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TUBERCULOSIS IN CHILDREN IN TOAMASINA MADAGASCAR

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SUMMARY

Tuberculosis is an infectious bacterial disease caused by a germ called *Mycobacterium tuberculosis or "*Kock Bacillus (KB)".[1] Tuberculosis is one of the illnesses caused by a unique deadliest infectious agent in the world. A goal of this work was to describe the epidemiology of pulmonary tuberculosis (PT) and non-pulmonary tuberculosis (NPT) in children. It is a descriptive and retrospective study concerning the cases of tuberculosis observed in 3 Center of Diagnosis and Treatment of the town of Toamasina Madagascar. The study has been done in a period of 24 months from January 2014 to December 2015. All the children from 0 to 15 years old having been objected of request of tuberculosis research were included. We have compiled 153 cases of tuberculosis that 14 cases of pulmonary and non-pulmonary tuberculosis associated. We have recovered 101 cases of pulmonary tuberculosis (66.01%) in which 41 children pulmonary tuberculosis on positive microscopy, 46 children pulmonary tuberculosis on negative microscopy, 5 cases of pleura localization and 9 cases of miliary. The average year of tuberculosis children were 6.81. Sixty six cases of non-pulmonary tuberculosis (33.99%) have been diagnosed. Among the NPT, ganglionnary tuberculosis was the most common in 27 cases (40.91%). The AFB sputum represents the most common means of diagnosis in 41 cases (26.80%). Most of the children (115) struck by tuberculosis were malnourished (75.16%) with $p<0.05$. The tuberculosis profile in infant in Toamasina is not in much important way different from the data of the literature except in the level of type that we noted a female predominance. Infant tuberculosis is still of actuality, reaching all ages especially in developing country. Malnutrition is obvious in here which is a social problem to which global and radical solution must be imposed.

KEYWORDS: Tuberculosis - Children - Epidemiology – Toamasina.

INTRODUCTION

Tuberculosis is an infectious bacterial disease caused by a germ called *Mycobacterium tuberculosis or "*Kock Bacillus (KB)".[1] Tuberculosis is one of the illnesses caused by a unique deadliest infectious agent in the world. It is only second after HIV/AIDS. In 2013, 9 million of persons have developed tuberculosis and 1.5 million were dead from it. More than 95% of the deaths of tuberculosis happen to be in the country at in-between or feeble income. In 2013, we estimated that 550 000 children became sick of tuberculosis and 80 000 seronegative children from HIV died from tuberculosis.[2] Among those new recorded cases annually, 90% were located in the third word, Madagascar included. The reason is that illness is given favor and aggravated by malnutrition that is manifest in Madagascar, so the rate of annual risk is near 1.5%.[3,4] Children represent up to third of the global case of tuberculosis. Most of the cases are pulmonary tuberculosis (PT).[5] Tuberculosis (TB) still represents a serious Public Health problem in Madagascar, one of the principal causes of hospital death.[6] The incidence is different from a region to another and from a district to another because of diverse factors socio-economic, cultural, environmental, climatic, geographic whose the accessibility of sanitary formations.[7] Studies concerning tuberculosis in children are still few in here. So as to update the knowledge concerning pulmonary and non-pulmonary tuberculosis epidemiology identified in children, we have led a study in the Center of Diagnosis and Treatment (CDT) of tuberculosis in the town of Toamasina Madagascar. A goal of this work was to describe the epidemiology of pulmonary tuberculosis (PT) and non-pulmonary tuberculosis (NPT) in children seen in 3 CDT of tuberculosis in Toamasina.

MATERIALS AND METHODS

It is a descriptive and retrospective study concerning the cases of tuberculosis observed in 3 CDT of the town of Toamasina. The study has been done in a period of 24 months from January 2014 to December 2015. All the children from 0 to 15 years old having been objected of request of tuberculosis research were included. The variable kept and studied were: the age, the kind, the

origin (urban or rural), the localization of the infection, the evolution after treatment, the different means of diagnosis, the nutritional condition of the patients and the result of microscopic exam searching for acid fast bacillus (AFB). The data were treated and analyzed by the software Epi-info 7.1.3. The analysis and the management of the data have been done with a threshold of signification of 0.05. For the comparison of percentages, the $\chi 2$ test of Fisher was used.

RESULTS

During those 24 months, we have compiled 153 cases of tuberculosis whom 14 cases of pulmonary and non-pulmonary tuberculosis associated. We have recovered 101 cases of pulmonary tuberculosis (66.01%) in which 41 children PTM+ (pulmonary tuberculosis on positive microscopy), 46 children PTM- (pulmonary tuberculosis on negative microscopy), 5 cases of pleura localization and 9 cases of miliary.

Table I: Evolution of pulmonary tuberculosis according to age.

Issue	0 to 2 years				3 to 6 years				6 to 10 years				11 to 15 years				Total
	PTM+	PTM-	P	M	PTM+	PTM-	P	M	PTM+	PTM-	P	M	PTM+	PTM-	P	M	
C	2	8	1	1	7	19	1	1	5	6	-	3	18	3	2	1	78
D	-	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	3
A	-	1	-	-	2	2	-	-	-	1	-	-	3	2	1	1	13
T	1	2	-	-	1	1	-	-	-	-	-	-	1	-	-	1	7

G: Cured, D: death, A: abandon, T: transferred, P: pleura tuberculosis, M: military.

The average year of tuberculosis children were 6.81 with 5 weeks of extreme and 15 years. The portion of age from 3 to 6 and 11 to 15 represent 17.82% of the cases and those of 7 to 10 14,85% of the cases. The rate of healing was 77.23% (78 of the cases). Three children died (2.97%) and 7 transferred (6.93%) (Table I). Ninety two pulmonary tuberculosis children (91.09%) come from urban milieu. Among those pulmonary tuberculosis children, 45 were male (44.55%) and 56 female (55.45%) with a sex-ratio of 0.80.

Table II: Non-pulmonary tuberculosis (NPT) allotment according to age and localization.

Localisation	0 to 2 years		3 to 6 years		7 to 10 years		11 to 15 years	
	n	%	n	%	n	%	n	%
Ganglionnary	6	30	8	50	8	47,06	5	38,46
Miliary	2	10	1	6,25	3	17,65	3	23,08
Pleura	1	5	1	6,25	-	-	3	23,08
Headache	**7**	35	3	18,25	-	-	-	-
Péritoneal	2	10	2	12,50	4	23,53	1	7,69
Osteo-articulary	2	10	1	6,25	2	11,76	1	7,69

Sixty six cases of non-pulmonary tuberculosis (33.99%) have been diagnosed. Among the NPT, ganglionnary tuberculosis was the most common in 27 cases (40.91%), followed by the peritoneal and miliary (13.63% each). Ten forms of headaches have been diagnosed (15.15%). Five children show pleura form (7.57%) and the osteo-articular form represents 6 cases (9.09%). The average year of children having extra pulmonary tuberculosis was 5.69 with 1 and 15 of extreme. The non-pulmonary tuberculosis was mainly seen in children of 0 to 2 years in 20 cases (30.30%) followed by children of 7 to 10 years old in 17 cases (25.75%) (Table II). Fifty six children who had NPT have been healed (84.85%).

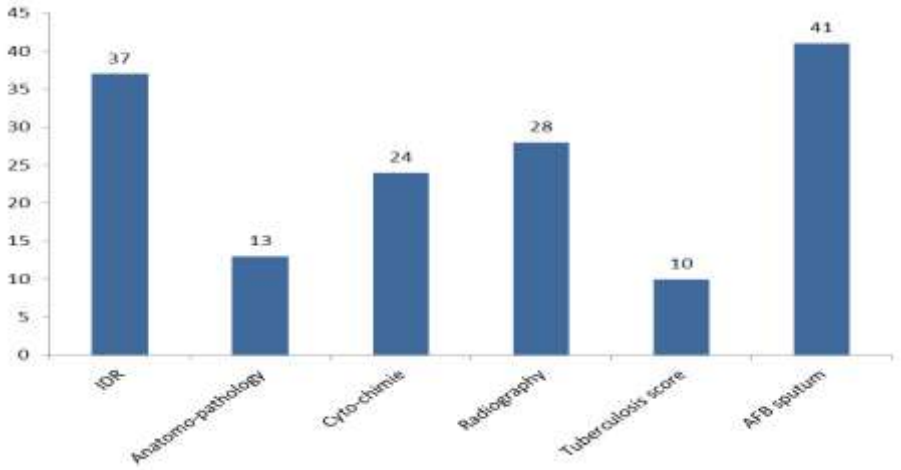

Figure 1: Allotment of tuberculosis cases according to the means of diagnosis.

As for figure 1, the AFB sputum represents the most common means of diagnosis in 41 cases (26.80%) followed by IDR (intra-dermo reaction) in 37 cases (24.18%) and of pulmonary radiography in 28 cases (18.30%). The tuberculous score was only seen in 10 children (6.53%).

Most of the children (115) struck by tuberculosis were malnourished (75.16%) with $p<0.05$. The state of malnutrition affect globaly both sex. Malnutrition was very important in the whole region of Toamasina with a respective rate of 84.62% for the tuberculosis children living in the rural milieu and 74.29% for those who live in the urban milieu. More than half of the children (77.23%) were healed even though they are malnourished and only 3 tuberculosis children die from malnutrition.

DISCUSSION

Tuberculosis is pathology of actuality that keeps on challenging the specialized community even though the main factor has been known for more than a century. The persistency of tuberculosis is principally assignable to poverty, natural growth of demography worsened by migratory phenomenon and by the important increase of tuberculosis cases in HIV endemic zones.[8] HIV infected children show a higher tuberculosis infection risk and active tuberculosis disease.[5]

In our study, we have recovered 101 cases of pulmonary tuberculosis or 66.01% of which 41 children were the case of pulmonary tuberculosis on positive microscopy (PTM+) who will be responsible of transmitting the bacillus in the collectivity and will create new affected subject as well and new patients.[8] Forty six children were unconfirmed cases. It means negative swab(PTM-), and 5 cases of pleura localization and 9 cases of miliary. A source cases with a PT on positive expectoration swab is more susceptible to infect contacts than the cases of negative expectoration swab.[5] A study led in the middle west of Madagascar found 3% of PT of the whole tuberculosis diagnosed.[9] Others authors in Togo showed that tuberculosis was pulmonary in thirty eight cases, of which twenty nine had positive swab and extra pulmonary in thirty six cases.[10] A study done in India showed that 51% of the children had pulmonary localization. The predominance of that localization is common wherever the region in the world[11] and could represent a very high rate: 70.8% in Gabon[12], 77.24% in Ivory coast[13] and 86.4% in Burkina.[14]

Tuberculosis appears in all ages but the younger the child, the more the probability to identify a case of tuberculous disease in the hearth of the child increase. Active tuberculosis might be more serious and occurs faster in infant and young child.[5] In older children, the contact with a source case of tuberculosis could happen outside of the hearth, for instance at school.[5] Concerning the delay after contact, generally, children develop a TB within 2 years after the exposition, even within the year in the most cases (90%).[5] The average age of pulmonary tuberculosis children was 6.81 with 5 weeks of extreme and 15 years. This match with a study done in Togo which found an average age of 8.10.[10] Their allotment according to their age was 0 to 5: twenty three cases (31%), 6 to 10: twenty cases (27%) and 11 to 14: thirty one cases (42%).[10] On 200 children, coming primarily from the Dakar region, children were aged 2 months to 15 with an average of 5 years.[15] The age group of 3 to 6 and 11 to 15 were more represented in more than half of the cases (33.66% of each), as it is habitually the case in sub-Saharan Africa.[16] Elsewhere, the young children are more affected. So, in India, authors found that the age group of 0 to 6 was more affected (37.7% of the cases).[17] The age group of 0 to 2 represents 17.82% of the cases and those of 7 to 10 14.85% of the cases. The reach of infant is most common in case of HIV coinfection. So, in Congo, among 803 children, having pulmonary tuberculosis, 14.6% were infants of which 6.4% had HIV infection associated.[18] For Cardenat and al, the children in baby hood bear more non-pulmonary tuberculosis the most (ganglionary, mediastinal, headache and miliary).[13] However**,** all the age group are at risk. The risk of developing active tuberculosis is even bigger on the patients who suffer from other diseases which weaken their immune system.[2] Other authors confirm that the young age of the child does not increase the risk of infection, but only the risk of progression to the disease.[19] The ratio of infected children having right away signs of tuberculosis disease is even more common as they are young. It could reach up to 40% in children less than 5 years.[20] However, the threshold age below which that risk is present is not clearly defined. It varies in the different recommendations of international societies: 2 years for British Thoracic Society (BTS)[21], 5 years for American Thoracic Society (ATS).[22] Youth is a particular period of development of the disease and above all the occurrence of cavitary forms very symptomatic as in adult.[23]

The evolution has been favorable in 77.23% of our children coming back for consultation, that result was inferior to the data of the literature where the good evolution varies around 98%.[24,25,26,27] The evolution was generally favorable under early anti-tuberculous chemotherapy, well done and during sufficient period. It was judged by the fast improvement of the general state and the disappearance of clinical signs that we get during the first weeks of treatment, where as radiologic signs linger often after 3 months. In our sequence, the abandonment of treatment was been seen in 13.86% of the cases regarded as those who stopped their treatment. The therapeutic abandonment is found in the age group 3 to 6 and 11 to 15. A study led in Togo showed a rate of those who stopped their treatment of 19%.[10] Some study of the literature as that of Peckan[28], Osman and El Sony[29] described respectively a rate of 28%, 48.6% of those who stopped their treatment. Other sequences brings less important percentages 2.9% in the study

about the European union/ the european economc air in 2011[30], 3.7% with Xi Rong Hu[31], and 7.2% with Barchiche.[32]

The rate of death is 2.97% and 6.93% of the transferred cases. Tuberculosis is one of the deadliest pathology.[33] The combination of signs of strong presumption in a patient is enough to start a treatment. All delay is a risk to dispatch the infection and may be responsible for the death. The mortality in the literature varies according to the studies, the Moroccan sequence El Harim[24] brings a death percentage of 6%. In the magrebines sequences, the mortality rates vary according to the studies. Barchiche[32] in Algeria relate 3 deaths in a total of 153 patients or 1.9% in Sudan, Osman[29] brings a percentage of 4.3%, a more important percentage was found by El Khemiri[26] in Tunisia, 13%. A study led in Togo showed a death rate of 4%.[10] We should point out by the end of this study, that the infant tuberculosis is of good prognosis by fast diagnosis and a correct treatment; The spontaneous development without any treatment has three possibilities, within the two years after the disease has started: 50% of the patients died, 25% healed (with functional after effect), and 25% become chronic and constitute a perennial tank.[2]

Forty five pulmonary tuberculosis children (44.55%) have been male and 56 female gender (55.45%) with a sex ratio of 0.80. The male predominance is classically found in literature.[10,24,25,29,32,34,35] But there was a sequence where the sex ratio was 1, as in the study of Clemax and Al.[31] Another case of figure was brought by other studies, with Chemlal in 2014 in Moulay Youssef de Rabat Hospital, the female predominance was 52.6%, in India, in the sequence of Ruchi and Thakur, it showed 62% and in Taiwan, Kuo-Sheng Tsai described 3.10 girls for 100 000 population reached by tuberculosis versus 2.91 boys/100 000 population.[36,37] In some studies, the female gender is regarded as risk factor of the disease to happen.[38]

In our sequence, we have noted a predominance of urban origin in 91.09% of cases of pulmonary tuberculosis globally. That joined to the data of the literature had the rate 73.3% to 95.5% in the studies of Rabat[24], of Algeria[32], India[36] and Kilimanjaro[39], and contradict the result of Xi Rong Wu[35] in China where the rural predominance was seen in 75.8%. That urban predominance found in developing country could be explained by anarchic and informel dwelling caracteried by low sun, bad ventilation and high human density, this doesn't exclude rural milieu factors but sun and ventilatin are often present. Another reflexion is possible, the limited access of the patients to the badly equipped structures of care with non equitable allotment of the structure of care, and even the number of patients is more important.

Sixty six cases of pulmonary tuberculosis have been diagnosed (33.99%). That rate is similar to those brought by some Africans[14] but superior to that of Cardenat and al: 22.76%. For Gaudelus and Al, the NPT would represent 20% of children tuberculosis in France.[40] For Rieder[41], it represents the third odd cases of children tuberculosis in the United States, whereas Maltezou and Al[42] evalue it at 9% in Athenes. In the world, OMS enumerates 14% of non-pulmonary tuberculosis. The patients are not contagious if it is no location associated in lungs. The infection by lymphatic hematogene or aerial ways could be expressed by predominant localization whereas the initial hearth has disappeared long ago.[43] Among the NPT, the ganglionary tuberculosis is the most common in 40.91% cases. Other authors confirm that the tuberculous adenopathy constitutes the most common form of NPT in infant, generally, it represents about 12% of the cases of infant tuberculosis. The ganglionary tuberculosis may or might not be associated to other tuberculosis symptoms. The cervical ganglions are the most affected. The age of apparition is generally 2 to 10. Generally, the hypertrophy of the lymphatic ganglion caused by tuberculosis is important (>2 x 2 cm), it means not only palpable but visible, painless and asymmetric, often multiple ganglions, separated mobile or adherents and lingering (>1 mouth) and does not respond to other treatments than antibiotics.[5] Subsequently, a needle puncture according to the recommended technic should be done during the first ambulatory visit of all the patients, followed by cytologic and microscopic examination shows a high diagnosis production, some report[44,45,46,47] but not all of them shows that the examination confirm the presence of ganglionnary tuberculosis in more than 85% of the patients, which makes us think that technic is important.[48]

Other authors have found a ganglionary localization in 35% of the cases, pleura 14%, peritoneal 5%, osteo-articular 3.5%, with headache 3%, pericardiac 2.5% or multifocal 10%.[15] In our sequences, 7.57% of children show pleura form. Tuberculosis is a probable cause of unilateral pleura effusion in the country at heavily loaded by tuberculosis. That is the diagnosis for 95% of the patients belonging to a sequence of originary cases from Ouganda and Zimbabwe.[49,50] The pleura pouring out suspected must be confirmed by thorax radiography and if possible, by instant puncture of fluid, followed by examination search from AFB.[51] Pleurisy and tuberculous pericarditis are classically described in weeks or months following a primo infection. However, those serous struck could coexist with active or miliary pulmonary tuberculosis.[43]

The peritoneal forms and miliary represent each 13.63% cases. The miliary tuberculous is a serious form of tuberculosis. It constitutes a therapeutical emergency. That form represents around 2% of all the forms of tuberculosis and 10% of non-pulmonary tuberculosis according to a study done in Mali.[52] It is a generalized infection (lungs, liver, spleen, bone marrow, meninx…), constituted by multiple granulomas of the size of mil

grain.[53] It is caused by the dissemination by hematogene or lymphatic way of the tuberculous bacillus. It could happen during primo-infection or by the in-between of common tuberculosis, habitually in old persons, children less of 2 years and immune depression patients. The tuberculous bacilli rarely found in biologic products, thus that form is hardly contagious.

The osteo-articulary forms represent 9.09% of the cases. In the literature, the most common localization osteo-articulary is frequently found in subjects from Africa or Asia. The clinical signs of Pott's disease, spinal pain more or less fevered, are not specific and the negative of the backbone which orient the diagnosis, showing the destroying images of the spinal body with cuneiform packing eventually associated to a condensing process.[54]

The meningeal forms represent 15.15% of the cases. The tuberculous meningitis is presented as meningitis of progressive installation on weeks, isolated, or associated to focal neurologis signs, with particularly evocative struck of the base of the skull. The beginning is often insidious (fever, anorexia, vomiting, headache) with trouble of behavior (irritability, apathy) which are sometimes the only manifestations alerting our attention, and lately, neurologic signs (convulsions, paralysis oculomotor coordination, trouble of consciousness, coma).[43] The diagnosis of certainty is done through the base of the presence of tuberculosis bacillus, in the cerebrospinal liquid or in direct examination or in the culture.[55]

Non-pulmonary tuberculosis is above all seen in infant from 0 to 2 years in 30.30% of the cases. Non-pulmonary tuberculosis is common in children and its clinic table varies with the age. The symptoms vary according to the site of the disease and are typically lingering, evolutive and sometimes associated to loss of weight or feeble gain of weight.[5] The children are more predisposed to develop an extra pulmonary struck. The impact would be more important on infants and babies who have the tendency to show serious forms, such as meningitis and military.[56,57] Even if it is a serious infection, 84.85% of the children stricken by NPT have been healed.

Tuberculosis is particularly hard to diagnose in children.[2] In our sequence, the AFB sputum represents the most common means of diagnosis (26.80%) followed by IDR (24.18%). A tuberculin IDR is useful to reinforce the TB diagnosis in children whose clinical characteristics are evocative but the expectoration swab are negative or cannot produce expectoration. A positive tuberculin IDR is particularly useful to show tuberculosis infection when there is no exposition known to the TB at clinic evaluation, it means no preceding contact. But we should be careful because a positive tuberculin IDR cannot make the difference between tuberculosis infection and active tuberculosis disease and a negative IDR may not exclude an active tuberculous disease.[5]

The determination of the threshold of positivity of the IDR and its interpretation must take into account of the vaccinal status of the patient but also of some other factors, notably epidemiological context of the concerned population and the promiscuity. As a matter of fact, in high tuberculosis endemicity zone, most of the positive IDR are the witness of the authentic tuberculosis infection on *M. tuberculosis*. On the contrary, when the prevalence or tuberculosis is low, the risk of positive IDR is the image of the contact with *M. tuberculosis* and is lower with a higher threshold of positivity. So, on each result taken in individual echelon, the interpretation of the same diameter of hardening can vary according to the concerned subject and the circumstances of realization.[58] Even though simple, sensible and cheap, this test shows some lack. The IDR can be positively wrongly whereas there is no tuberculous infection. The habitual causes are mycobacterian infection non tuberculous of the environment and the BCG. For instance, 65% of the positive IDR in France are linked to BCG vaccination.[59] Inverse, all deficiency even transitory of the communitary state can make negative a positive tuberculosis test. For all those reasons, the result of the test must be interpreted according to the particular context of the patient. 10 to 25% of adults show a tuberculosis disease and have wrongly negative IDR. This percentage is in the order of 10% on immunocompetents. The specificity of the cutaneous test varies between 35 and 100% according to the tested population.[59]

The pulmonary radiography represents 18.30% of the means of diagnosis in our sequence. The pulmonary radiography is an important tool for diagnosing the PT in children in negative expectoration swab or can't produce expectoration. The most common radiography aspects of children tuberculosis are heterogeneous opacity, pleura effusion, micro nodular opacity, observed respectively in 30, 28 and 16% of the cases in Adonis-Koffyet al's study in Ivory coast.[60] The pleura and pericardiac effusion though observed in radiography return to non-pulmonary TB which tends to happen in older children. The discovery of important anomaly on the radiography in children who does not present signs of respiratory distress is beneficial to the diagnosis of TB.[5] It is an unavoidable examination but not specific which often allows to comfort the diagnosis. The reliability has been under doubt because of the aspect of reproducibility of the reading of diverse observant.[61]

The tuberculous score is only present in 6.53% of our children. Other authors have developed score systems of point, classifications of diagnosis and algorithms of diagnosis to handle with the difficulty of tuberculosis diagnosis and to provide to health agents a rational tool and by step of identification of the children who must be treated for tuberculosis. Even if those score of system represent essential tool for the clinician to diagnose the pediatric tuberculosis in low resource country, few score systems have been seriously validated. The estimation of

the sensibility and specificity has been spread from 41 to 91% for the sensibility and 44 to 97% for the specificity. The correlation between clinic score system is poor and involve some disagreement on decision concerning the treatment or not, which highlight the need of improving the tuberculosis diagnosis in children.[62]

In our sequence, the majority of the children stricken by tuberculosis are malnourished (75.16%) reaching globally both sex in the whole region of Toamasina in urban milieu than rural. There was a significative difference between nutritional state of the children and the tuberculous disease ($p<0.05$). According to the literature, the majority of the children stricken by active tuberculous disease generally show a low weight gain, can lose weight or malnourished.[5] We always have to precisely weigh the child and compare the weight to the other preceding weights during the follow up visit, adapt the posology if needed. Besides, malnutrition is another factor of worsening, responsible of more than 2 millions of children death less than 5 years. In Senegal, 27% of tuberculosis children suffer from chronic malnutrition and 11% of severe malnutrition.[39] More than half of the children are healed though they are malnourished, and only 3 tuberculosis children die from malnutrition. The risk of tuberculosis disease to happen in children is multifactorial, it is an aspect largely described in literature, mainly, and the problem is always linked to low standard of life and to the fragility of social tissue[63], without omitting other factors actually responsible in the recrudescence of the sickness we mention the infection by the human immuno deficiency virus, the apparition of multiresistant stump[64], and the lack of vitamin D.[65] Those factors weaken the child even more and expose him to the disease to happen. The relation between poverty and tuberculosis appears like a largely shared obviousness in the medical literature, that element is directly linked to the notion of insignificance and promiscuity.[66,67] Decisions of extra care are sometimes necessary as hospitalization for serious forms of PT and NPT in the end of complementary examination and the initial care, for a severe malnutrition state to the end of nutritional rehabilitation, the presence of severe pneumopathy sign or the other comorbidity, for instance a severe anemia, social and logistic reasons to assure the observance and severe undesirable effects such as hepatotoxicity.[5] It is suitable to provide a nutritional support to those malnourished children if this is available. It is important to keep on breastfeeding the infant and breast feeded children went the latter receive antituberculosis treatment.[5]

The prevention of TB transmission and of the tuberculosis infection in the hearth and health establishment constitutes an important element of fight against TB and its care in infant. In Madagascar, the national program of fight against tuberculosis aim to supply to each actor in the fight and to the different partner, effective strategies, clear objectives and indicators for the follow up and the evaluation so as to ease the planning, the implement, the coordination, the follow up and the evaluation of the activities of the fight at all level of the system. The first priority of the fight is to screen and cure contagious cases, it means, the patient stricken by pulmonary or non-pulmonary tuberculosis with positive swab. The compulsory announcement allows to the national level to follow the tendencies of the disease and the evolution of the characteristics of the risky group and in local level, to realize investigations around a case, to implement procedures to control the transmission of the disease, and to orient the actions of anti tuberculous fight. In our sequence, the samples are not representative of all the cases of infant tuberculosis found in Madagascar.

CONCLUSION

The tuberculosis profile in infant in Toamasina is not in much important way different from the data of the literature except in the level of type that we noted a female predominance. Infant tuberculosis is still of actuality, reaching all ages especially in developing country. Malnutrition is obvious in here which is a social problem to which global and radical solution must be imposed. Elsewhere, it is obvious that only the health action cannot solve the problem of tuberculosis. The care of other determinants reveals to be important. The decreasing of poverty, the improvement of the dwelling and of the environment, the fight against stigmatization and the development of strategies adapted to specific target are essential axis to integrate to work out harmonious plan of fight against tuberculosis.

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