

EPIDEMIOLOGIC SURVEILLANCE OF TUBERCULOSIS IN PRISONS OF ESPÍRITO SANTO

Vigilância epidemiológica da tuberculose em presídios do Espírito Santo

Vigilancia epidemiológica de la tuberculosis en prisiones de Espirito Santo

Original Article

ABSTRACT

Objective: To identify the epidemiological profile of tuberculosis cases diagnosed during the period from July 2009 to July 2010 in the inmate population of prison facilities situated in the state of Espírito Santo (ES). **Methods:** Epidemiologic, descriptive and retrospective survey comprising the diagnosed tuberculosis cases in the 27 prison units in ES administered by the State Secretariat of Justice (Secretaria de Estado da Justiça - SEJUS) during the studied period. The data was collected from the review of the standard tuberculosis monitoring records, when the population was characterized by the variables: gender, age range, form of tuberculosis, outcome of the case and location. Descriptive statistics was used by means of tables and graphics. **Results:** 167 tuberculosis cases were observed (incidence rate of 1,962.6 per 100 thousand prisoners). Male gender had higher number of patients, as well as the 25 to 36 age group and the pulmonary clinical form. On the cases outcome, it is highlighted that 167 (65.3) patients were discharged after being cured and two patients died during the period, the rate of tuberculosis mortality being 11.7 per 100,000 prisoners. The highest tuberculosis incidence was found in patients in prison units of the metropolitan region and a small number of cases occurred in other locations outside the prisons facilities. **Conclusion:** Cases were mainly male, aged 26 to 35, carriers of the pulmonary form of tuberculosis, coming from the metropolitan region of the state and having discharge/healing as the outcome.

Descriptors: Epidemiology; Tuberculosis; Prisons.

RESUMO

Objetivos: Identificar o perfil epidemiológico dos casos diagnosticados de tuberculose durante o período de julho de 2009 a julho de 2010, na população carcerária localizada nas unidades prisionais do estado do Espírito Santo (ES). **Métodos:** Estudo epidemiológico, descritivo do tipo levantamento retrospectivo referente aos casos diagnosticados de tuberculose nas 27 unidades prisionais do ES sob a administração da Secretaria de Estado da Justiça (SEJUS) durante o período estudado. Os dados foram coletados a partir da revisão das fichas padronizadas de acompanhamento de tuberculose, cuja caracterização da população englobou as variáveis: sexo, faixa etária, forma de tuberculose, desfecho do caso e localização. Utilizou-se estatística descritiva, por meio de tabelas e gráficos. **Resultados:** Observaram-se 167 casos de tuberculose (taxa de incidência de 1962,6 por 100 mil presos). O sexo masculino apresentou maior número de pacientes, assim como a faixa etária de 25 a 36 anos e a forma clínica pulmonar. Sobre o desfecho dos casos, destaca-se que 167 (65,3%) pacientes tiveram alta por cura, ocorrendo dois óbitos durante o período, sendo a taxa de mortalidade por tuberculose de 11,7 por 100 mil presos. A maior incidência da tuberculose foi em pacientes localizados nas unidades prisionais da Região Metropolitana e um pequeno número de casos ocorreu em outros locais externos às unidades prisionais. **Conclusão:** Observou-se que em sua maioria eram homens, com idade entre 26 e 35 anos, portadores de tuberculose do tipo pulmonar, provenientes da região metropolitana do Estado e possuíam o desfecho de alta/cura.

Descritores: Epidemiologia; Tuberculose; Prisões.

Laylla Ribeiro Macedo⁽¹⁾
Cristina Ribeiro Macedo⁽²⁾
Ethel Leonor Noia Maciel⁽¹⁾

1) Federal University of Espírito Santo
(Universidade Federal do Espírito Santo - UFES) - Vitória-ES - Brasil

2) College of the Holy House of Mercy of Victory (Escola Superior de Ciências da Santa Casa de Misericórdia de Vitória - EMESCAM) - Vitória-ES - Brasil

Received on: 08/30/2012

Revised on: 11/26/2012

Accepted on: 01/03/2013

RESUMEN

Objetivo: Identificar el perfil epidemiológico de los casos diagnosticados de tuberculosis en el periodo de julio de 2009 y julio 2010 en la población de prisiones localizadas en las unidades de prisión del estado de Espírito Santo (ES). **Métodos:** Estudio epidemiológico, descriptivo del tipo retrospectivo referente a los casos diagnosticados de tuberculosis en las 27 unidades de prisión de ES bajo la administración de la Secretaría del Estado de Justicia (SEJUS) en el periodo del estudio. Los datos fueron recogidos a partir de la revisión de fichas estandarizadas de seguimiento de tuberculosis cuya la caracterización de la población incluyó las variables: sexo, franja etaria, forma de tuberculosis, desenlace del caso y localización. Se utilizó la estadística descriptiva por medio de tablas y gráficos. **Resultados:** Se observó 167 casos de tuberculosis (tasa de incidencia de 1962,6 para cada 100 mil presos). El sexo masculino presentó más número de pacientes así como la franja etaria entre 25 y 36 años y la forma clínica pulmonar. Acerca del desenlace de los casos, se destaca que 167 (65,3%) pacientes tuvieron el alta por cura, habiendo dos muertes en el periodo, siendo la tasa de mortalidad de tuberculosis de 11,7 para cada 100 mil presos. La mayor incidencia de tuberculosis fue en pacientes localizados en las unidades de prisión de la Región Metropolitana y un pequeño número de casos se dio en otros locales externos a las unidades de prisión. **Conclusión:** Se observó que su mayoría eran hombres, con edad entre los 26 y 35 años portadores de tuberculosis del tipo pulmonar, procedentes de la región metropolitana del Estado y poseían el desenlace de alta/cura.

Descriptor: Epidemiología; Tuberculosis; Prisiones.

INTRODUCTION

Tuberculosis is a disease reported since Antiquity, however, about two decades ago it was considered by the World Health Organization (WHO) a disease in a state of emergency throughout the world. This is a significant public health issue, as it is a cause of death in adults⁽¹⁾. Data on TB in vulnerable populations can reach levels even higher and troubling, such as the case of the prison population, which, despite accounting for only 0.2% of the population, has contributed with 5% of all the reported cases of tuberculosis in 2008⁽²⁾.

In Ethiopia, the prevalence rate of tuberculosis in the prison population is 1,913 per 100,000 inmates. In other African countries, this rate reaches levels 10-35 times higher than in the general population⁽³⁾. Data on incidence of tuberculosis in the Russian prison system differs according to region, with rates ranging from 1163-4173 per 100 000 individuals, with an average of 2,028 per 100,000⁽⁴⁾.

In Brazil, these rates are similar. In Rio de Janeiro,

the incidence rate of TB in prisons was 3,532 per 100,000 inmates in 2005⁽⁵⁾. In Campinas-SP, in the period 1993-2000, the incidence of tuberculosis in the prison population had a rate that ranged from 559 (1999) to 1,397 (1994) per 100,000 inmates⁽⁶⁾. In the state of Espírito Santo, the average incidence of TB in prisons in the period 2003 to 2006 was 777.5 per 100 000 inhabitants⁽⁷⁾.

Among the factors that contribute to the high endemicity of tuberculosis in the prison population, one can mention those related to the individuals and their living conditions before incarceration, such as low education, origin from disadvantaged communities and with higher prevalence of tuberculosis, the use of illicit drugs, greater frequency of previous treatment of TB, history of incarceration and difficult access to health services. As to the factors related to the very imprisonment are the overcrowded cells, poorly ventilated and poorly lit by sun, the frequent exposure to *Mycobacterium tuberculosis* in an environment of confinement, lack of information and poor access to health services in prison⁽²⁾.

The burden of this disease for the public health is undeniable and extremely important, since its consequences are straightforward. Therefore, public policies are needed to meet this specific demand.

Interministerial Ordinance No. 1,777, of September 9, 2003, approved the National Plan for Health in the Prison System (*Plano Nacional de Saúde no Sistema Penitenciário*). It is designed to provide comprehensive healthcare for the prison population confined in male, female and psychiatric units, through actions and services, which aim to promote the health of this population and contribute to the control and/or reduction of injuries more frequently affecting them, as well as establishing priorities and lines of action for these objectives to be achieved. One of the lines of action established refers to the control of tuberculosis regarding the search for new cases, treatment of patients and protection of the healthy⁽⁸⁾.

For a better understanding of TB in prisons, it is important to know the characteristics of the carriers of the disease in this specific population, especially concerning the conditions of disease progression, since this knowledge is able to give support to the intervention projects. Given the above, the purpose of this study is to identify the epidemiological profile of tuberculosis cases diagnosed during the period from July 2009 to July 2010, among the inmate population in the prison units located in the state of Espírito Santo.

METHODS

This is an epidemiological study, descriptive and retrospective. The study population consisted of all

diagnosed cases of tuberculosis during the period from the 1st of July 2009 to June 30th 2010, in the prison population of Espírito Santo.

The study was conducted in 27 prison facilities under the administration of the State Secretariat of Justice (*Secretaria de Estado da Justiça - SEJUS*) of Espírito Santo. These units hold about 11,000 inmates, with around 1,000 women and 10,000 men⁽⁹⁾. Inmates located in the Departments of Judicial Police (*Departamentos de Polícia Judiciária-DPJ*) or in police stations which are under the administration of the State Department of Public Safety (*Secretaria de Estado de Segurança Pública-SESP*) do Espírito Santo were excluded from the survey.

The Penitentiary Healthcare System of Espírito Santo is composed of clinics located in the penitentiary units, in addition to a Health Unit Prison, with the purpose of offering healthcare for the inmate population at a basic level, and one Tuberculosis Monitoring Unit (*Unidade de Acompanhamento de Tuberculose-UAT*). This UAT comprises an area specifically meant for the diagnosis and treatment of inmates with TB coming from other prison facilities in the state that do not have conditions to provide respiratory isolation of the patient.

Currently, UAT has the capacity of 30 beds and is assisted by a multidisciplinary health team, acting in accordance with Ordinance No. 690, of September 29, 2008, and the Pulmonary Tuberculosis Control Protocol for the Prison Population of Espírito Santo⁽¹⁰⁾. This protocol deals with the screening of respiratory symptoms in the doorway of prisons, to enable the establishment of an immediate therapeutic plan, among other issues relevant to the condition.

The collection and study of data were made from reviewing the Tuberculosis Monitoring Files, which are standardized by the Board of Health of the Penal System (*Diretoria de Saúde do Sistema Penal-DSSP*) of SEJUS. They have the following information: patient name, date of birth, clinical form, treatment plan, date and place of diagnosis, prison unit identification and treatment outcome. These files are monthly sent to DSSP by the nursing professionals working in prison facilities. This instrument was chosen for data collection since the Information System for Notifiable Diseases (SINAN) expresses the data of the entire prison population in the state, which is not the purpose of this study, as it aims to analyze the profile of the inmate population specifically in prisons units.

For the characterization of the population, the following variables were assessed: gender (male and female), age group (18-25 years; 26-35 years; 36-45 years; and above

45), form of TB diagnosed (pulmonary . extrapulmonary and pulmonary + extrapulmonary), location (metropolitan, central, south and north) and outcome of the case (discharge/healing, release warrant, house arrest, death, court order in progress). From the obtained data, the indicators of the incidence rate of tuberculosis and tuberculosis mortality rate were calculated.

The information was collected by one of the article's authors, being coded and stored in a database by using Microsoft Office Excel for Windows for the statistical processing. Descriptive statistics was displayed through tables and graphs.

This study received approval by the Ethics Committee in Research of the Infant Hospital Nossa Senhora da Glória, under Opinion no.91/2010.

RESULTS

During the studied period, 167 tuberculosis cases were notified among the prisons population of Espírito Santo, what corresponds to an incidence rate of 1,962.6 tuberculosis cases per 100 thousand inmates.

From the analyzed data, male gender was predominant for patients carrying tuberculosis, representing 97.6% (163) of the population. Female gender represented 2.4%(4) of the patients (Table I).

The patients' age ranged from 20 to 58 years. Regarding the age range, the majority was between 26 and 35 years, totaling 83 cases (49.7%), while the cases with age above 45 years were 4 patients (2.4%), representing the minor group (Table I).

The classification of the clinical form of tuberculosis (Table I) pointed that 94% (157) of the patients presented the pulmonary form; 4.8%(8) were diagnosed with the extrapulmonary form; and 1.2%(2) were affected by both forms (pulmonary and extrapulmonary).

As to the output of the tuberculosis diagnosed cases, 65.3% (109) achieved discharge by healing. Nevertheless, 42 inmates (25.1%) left the prison unit before completing the treatment, whether due to a releasing court order, house arrest or escape. Death occurred in 1.2%(2); and 8.4%(14) of the cases were still undergoing treatment in the prison unit, by the conclusion of the study (Figure 1).

Of the death cases reported, only one was specifically due to tuberculosis, what represents a mortality rate by tuberculosis of 11.7 per 100 thousand inhabitants.

The cases of transference among the prison units during the period of the study were 68, meaning 40.7% of the studied population.

The analysis of the local where the diagnosis occurred led to the conclusion that 80.8% (135) were in the prison units of the metropolitan region, while the minor part

came from North region (5; 3.0%). Others (4; 2.4%) were diagnosed in places outside the prison units, such as the Departments of Judicial Police (2; 1.2%) or in health facilities (2; 1.2%).

Table I - Distribution of the patients regarding sociodemographic and epidemiologic variables (n=167). Vitória-ES. 2010.

Indicators	Absolute frequency	Relative frequency
Sociodemographics		
Gender		
Male	163	97.6%
Female	04	2.4%
Age		
18-25	66	39.5%
26-35	83	49.7%
36-45	14	8.4%
Above 45	04	2.4%
Epidemiologies		
Clinical form		
Pulmonary	157	94.0%
Extrapulmonary	08	4.8%
Pulmonary and extrapulmonary	02	1.2%
Total	167	100%

Source: Data collected from July 2009 to June 2010. SEJUS-ES.

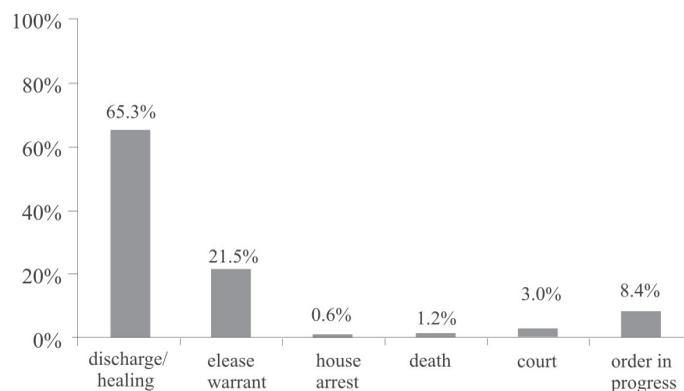


Figure 1 - Distribution of the patients regarding the case's outcome (n=167).

Source: Data collected from July 2009 to June 2010. SEJUS-ES.

Table II - Distribution of the patients regarding the local of diagnosis (n=167). Vitória (ES), 2010.

Local of diagnosis	Absolute frequency	Relative frequency
Regions		
Metropolitan	135	80.8%
Central	16	9.6%
South	07	4.2%
North	05	3.0%
Others	04	2.4%
Total	167	100%

Source: Data collected from July 2009 to June 2010. SEJUS-ES.

DISCUSSION

Taking into consideration the incidence rates of TB in 2009 (in Espírito Santo, 31.37 per 100 thousand inhabitants and in Brazil, 35.15 per 100,000 population), the incidence rates presented in this study is approximately 62 times greater than the state rate and 55 times the national one⁽¹¹⁾. This high incidence rate (1,962.6 per 100,000 population) concurs with studies in other locations in the world^(3,4), as observed in the state of São Paulo⁽¹²⁾ but is lower than the rates of Rio de Janeiro⁽¹³⁾.

The conditions of imprisonment to which this population is subjected contribute to the high rates presented. The cells are overcrowded, poorly ventilated and poorly lit, recurrent contact with the tuberculosis bacillus⁽¹⁴⁾.

As regards the evaluation by gender, one realizes that this data is consistent with research conducted in the inmate population in Bauru-SP, where male gender is prevalent among the population studied⁽¹⁵⁾. This result was expected, since the Brazilian prison population is mostly composed by men. Diagnosed cases of tuberculosis are prevalent in young adults⁽¹⁶⁾.

With respect to the age of the population in question, it appears that the findings of the current study corroborate the research conducted in the prison system of Campinas-SP⁽⁶⁾, where the majority of patients was between 25 and 34 years. The pulmonary form was also the most frequent in the mentioned study. It is observed that this profile is commonly found in other locations^(17,18), reflecting the reality of the prison system.

A study held in Espírito Santo, in the period 2003-2006, shows little variation compared to the data found in the present investigation. Cure rate remains similar, whereas the mortality rate showed a decrease compared to the previous survey⁽⁷⁾. The cure rate of the prison system is low compared with the rate among general population of the state, which was 72.68% in 2010⁽¹¹⁾.

In the current research, approximately 20% of patients received release warrant during treatment of TB, which reinforces the importance of communication between health services within and outside the walls, in order to ensure the continuity of the treatment, the decrease in the abandonment rates and hence, in resistance to drug therapies⁽¹⁹⁾.

The number of transfer cases during treatment was also significant in this study, being higher than that found in other studies^(6,7), a fact that highlights the importance of the instrument developed to control the evolution of therapy, where should be described the prisoner's current situation and the changes during treatment.

It is essential that release warranties, benefits of home detention and transfer of prisoners are previously agreed with the health teams, so that measures are taken to prevent

contagion of other vulnerable groups and reduce the risk of spreading the disease⁽¹⁶⁾.

The rate of evasion, although small, is also worrisome because, in these cases, it becomes difficult to locate the prisoner and, in most cases, it leads to treatment abandonment.

There were no cases of abandonment during the period of incarceration, however, to assure that this ratio is zero among the patients studied, a more detailed search should be carried out, by consulting other sources, like SINAN.

As for the local where diagnosis occurred, 80.8% of the notifications of the current study corresponded to patients incarcerated in prison facilities in the metropolitan region, reflecting also the largest number of units located in this region. A study conducted in the state of Espírito Santo, assessing the profile of patients diagnosed with tuberculosis, shows that approximately 90% of cases include individuals living in the urban area, corroborating the data of this study⁽²⁰⁾. It is noteworthy that the high number of cases diagnosed in the metropolitan area can be attributed to the existence of UAT in this region.

The treatment of tuberculosis in the penitentiary system of Espírito Santo is carried out inside the prison facilities, in partnership with the services that compose the extramural SUS. Since the onset of a suspicious case, the inmate is referred for respiratory isolation in a cell specific for this purpose, until the disease is confirmed by laboratory tests. On confirmation, the notification of the case is performed and the indicated treatment schedule starts.

It is noteworthy that medicines are administered under supervision (Directly Observed Treatment Strategy - DOTS), as recommended by the Ministry of Health⁽²⁾. The introduction, in 2007, of the item informing about the prison origin (institutionalized) in the notification form of TB has enabled a better understanding of data concerning the disease among the population deprived of freedom, as has support investigations in this area.

These patients' profile has been directly attributed to social and demographic characteristics, such as low income and education level, younger age, skin color, clinical factors and association with comorbidities (namely, AIDS), form and severity of this disease⁽¹³⁾.

The data relating to TB epidemiological questions is extremely important, since it underlies the definition of the indicators, the development and implementation of intervention strategies for disease control.

To ensure the effectiveness of intervention actions for the control of TB, an integrated approach is fundamental, with participation of health professionals and security personnel, prisoners and their families, teachers, religious and all those involved in the process.

The main challenges are the physical structures, which facilitate the transmission of the disease; the prejudice involving tuberculosis, which may cause segregation among people; autonomy restriction of the prison population, with low participation in treatment or preventative actions; and prison authorities' misunderstanding, who value safety over health, among others.

Given the above, the TB situation among the prison population in Espírito Santo, described in this study, emphasizes the need to adopt specific and effective measures, as well as the consolidation of public health policies addressing this issue.

Actions supporting awareness and education are necessary as regards tuberculosis in prisons, in order to ensure the visibility of the problem, enhance knowledge about the disease beyond its form of treatment and prevention, enable the deconstruction of values that foster discriminatory practices, highlight the contribution of different members of the prison community in TB control and promote the perception of health as a common good and a right for all.

CONCLUSION

From the research in question, it was possible to establish the characterization of patients diagnosed with tuberculosis in the prison population of Espírito Santo. It was observed that, in most cases, they were men, aged between 26 and 35 years, carrying the pulmonary form of tuberculosis, from the metropolitan region of the state and had as outcome discharge or healing.

ACKNOWLEDGEMENTS

To the State Secretariat of Justice of Espírito Santo (*SEJUS*) and its technical staff and to the health coordination team for collaboration in the research.

REFERENCES

1. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde. Programa Nacional de Controle da Tuberculose, 2010. [acesso em 2010 Nov 20]. Disponível em URL: http://portal.saude.gov.br/portal/saude/visualizar_texto.cfm?idtxt=28055.
2. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde. Programa Nacional de Controle da tuberculose: manual de recomendações para o controle da tuberculose no Brasil. Brasília; 2011.
3. Abebe DS, Bjune G, Ameni G, Biffa D, Abebe F. Prevalence of pulmonary tuberculosis and associated risk factors in Eastern Ethiopian prisons. *Int J Tuberc Lung Dis*. 2011;15(5):668-73.
4. Lobacheva T, Asikainen T, Giesecke J. Risk factors for developing tuberculosis in remand prisons in St. Petersburg, Russia – a case-control study. *European Journal of Epidemiology*. 2007; 22(2):121-7.
5. Sánchez AR, Diuana V, Gerhardt G, Camacho LAB. A tuberculose nas prisões: uma fatalidade? *Cad Saúde Pública* 2006; 22(12):1547-55.
6. Oliveira HB, Cardoso JC. Tuberculosis among city jail inmates in Campinas, São Paulo, Brazil. *Rev Panam Salud Publica*. 2004;15(3):185-93.
7. Moreira TR, Favero JL, Maciel ELN. Tuberculose no sistema prisional Capixaba. *Rev Bras de Pesquisa em Saúde*. 2010;12(1):26-33.
8. Ministério da Saúde (BR), Secretaria de Atenção a Saúde, Departamento de Ações Programáticas Estratégicas. Plano Nacional de Saúde no Sistema Penitenciário: Portaria Interministerial Nº 1777 de 09/09/03. Brasília: Editora do Ministério da Saúde; 2004.
9. Secretaria de Estado da Justiça (BR), Sistema Penitenciário em Números. Relatório Janeiro 2011, 2011. [acesso em 2012 Nov 26]. Disponível em: <http://www.sejus.es.gov.br/default.asp>
10. Secretaria de Estado da Saúde do Espírito Santo (BR), Secretaria de Estado da Justiça. Portaria R Nº 690 de 29 de setembro de 2008 e o Protocolo de Controle de Tuberculose Pulmonar da População Prisional do Espírito Santo. Espírito Santo; 2008.
11. Ministério da Saúde (BR). Sala de Situação em Saúde: Indicadores epidemiológicos - Tuberculose, 2012. [acesso em 2012 Nov 26]. Disponível em: <http://189.28.128.178/sage/>.
12. Abrahão RM, Nogueira PA, Malucelli MI. Tuberculosis in county jail prisoners in the western sector of the city of São Paulo, Brazil. *Int J Tuberc Lung Dis*. 2006; 10(2):203-8.
13. Sánchez AR, Massari V, Gerhardt G, Barreto AW, Cesconi V, Pires J, Espínola AB, Biondi E, Larouzé B, Camacho LAB. A tuberculose nas prisões do Rio de Janeiro, Brasil: uma urgência de saúde pública. *Cad Saúde Pública*. 2007; 23(3):545-52.
14. Coninx R, Maher D, Reyes H, Grzemska M. Tuberculosis in prisons in countries with high prevalence. *BMJ*. 2000;320(7332):440-2.

15. Monti JFC. Perfil epidemiológico, clínico e evolutivo da tuberculose na Região de Bauru. *Rev da Sociedade Bras de Medicina Tropical* 2000;33(1):99-100.
16. Secretaria de Estado da Saúde do Mato Grosso (BR). Portal de serviços e informações do Mato Grosso do Sul. A tuberculose no Sistema penitenciário brasileiro. [acesso em 2010 Jan 12]. Disponível em: <http://www.saude.mt.gov.br/upload/documento/81/a-tuberculose-no-sistema-%5B81-080909-SES-MT%5D.pdf>.
17. Lemos ACM, Matos ED, Bittencourt CN. Prevalência de TB ativa e TB latente em internos de um hospital penal na Bahia. *J Bras Pneumol*. 2009;35(1):63-8.
18. Banu S, Hossain A, Uddin MKM, Uddin MR, Ahmed T, Khatun R, Mahmud AM, Hyder KA, Lutfur AB, Karim S, Zaman K, Khan AI, Barua PC, Luby AP. Pulmonary Tuberculosis and Drug Resistance in Dhaka Central Jail, the Largest Prison in Bangladesh. *Plos one*. 2010;5(5):1-5.
19. Lourenço MCS, Silva MG, Fonseca LS. Multidrug-resistant tuberculosis among male inmates ind Rio de Janiero, Brazil. *Braz J Microbiol*. 2000;31(1):17-9
20. Prado TN, Caus AL, Marques M, Maciel EL, Golub JE, Miranda AE. Perfil epidemiológico de pacientes adultos com tuberculose e AIDS no estado do Espírito Santo, Brasil: relacionamento dos bancos de dados de tuberculose e AIDS. *J Bras Pneumol*. 2011;37(1):93-9.

Mailing address:

Laylla Ribeiro Macedo
Rua Orlando Caliman, 130 / 503
Bairro: Jardim Camburi
CEP: 29090-220 - Vitória-ES - Brazil
E-mail: layllarm@hotmail.com