB, Murhula B. [10] found that 62.1% of patients in her series having TBMR had a history of previous treatment of TB with 48.3% of cases relapsing. In our study, the history of TB was identified as a risk factor statistically associated with the onset of MDR-TB (p < 0.001 with OR = 2, 16 and CI = [1.06-3.42]). Other studies have found similar results: this is the case of studies done in Brazil [19] and at the University of Padjadjaran [20] on the role of risk factors for MDR-TB. Baough and coll. [21] found in a study of cases of MDR-TB observed in a Pneumo-phtisiology department in Algiers that around 77% of cases had already received at least two courses of anti-tuberculosis chemotherapy.

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Variables		Modalities	OR _{adj}	IC a 95 %	Р
Sex	·	Female	Reference	<u> </u>	
		Male	1.00	[0.51 -1.93]	0.999
Age		15-24 years	Reference		
		25-34 years	0.72	[0.29 -1.72]	0.910
		35-44 years	0.77	[0.30 -1.96]	
		45-54 years	0.93	[0.32 -2.79]	
		55 and plus	0.83	[0.27 -2.64]	
Study level		Without	Reference		
		Primary	0.28	[0.09 -0.74]	0.057
		Secondary	0.26	[0.08 -0.75]	
		University	0.52	[0.10-2.91]	
Marital status		Maried	Reference		
		Single	1.70	[0.86-3.44]	0.282
		Widower/Divorced	1.57	[0.58-4.72]	
Residence		Rural	Reference		
		Urban	2.66	[1.29-5.54]	0.008
Collective residence		No	Reference		
		Yes	0.20	[1.05-3.63]	0.009
Profession		With	Reference		
		Without	3.19	[1.25 -9.85]	0.024
Person/household		≤6	Reference		
		>6	0.25	[4.11-7.52]	<0,001
Bedroom		>2	Reference		
		≤2	2.69	[1.40-5.18]	0.003
Person by bedroom		≤3	Reference		
		>3	0.82	[0.29-2.51]	0.711
Transportation means		With	Reference		
•		Without	1.71	[0.92-3.22]	0.093
Residence distance-Hospital		<10Km	Reference		
-		>10Km	0.96	[0.40-2.37]	0.927
		Not estimated	2.55	[1.12- 6.39]	0.33
Incarceration history		No	Reference		
·		Yes	0.28	[0.06 -1.19]	0.091
Hospitalization history		No	Reference		
		Yes	0.95	[0.45-2.07]	0.897
TB history		No	Reference		
		Yes	0.26	[2.12 - 3.57]	<0.001
Relapse		No	Reference		
		Yes	15.3	[1.32-2.37]	0.032
Lost to follow-up		No	Reference		
		Yes	0.50	[0.02-1.27]	0.622
Welcome		Satisfying	Reference		
		Bad	0.064	[0.01-0.37]	0.011
Anti-TB regularity		Yes	Reference		
		No	1.38	[0.51-3.56]	0.504
TB in the environment		No	Reference		
		Yes	1,34	[0.70 -2.62]	0.381
Contact subject with		No	Reference		
MDR-TB		Yes	0.06	[1.01-3.20]	0,001
Tobacco		No	Reference		
		Yes	0.25	[2.11-4.52]	< 0.001
Alcohol		No	Reference		
		Yes	0.46	[0.22 - 0.95]	0.041
Cannabism		No	Reference		
		Yes	1.01	[0.25-4.87]	0.999
HIV		No	Reference		
		Yes	1.06	[0.47-2.51]	0.889
Diabetes		No	Reference		

Table: Association between MDR-TB and the various risk factors of our patients

So, after recovery, a patient who has taken anti-tuberculosis drugs Conclusion:

presents a risk of reactivation of endogenous Koch bacilli [4]. A.M.Kalabela and G.Tsague have reported that having taken a TB Factors such as the place of residence, the personal history of TB, tuberculosis drugs was not significantly associated with MDR-TB complications. [22,23].

In our series, relapsed cases were 15.3 times more likely to References: develop MDR-TB. This result is consistent with that of R. Soad [13] in Morocco and I. Elkard [24].

drug in the past five-fold increases the risk of having MDR-TB the contact subject with MDR-TB and tobacco are implicated in [16]. Similarly, G. Mulisa and A. Rabah reported that taking the development of MDR-TB as found in our study. previous TB treatment was significantly associated with the onset Strengthening health education and avoiding these risk factors of MDR-TB. In contrast, a Chinese study found that taking anti- will certainly reduce the prevalence of MDR-TB and limit its

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