Innovative Journal of Medical and Health Science

IJMHS 10 (05), 792–796 (2020) ISSN (O) 2277:4939 | (P) 2589:9341

Epidemiological aspects and therapeutic results of tuberculosis cases in the department of respiratory diseases, Befelatanana University Hospital

Harison Michel TIARAY[⋆,†,1], Kiady RAVAHATRA[2], Jobeline RAJAOARIFETRA[3], Oninala Fenitra RAKOTONDRASOA[4], Iantsotiana Davidson RAKOTONDRABE[5], Marie odette RASOAFARANIRINA[6], Anjara Mihaja NANDIMBINIAINA[7], Jocelyn Rakotomizao[8], Rakotoson Joelson Lovaniaina[9], ANDRIANASOLO Radonirina Lazasoa[10], RAHARIMANANA Rondro Nirina[11]

[1]*Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar*
[2]*Department of pneumonology, Tertiary hospital of Fenoarivo, Antananarivo, Madagascar*
[3]*Department of pneumonology, Tertiary hospital of Tamatave, Antananarivo, Madagascar*
[4]*Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar*
[5]*Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar*
[6]*Department of pneumonology, Tertiary hospital of Tamatave, Antananarivo, Madagascar*
[7]*Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar*
[8]*Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar*
[9]*Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar*
[10]*Department of Infectious desease, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar*
[11]*Department of pneumonology, Tertiary hospital of Fenoarivo, Antananarivo, Madagascar*

DOI: https://doi.org/10.15520/ijmhs.v10i03.285

Accepted 01/05/2020; Received 15/04/2020; Publish Online 10/05/2020

Reviewed By: Dr Daniel V.
Department: Medical

ABSTRACT

Introduction: One of the ways to assess the quality of the treatment of tuberculosis is to analyze the treatment of outcomes the patients followed up. Our objective is to describe the epidemiological aspects and the therapeutic results of tuberculosis patients seen at the Joseph Raseta Befelatanana University Hospital Center.
Methods: This is a retrospective and descriptive cohort study from January 1^{st}, 2014 to December 31, 2017. Data were collected from the tuberculosis registry.
Results: We included 759 cases, the average age were 36.48 years. There was male predominance a sex ratio of 1.62. The pulmonary forms tuberculosis predominated (62.50%). Pleural (51.58%) and lymph node (16.49%) lesions were the most frequent extra pulmonary forms. The prevalence of TB-HIV coinfection was 5.80%. The treatment success rate for all forms was 84.46%, it was 90.50% for the smear positive pulmonary tuberculosis. Age, type of tuberculosis and HIV status influenced treatment outcomes ($p < 0.05$).
Conclusion: The data on the therapeutic outcome of our study meets the objective of the WHO. Other multicenter studies are necessary to answer certain questions that were not clarified during our study in relation to the other factors influencing therapeutic outcomes in Madagascar.

Key words: epidemiology–tuberculosis–treatment outcome–Madagascar

1 INTRODUCTION

Tuberculosis is a communicable, non-immunizing infectious disease caused by *Mycobacterium tuberculosis* (or Koch's

⋆ Corresponding author.
† Email: tiarayharison@yahoo.fr.

bacillus, BK). It's the leading cause of morbidity and mortality in individual aged 15 to 50 in Madagascar [1] . The 2017 report on the fight against tuberculosis further demonstrates that this pathology remains a threat worldwide [2] .

In fact, it was estimated that there were 1.3 million deaths from tuberculosis in populations with the HIV-negative (compared to 1.7 million in 2000) in 2016, which were added 374 000 deaths in the HIV-positive population [2] . Drug-resistant tuberculosis is a constant threat. Also in 2016, there were 600,000 new cases of resistance to rifampicin (the most effective first-line drug), including 490,000 cases of multidrug-resistant tuberculosis (MDR-TB).

We know that the quality of care plays an important role in the fight, both in terms of the prognosis and in relation to the spread of the disease. Under effective treatment, the contagiousness of a tuberculosis patient decreases very quickly and, most deaths from tuberculosis could be prevented by early diagnosis and appropriate treatment. The outcome of the treatment and the prognosis of tuberculosis largely depends on this quality of care [3] .

According to certain authors [4], one of the ways assessing the quality of the tuberculosis treatment for a region or a country, it consists the analysis of the treatment outcome of the follow-up patients. Hence, this study is targeting on description of the epidemiological aspects and the therapeutic outcomes in patients with tuberculosis seen at the Training and Research Care Unit in Respiratory Diseases department, Joseph Raseta Befelatanana, University Hospital Center.

2 METHODOLOGY

This is a retrospective, descriptive study, carried out during the period from January 01, 2014 to December 31, 2017 (4 years). We included in the study all patients hospitalized during the study period that were diagnosed with tuberculosis, regardless of its form. We excluded all patients whose files were incomplete, making the interpretation of treatment outcomes impractical. These include all transfer cases so called "transfer out" to other diagnosis and treatment center, where the outcome of the treatment was unknown for them.

The diagnosis of tuberculosis was made in different ways depending on the location and according to the guidelines of the National Tuberculosis Control Program in Madagascar. The treatment protocol and follow-up of patients under treatment is also those of the Program.

We collected data from the files of patients hospitalized in the Respiratory Diseases department of the CHUJR-Befelatanana during the year 2014-2017. A data collection grid was used. The department's tuberculosis registry was the source of the study data. This register is part of the tuberculosis case management tools used in all Tuberculosis Diagnosis and Treatment Centers in Madagascar.

The data collected was entered and processed using Microsoft office Excel® 2007 and Microsoft office Word® 2007. The data was then imported into Epi-Info® 3.5.2 software for statistical analysis.

Patient confidentiality was respected with no information revealing their identity was disclosed during and after data collection in this study to ensure anonymity. The data collected was stored and secured to avoid any problem of information disclosure.

3 RESULTS

We were able to collect 1,212 cases of tuberculosis from the registry data, including 453 cases of transfer out (transferred to other Diagnosis and Treatment Center or Treatment Center, CT). Seven hundred and fifty-nine (759) patients met our inclusion criteria. The median age were 36.48 years old with an extreme, ranging from 25 months-95 years. Male predominance was notified, a sex ratio was 1.62. Smear positive pulmonary tuberculosis form was the most representative forms of tuberculosis, accounting for 48.40% of the cases. Extra pulmonary forms occupied second place with a frequency, 37.50%. For extra-pulmonary tuberculosis, the pleural tuberculosis was the most frequent locations about 57.19%. Grouping the involvement of serous membranes together, it could be represented at least 76% of extra-pulmonary locations.

Lymph node tuberculosis ranked second (16.49% of cases) in decreasing order by frequency of extra-pulmonary tuberculosis (Table I). The prevalence of TB-HIV co-infection was 05.80%. The treatment outcome is presented in Table II. Successful treatment included cases reported cured and treatment completed. Nineteen patients have been stopped their treatment after a medical decision related to the wrong diagnosis. The factors influencing treatment outcomes were: age, type of tuberculosis and HIV status (Figures 1, 2 and 3).

4 DISCUSSION

Knowledge of the therapeutic outcomes of all followed patients in a health facility is paramount. It is an indicator of the quality of the care offered in relation to given pathology. For our study, we excluded those who transferred out to other care centers related to therapeutic outcomes which were unavailable in the register records, thus making the exploitation of data relating to therapeutic outcomes impractical. This is the case of patients that are hospitalized in our department for an acute episode, then transferred to another treatment center, once the acute episode has passed.

The predominance of men (sex ratio 1.62) observed during our study was consistent with the results of other studies [5] . This difference, according to gender has already been reported for several years by other authors [6] . For the male gender, some authors put forward certain risk factors such as alcohol and tobacco to explain this predominance. Some authors also put forward other explanations for this predominantly male gender involvement, such as their

Tuberculosis form		Number (n=759)	Percentage (%)
Smear positive pulmonary tuberculosis		367	48,40
Smear negative pulmonary tuberculosis		107	14,10
Extra-pulmonary tuberculosis		285	37,50
	Pleural tuberculosis	163	57,19
	Lymphe node tuberculosis	47	16,49
	Peritonitis tuberculosis	22	07,72
Extra-pulmonary tuberculosis	Meningeal tuberculosis	21	07,39
	Many serous involvement	11	03,86
	Spinal tuberculosis (Pott disease)	07	02,45
	Multifocal tuberculosis*	02	0,69
	others**	12	04,21

Table 1. Distribution of tuberculosis patients according to clinical forms of tuberculosis

Treatment outcome	Number (n=759)	Percentage (%)
Success	641	84,46
Died	76	10,02
Treatment stopped for medical reason	19	02,50
Dopped out of treatment	15	01,97
Failed	08	01,05

Table 2. Treatment outcome of tuberculosis cases

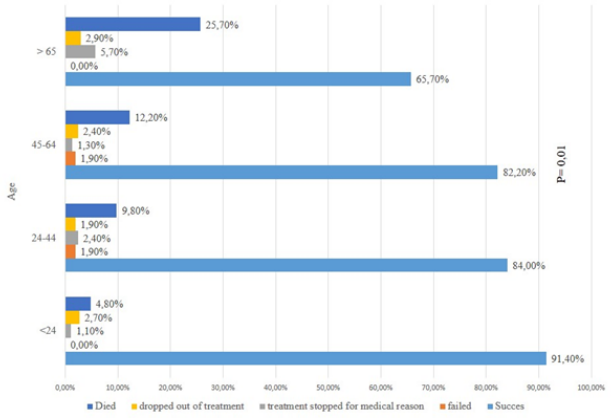

Figure 1. Treatment outcome of tuberculosis cases, according to ages

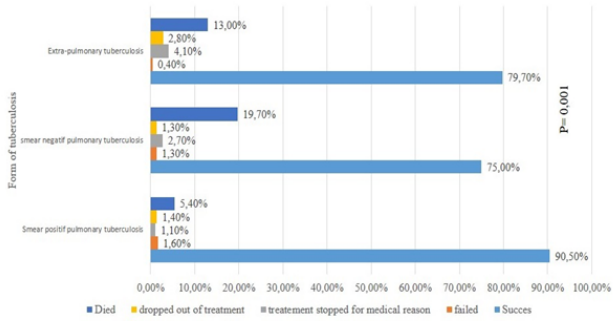

Figure 2. Treatment outcome, according to the form of tuberculosis

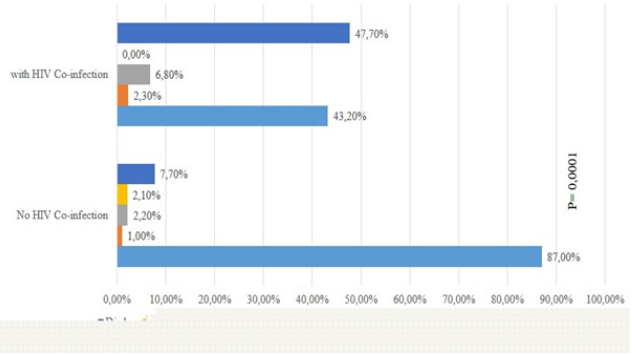

Figure 3. Treatment outcome of tuberculosis cases, according to HIV status

socio-professional activities, which expose them much more to human-to-human contact [7].

The predomination of the pulmonary site in tuberculosis compared to the other site, in our study, has been unanimously accepted for a long time. The management of these pulmonary locations is an absolute priority in public health since it is the contagious form which perpetuates the spread of the disease. Moreover, the frequency varies from one region to another. Several explanations are offered for this variation in frequency, among of them including, level of exposure to risk factors, promiscuity, immune status, average age, prevalence of HIV infection in the general population and so on.

In several regions, the underdiagnosis of the pulmonary form of tuberculosis remains a major challenge [8] according to Arega B et al. Several reasons could justify this situation, including the use of a passive case detection strategy which is based on the self-presentation of symptomatic patients in health facilities for diagnosis instead of active detection. It means to search the patients where they are, identified them and brought them into the nearest Treatment Centers for confirmation of the diagnosis and initiation of anti-tuberculosis treatment. The second reason could be the use of diagnostic techniques test less sensitive, such as microscopy with the Ziehl Neelsen staining technique, which remains the cornerstone of diagnostic modalities in low-income countries, rather than using a relatively sensi-

tive test, and practical like fluorescence microscopy and very sensitive tests, including molecular technique.

In Madagascar the situation seems to be similar where we refer to the number of expected cases. As the underdiagnosis is the most frequent form of dissemination, it maintains the spread of the disease, therefore greatly compromises the fight against tuberculosis. Some authors have put forward other risk factors of a patient to develop pulmonary tuberculosis such as tobacco, taking immunosuppressive drugs such as corticosteroids and diabetes. In contrast the female gender, young age, HIV infection and cirrhosis are predictive factors for the occurrence of extra-pulmonary tuberculosis [9, 10]. More studies are needed to verify the veracity of this information about our country.

The frequency of pleural and lymph node tuberculosis in our study was consistent with that of other studies [11, 12]. These two locations would then be systematically sought before a suspicion of extra-pulmonary tuberculosis in Madagascar.

The lymph node localization of tuberculosis is the most common localization, especially in children. Because of the difficulty of the diagnosis in front of any suspicion of a tuberculous origin especially in regions with high endemicity like Madagascar, using the pathological examination is recommended [13] . It is necessary to pay attention to the frequency of the meningeal localization of our study because as it is a department which takes care of the respiratory problems, the meningeal forms which are manifested by neurological signs could be hospitalized in other service (therefore, interpretation with reservations about this frequency which could be the source of an error of interpretation when the actual frequency of meningeal tuberculosis in our hospital). There may indeed be an underestimation of the frequency of meningeal localization for our study.

For our study, the prevalence of TB-HIV co-infection was 05.80%. Seroprevalence of HIV infection in the general population is low in Madagascar (0.3 / 100,000 inhabiting among adults between 15 and 49 years old) [14] . The prevalence of TB-HIV coinfection varies from a region to a region; several causes have been putting forward explaining this situation, including the level of prevalence of HIV infection in the general population. According to some authors, the higher this prevalence, the higher the frequency of TB-HIV coinfection [15], which could reflect this low prevalence of TB-HIV coinfection for our study.

Regarding the therapeutic outcome, we are able to state that the success rate recorded during our study (84.46%) is slightly below the objective set by the WHO (success rate> 85%) otherwise whether we are looking specifically the success rate of smear positive pulmonary tuberculosis, the objective was achieved [16] . Treatment success rates vary from one country to another, several factors have been identified to explain these differences. Furthermore, it is revolving around the health system condition, including coverage in centers which are able diagnosing and treating tuberculosis cases (Diagnostic and Treatment Center or Treatment Center for Madagascar) [17] . Actually looking at the mortality rate, our result studies are in agreement with founding by Babatunde O and colleagues. in Nigeria [16] . On the other hand, this mortality rate of our study is lower than in Malaysia [18] and higher than the mortality rate in a region of Ethiopia [19]. The probable causes of these variations are multifactorial, including infection severity, proportion of subjects at the risk of complication and death / immunocompromised, young children, loss of follow-up, aspect of treatment quality and health system condition.

In our study, age, type of TB and HIV status have been influenced treatment outcomes. Among of young age, several explanations could be advanced, such as the psychological behavior of these groups of individuals who are known to be difficult to adhere to treatment. For TB-HIV coinfection, several factors can explain this negative impact on therapeutic outcomes: psychological factors (frequency of cases of depression, consequences of stigma and discrimination, and so on.), difficulties in making the diagnosis (frequency of atypical pulmonary forms and extra pulmonary forms), difficulties in achieving optimal compliance (number of tablets often important because at least two pathologies are being treated, the occurrence of undesirable effects much higher).

Despite Our results, this study does not pretend to be representative of tuberculosis patients of the Malagasy population, but as one of the national reference centers, which takes care of all patients coming from all regions of Madagascar; we can say that the data we were able to collect during this study are additional information relevant to the database in Madagascar. They can thus be profitable at different levels and to those working in the fight against tuberculosis in Madagascar.

5 CONCLUSION

During our study, tuberculosis mainly affects young adults and in male gender. It is especially the pulmonary forms which predominated with a significant proportion of the extra pulmonary forms. The prevalence of TB-HIV coinfection was still low. For therapeutic results, therapeutic success rates for all form were slightly below the target set by the WHO, but for smear positive pulmonary tuberculosis patients, the target was reached.

Conflicts of interest: The authors declare no conflicts of interest.

REFERENCES

[1] Oms, Rapport; 2017. Available from: https://www.theunion.org.../dapres-le-rapport-2017-de-l'OMS-sur-la-lutte-contre-latuberculose.

[2] Ali MK. «Factors associated with tuberculosis treatment outcomes among tuberculosis patients attending tuberculosis treatment centres in 2016. PAMJ. 2017;28:1–14.

[3] Holmes CB. A review of sex differences in the epidemiology of tuberculosis. Int J Tuberc Lung Dis. 1998;2:1–9.

[4] Gonzalez OY. Extra-pulmonary manifestations in a large metropolitan area with low incidence of tuberculosis. Int J Tuberc Lung Dis. 2003;12:1178–85.

[5] Woessner J. Epidémiologie de la tuberculose à Mayotte. Bull Soc Pathol Exot. 2008;101:1–7.
[6] Shiying L. Diagnostic accuracy of Xpert MTB/RIF for tuberculosis detection in different regions with different endemic burden : a systematic review and meta-analysis. PlosONE. 2017;7:1–13.
[7] Islam S, Hirayama T, Islam A, Ishikawa N, Afsana K. Treatment referral system for tuberculosis patients in Dhaka, Bangladesh. Public Health Action. 2015;5(4):236–240. Available from: https://dx.doi.org/10.5588/pha.15.0052.
[8] Datiko DG, Yassin MA, Chekol LT, Kabeto LE, Lindtjørn B. The rate of TB-HIV co-infection depends on the prevalence of HIV infection in a community. BMC Public Health. 2008;8(1):1–10. Available from: https://dx.doi.org/10.1186/1471-2458-8-266.
[9] Mangtani P, Abubakar I, Ariti C, Beynon R, Pimpin L, Fine PEM, et al. Protection by BCG Vaccine Against Tuberculosis: A Systematic Review of Randomized Controlled Trials. Clinical Infectious Diseases. 2014;58(4):470–480. Available from: https://dx.doi.org/10.1093/cid/cit790.
[10] Atif M. Treatment outcome of new smear positive pulmonary tuberculosis patients in Penang, Malaysia. BMC Infect Dis. 2014;14(1):1–8.
[11] Antoine D. Les issues de traitement des cas de tuberculose déclarés en France en. Bull Epidémiol Hebd. 2008;32:1–8.
[12] ; 2011.
[13] Wang J. Gender difference in knowledge of tuberculosis and associated health-care seeking behaviors : a cross-sectional study in a rural area of China. BMC Public Health. 2008;8:1–7.
[14] Babatunde O. Factors affecting treatment outcomes of tuberculosis in a tertiary health center in southwestern Nigeria. Int Rev Soc Sci Hum. 2013;4:209–220.
[15] Rakotonirina EJ. Facteurs contextuels de l'efficacité du contrôle de la tuberculose à Madagascar : étude de validité au niveau national. Med Sante Trop. 2016;26:64–70.
[16] Sreeramareddy CT, Panduru KV, Verma SC, Joshi HS, Bates MN. Comparison of pulmonary and extrapulmonary tuberculosis in Nepal- a hospital-based retrospective study. BMC Infectious Diseases. 2008;8(1):1–6. Available from: https://dx.doi.org/10.1186/1471-2334-8-8.
[17] Lin JN. Risk factors for extrapulmonary tuberculosis compare to pulmonary tuberculosis. Int J Tuberc Lung Dis. 2009;5:620–625.
[18] Arega B, Tilahun K, Minda A, Agunie A, Mengistu G. Prevalence rate of undiagnosed tuberculosis in the community in Ethiopia from 2001 to 2014: systematic review and meta-analysis. Springer Science and Business Media LLC; 2019. Available from: https://dx.doi.org/10.1186/s13690-019-0360-2.
[19] ;. Available from: www.who.int/tb/publications/global_report/gtbr2017.

AUTHOR BIOGRAPHY

Harison Michel TIARAY Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar

Kiady RAVAHATRA Department of pneumonology, Tertiary hospital of Fenoarivo, Antananarivo, Madagascar

Jobeline RAJAOARIFETRA Department of pneumonology, Tertiary hospital of Tamatave, Antananarivo, Madagascar

Oninala Fenitra RAKOTONDRASOA Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar

Iantsotiana Davidson RAKOTONDRABE Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar

Marie odette RASOAFARANIRINA Department of pneumonology, Tertiary hospital of Tamatave, Antananarivo, Madagascar

Anjara Mihaja NANDIMBINIAINA Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar

Jocelyn Rakotomizao Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar

Rakotoson Joelson Lovaniaina Department of pneumonology, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar

ANDRIANASOLO Radonirina Lazasoa Department of Infectious desease, Tertiary hospital of Joseph Raseta Befelantanana, Antananarivo, Madagascar

RAHARIMANANA Rondro Nirina Department of pneumonology, Tertiary hospital of Fenoarivo, Antananarivo, Madagascar