

Tuberculosis: analysis of patient's route during treatment in Ribeirão Preto/SP

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ABSTRACT

The objective was to analyze the route of the tuberculosis (TB) patient during treatment in the health service system. An epidemiologic, descriptive study conducted in Ribeirão Preto, São Paulo. We used tuberculosis-related registries from the municipal system of electronic records and the state notification system as data sources. The selected variables for the study were categorized in the analysis dimensions: demand, resources, processes/products and results. We selected 109 TB patients' registries accompanied in reference ambulatories for TB treatment. When facing a complication, we noted the preference to search for emergency care 67 (61.5%). The attention was centered in physicians and nursing assistant/technicians 108 (99.1%), and it was the main responsible for home visitations and medication supervision (71.6%). The results allowed us to observe the attention centralized at the secondary attention level, privileging specialized teams and maintaining this point as the main care ordaining.

Descriptors: Tuberculosis; Directly Observed Therapy; Health Information Systems; Health Services.

INTRODUCTION

In 2014, Brazil notified more than 76,000 new cases of tuberculosis (TB), and 8% of people died. The country still presents worrying rates in relation to treatment results (cure, 72%; death, 8%; abandonment, 10%), considering that these do not meet the goals proposed by the World Health Organization (WHO), remaining between

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the 22 countries with the largest disease burden of the world⁽¹⁾.

Understanding that the early start of treatment and taking medication correctly are the crucial points for a favorable outcome and, the interruption of the transmission chain, the WHO preconizes care strategies centered on the patient and the support of policies to strengthen assistance, as the social support to patients, families and communities affected by TB⁽¹⁾.

From this perspective, the Brazilian Health Ministry recommends the decentralization of TB control actions for Primary Care Units (Basic Health Units and Family Health Units) since 2006. Although there is a political and technical guidance through manuals, protocols and legal frameworks for such transference of actions and responsibilities, a series of difficulties are perceived at this attention level related to TB control⁽²⁻³⁾, such as: lack of professional training to deal with the disease, resistance to incorporate DOT by health professionals, high rotation of human resources and, political discontinuity/lack of compromise from the management⁽⁴⁾.

Once TB is characterized as chronic condition, questions related to its assistance coordination, attention flow, attention continuity, shortcomings to integrate actions and services, can influence the accompaniment of the TB patient during treatment, besides reflecting the attention network performance^(3,5-8).

Although various studies address the problem related to patient's treatment difficulties and barriers related to assistance in health services, few studies report the TB patient' route through the health system during treatment. In a survey about the theme, only three studies were identified about the subject⁽⁹⁻¹¹⁾, none of them were conducted in Brazil. In 2009, one study from Ribeirão Preto analyzed the user's route, although, it focused on obtaining the TB diagnosis at the local health system⁽¹²⁾.

Considering that different instances of assistencial network do not have all needed resources to resolve health problems of the population⁽⁸⁾, this study aimed to analyze the TB patient's route during treatment in the public health network in Ribeirão Preto, having the coordination of assistance/integration of health actions and services as a reference⁽⁸⁾.

METHODS

We conducted an epidemiologic, descriptive and exploratory study, with a quantitative approach in the city of Ribeirão Preto, located in the northeast region of São Paulo state, of an estimated population of 619,746 inhabitants during the year of 2013⁽¹³⁾. The municipal public health network was composed by 26 Basic Health Units (BHU), 15 Family Health Units (FHU), five Basic and Specialized Units, being two with 24h-Emergency Care (EC), one with Emergency Care (EC) and 11 Specialized Units⁽¹⁴⁾.

In 2013, 213 TB cases were notified in the city, from those, 85.9% (183) were new cases, 11.3% (24) were recurrences and 2.8% (6) were re-treatments. Regarding the outcomes, it was verified a 79% cure rate among new cases, death (13.6%) and abandonment (3.5%)⁽¹⁴⁾.

During the data collection period, the attention provided to TB patients was centralized in four

Reference Ambulatories (A, B, C and D) with specialized teams, but not exclusive to the Municipal Program of Tuberculosis Control (MPTC). The composition of such teams varied according to the availability of human resources or with the involvement of professionals in TB actions, in a way that there were minimally constituted by a physician, two nursing assistants, one sanitary inspector (ambulatory C) and one nurse (ambulatories A and D). The highlighted attributions of teams are: to conduct a diagnosis, notification of cases and assessment of communicators, besides accompanying the treatment through medical consultations, nursing attention and conduction of Directly Observed Treatment (DOT), that occurred in the ambulatory or in the patient's house by car.

In this study, the population was composed by TB patients living in Ribeirão Preto, accompanied on the four reference ambulatories, not pertaining to the prison system and that started and ended the case between January of 2012 and July of 2013. We excluded patients who had an ending situation due to change of diagnosis or transference.

We identified 181 TB patients during the period above but according to the presented criteria, we identified 152 patients to include in the study. After this survey, we calculated the sample size considering the parameters: sampling error of 0.05; 95% confidence interval and P (population proportion) of 50%, obtaining:

$$n_0 = \frac{p.(1-p).Z^2}{e^2} = 384$$

Because the study population was finite, the minimal calculated sample was corrected using the equation:

$$n = \frac{n_0}{1 + (n_0 - 1/N)} = \frac{384}{1 + (384/152)} = 109$$

Thus, we obtained a sample of 109 TB patients to include in the study.

Through stratified sampling using proportional sharing, we defined the number of TB patients per health service, as shown on Table 1.

Table 1: Distribution of tuberculosis patients and sample calculation for data collection in reference ambulatories of Ribeirão Preto, SP, Brazil, 2013.

Reference ambulatory*	Number of TB patients (%)	Calculation (M1/39=M2/31=M3/48=M4=109/152, that is:)	Sample
Service A	39 (25.7%) M1	M1/39=109/152 => M1=39x109/152= 28	28
Service B	31 (20.4%) M2	M2/31= 109/152 => M2=31x109/152= 23	23
Service C	48 (31.6%) M3	M3/48= 109/152 => M3= 48x109/152= 34	34
Service D	34 (22.3%) M4	M4/34=109/152 => M4= 34x109/152= 24	24
TOTAL	152 (100%)	-	109 (100%)

Footnotes: M=Mean / Source: TB-WEB (August of 2013)

* to protect the identity of studied health services, we opted for identifying them using the letters A, B, C and D.

We used secondary sources to collect data, constituted by Clinical Records and files of Treatment

Accompaniment, in addition to two information systems:

- A) Control System of Patients with Tuberculosis (TB-WEB): implemented by the State Health Secretary of São Paulo State through the Division of Tuberculosis Control in 2006, which allows the storage and accompaniment of information about notified TB cases in the state via internet. We highlight that in the studied city, the access to this system is centralized in district units of Epidemiological Vigilance, and only few professionals and the MPTC can consult and enter data in the system.
- B) Hygia-WEB System of electronic registries and records: implemented by the Municipal Health Secretary of Ribeirão Preto to automatize the registration of clinical records, health exams, vaccination programs, sanitary and epidemiological vigilance, SUS bills, etc. This system allows any health unit from the city to access data of attention given to patients and lab information, wherever they are attended. We emphasize that this system is available only in health units and hospitals connected to the Municipal Public Health Network.

The study used discrete quantitative (age, number of times that the patient had a consultation in the reference ambulatory during TB treatment, number of times that the patient was seen in another health service, the person responsible for the case during treatment and, proportion of TB patients in DOT) and nominal qualitative variables (all others).

Chart 1: Sources for data collection and variables.

Data collection sources	Variables
TB-WEB	Gender
	Age
	Case type
	Clinical form
	Co-infection by HIV (Human Immunodeficiency Virus)
	Treatment type
	Date of diagnosis
	Date of case closure
	Type of closure
	Accompaniment location
Hygia-WEB	Number of times the patient passed through consultation in the reference ambulatory during TB treatment
	Health professional who attended the patient (physician, nurse, nursing assistant/technician, others) in the ambulatory
	Health professional who attended the patient (physician, nurse, nursing assistant/technician, others) in another service
	Health services where the patient was attended during the treatment
	Exams requested during treatment
	Health service which requested the exam
	Health professional who requested the exam
	Number of times that the patient was attended in another health service, besides the responsible for the case, during treatment
	Type of search for another services (ambulatory/scheduled or eventual/ not-scheduled)
Clinical record and file of treatment accompaniment	Proportion of TB patients in DOT

We understand that the analysis of the user's route during TB treatment contains a series of health actions and services that are directly linked to how the local health attention is organized and the resources that it can offer. Thus, based on Tamaki and collaborators⁽¹⁵⁾, we created dimensions and indicators to analyze the study results, adapting them to answer the designed objective:

1. Demand: refers to the search for health services, configuring health services searched by TB patients and the type of assistance provided (scheduled or spontaneous);
2. Resources: refers to health professionals involved in attention to TB patients in services searched during treatment;
3. Process/Products: constituted by the dynamics to execute activities to develop TB control actions linked to how health services are organized to attend the patient during treatment;
4. Results: this dimension is constituted by indicators aimed at the impact and repercussion of actions developed during the TB treatment, as well as its outcomes.

Chart 2: Panel of dimensions and indicators of the study.

Dimension of analysis	Indicators
Demand	Proportion of TB patients treated by the reference ambulatory
	Proportion of TB patients who searched for another health service during treatment
	Median of the number of attention/consultations in the reference ambulatory (return, eventual consultations, and home visits)
	Proportion of TB patients with registered home visits
	Median of registered home visits
	Median of return consultations in reference ambulatories
	Median of eventual consultations in reference ambulatories
	Proportion of TB patients attended in Emergency Care (EC) during treatment
	Proportion of TB patients attended in another reference ambulatory during treatment
	Proportion of TB patients attended in Basic Health Attention Units – BHU/FHU during treatment
Resources	Proportion of TB patients attended in hospitals during treatment
	Professionals that conducted home visits
	Proportion of TB patients attended by a physician in reference ambulatories
	Proportion of TB patients attended by nurses in reference ambulatories
	Proportion of TB patients attended by nursing assistants and technicians in reference ambulatories
Process and products	Proportion of TB patients attended by social workers during treatment in reference ambulatories
	Proportion of TB patients under DOT
	Proportion of TB patients that had a control skin smear requested during treatment
	Proportion of TB patients that had a X-ray during treatment
	Proportion of TB patients who had tuberculin test
	Proportion of TB patients who had an anti-HIV test during treatment
Results	Proportion of TB patients that had a sputum culture exam
	Proportion of TB patients who were cured
	Proportion of TB patients who died
	Proportion of TB patients who abandoned the treatment

Source: Adapted⁽¹⁵⁾.

The data were analyzed through descriptive statistical techniques, as frequency, median, and interquartile range (IR), using the Statistica 9.0 software from Statsoft.

We highlight that a semi-structured observational guide was used to collect information in the study

campus, information regarding how team services and work processes were organized to control TB in ambulatories. Such observations were useful to support the discussion of our study results.

The study was submitted and approved by the Ethics Committee from the Nursing School of Ribeirão Preto, under the protocol CAAE 15671713.9.1001.53.93, in 2013.

RESULTS

About the characteristics of TB patients who had their records selected, the median age was 35.0 (IQ: 28.0-49.0) years and predominance of males (68.8%). About the TB clinical form, most were notified as pulmonary (91.7%), new case (91.7%), with median treatment time of 6.0 (IQ: 6.0-7.0) months.

About the “Demand” dimension, we observed a median of visits of 46.0 (IQ: 17.0-96.0), being 20.0 (IQ: 3.0-44.0) home visits (HV), 10.0 (IQ: 4.0-32.0) eventual visits (EV) and, 4.0 (IQ: 2.0-6.0) return visits (RT).

Table 2: Results by dimension of analysis. Ribeirão Preto, SP, Brazil, 2013.

Dimension of analysis	Indicator	Results N=109 (%)
Demand	Proportion of TB patients who searched for another health service during treatment.	83 (76.1)
	Proportion of TB patients with registered home visits	87 (79.8)
	Proportion of TB patients attended in Emergency Care (EC) during treatment	67 (61.5)
	Proportion of TB patients attended in another reference ambulatory during treatment***	35 (32.1)
	Proportion of TB patients attended in Basic Health Attention Units – BHU/FHU during treatment	37 (33.9)
	Proportion of TB patients attended in hospitals during treatment	8 (7.3)
Resources	Professionals that conducted home visits	
	Nursing assistants and technicians = 78 (71.6)	
	Sanitary visitor= 2 (1.8)	
	Assistant and visitor = 6 (5.5)	
	Nursing assistant and physician = 1 (0.9)	
	Nurse =0 (0.0)	
Processes and products	TB patient did not have a registered home visit = 22 (20.2)	
	Proportion of TB patients attended by a physician in reference ambulatories	
	108 (99.1)	
	Proportion of TB patients attended by nurses in reference ambulatories	
	36 (33.0)	
Results	Proportion of TB patients attended by nursing assistants and technicians in reference ambulatories	
	108 (99.1)	
	Proportion of TB patients attended by social workers during treatment in reference ambulatories	
	50 (45.9)	

Footnotes: IQ= interquartile range

***refers to reference ambulatories that attend other specialties, as: cardiology, physiotherapy, orthopedics, etc.

DISCUSSION

The results obtained about the “Demand” dimension showed the quantity and types of attention offered and registered for TB patients, which can reveal the proximity between the service and the health team who attends them.

As observed in the results, not only RT consultations were conducted in health services that

accompanied cases, but also EV and HV, which can indicate that users had “open doors” to search the unit for any necessity, even without previous scheduling, besides the frequent presence of a health professional at home. This easy access to services and professionals is also pointed in other studies⁽¹⁶⁻¹⁷⁾ as one of the primordial aspects for success of TB treatment because it optimizes activities favoring the case management, such as: exams requests, referrals, registries about the clinical history and treatment.

Within the most searched services when there is a health necessity or complication during TB treatment, we noted the preference for the EC in detriment of other health services. Such findings were also seen in other studies^(12,18), which justify this search for more availability of days and times for attention, besides medical consultations and execution of immediate exams. On the other hand, such result can signal few or none sharing of information between the BHUs and the reference ambulatory that accompany the patient, showing the difficulty for BHUs to feel responsible for TB control, even if this is the priority door inside the health system, reinforcing the centralized and specialized model of attention for TB in the city.

According to what we observed in the study field, it is important to highlight the facility which TB patients were attended or referred to other specialties, considering that in many times they occurred informally and not registered by professionals that accompanied the case. This fact can be explained by structural matters, once both attentions (TB and other comorbidities) occurred in the same physical structure of the unit where the TB team works.

Thus, regarding the route itself, it is noted that the reference ambulatory is the main ordaining of care and the biggest responsible for the integration of actions and assistance services for TB patients. One study that considered assistencial routes for TB patients in three Brazilian capitals⁽¹⁹⁾, found critical nods on systems that centralize TB actions in specialized services, as well as, in those with decentralized attention for BHU; being this last one very problematic because it presents fragmented and disarticulated assistance, with professionals unaware of the epidemiological matters of the field where they work at. Thus, these aspects envision barriers in the basic attention network for TB cases, once the coordination of care might not be satisfactory to resolve all necessities that the treatment requires for a chronic condition as TB.

Regarding the “Resources” dimension, it calls attention the fact that attention is mainly based on medical professionals and nursing assistants/technicians, focused on monthly consultations. Thus, analyzing such registries, we note the little involvement of the nursing professional in actions related to the TB patient, in intra-ambulatory attention as well as in HV. The last one is important so the professional gets involved and comprehends the domestic/familiar environment and the relationships established within, to intervene adequately, especially when related to a social disease as TB⁽¹⁶⁾. We observe that these results are not isolated and increasingly, we note withdraw of nurses from the assistance and from the care planning for these patients and their families⁽²⁰⁾.

It is indispensable to highlight that it is difficult for some ambulatory managers to move one nursing professional to act exclusively in activities pertaining to TB control, being this nurse frequently allocated to act in urgency and emergency actions, management activities or essentially bureaucratic, accumulating

functions within health services⁽²¹⁾. However, besides questions out of control of the professional, it is important to consider the unsatisfactory involvement of few nurses who cannot play the aggregator role in the team, leaving their activities for other professionals⁽²²⁾.

Because this is a social disease, the participation of social workers in this process becomes important and noticeable. Although the percentage of care provided by this professional have not met even half of TB patients' registries, there is an evident worry to offer some social support, related to benefits that the program offers or regarding the rights that users have. A study conducted in a large city in the northeast region of Brazil showed that the availability of a complete multi-professional team, including the social worker, strengthens the inter-sectorial articulation and, consequently, the patient's adherence to treatment⁽²³⁾.

In relation to the "Processes and products" dimension, we could observe the list of services registered and offered to the TB patient. Although it have not reached 100% of DOT coverage, a significant percentage was present on this treatment regimen, strengthening the bond with the health team and the treatment success⁽¹²⁾.

The large number of patients, the extensive area to be covered and the lack of human and material resources, can be few of the aspects regarding the number of DOT users, once when it is impossible to offer supervision and to be able to supervise all, the team should opt for electing priorities within the most vulnerable and with higher risk to abandon the treatment⁽²⁴⁾. Moreover, it is important to highlight that the patient can deny receiving such action and the team use other strategies, as sharing the supervision with some family or community member.

Regarding the conducted and registered exams, it is important to note the importance of a control skin smear and the anti-HIV test, being the first, fundamental to monitor the treatment, especially within TB pulmonary cases; and the second, should be offered to all to identify co-infection cases, once the disease is within one of the main causes of death of people living with HIV/aids. Thus, it is essential for the team to be aware to request and register these exams, to identify a possible resistance or failure of the drug treatment and new infections⁽²⁵⁾.

The rates presented in the "Results" dimension reflect that the city reached satisfactory cure and abandonment coefficients, regardless of the issues found in the assistance to TB patients that were explained throughout this discussion. By this result, we admit a possible bias of sample selection, once a simple random sampling was not performed. Moreover, other limitations of the study refers to the information source being only of secondary data and the fact that the information system used for data collection does not connect all public hospitals of the city, which can cause important gaps regarding actions developed in this attention level. Thus, we suggest the conduction of other studies with distinct approaches related to the patient's route during the TB treatment, to amplify the vision about strengths and fragilities related to the theme.

CONCLUSION

The results related to the TB patient's route during the treatment in the studied city show the centralization of health actions on the secondary level of attention, privileging the attention by specialized teams and being the main ordaining, according to the pact with the MPTC. In addition, it was possible to identify the low participation of Basic Attention Units and of nursing professionals in the attention to TB patients.

We understand that to assist the user in these conditions runs through different aspects and should focus on the best way to favor treatment continuity and success, to maintain the patient assisted until the outcome in one well traced line of care, with available teams and services.

Such findings can help the well-founded assistencial planning by the nursing which is the protagonist of care management to TB patients in public health.

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REFERENCES

1. World Health Organization. Global tuberculosis report [Internet]. Geneva: World Health Organization; 2015 [cited 2016 out 20]. Available from http://www.who.int/tb/publications/global_report/en/index.html.
2. Silva-Sobrinho RA, Zilly A, Monroe AA, Pinto ÉSG, Silva RMM, Villa TCS. Ambivalência das ações de controle da tuberculose na atenção básica à saúde. Rev Rene [Internet]. 2014 [cited 2016 out 20];15(4):605-12. Available from: <http://www.revistarene.ufc.br/revista/index.php/revista/article/view/1610>.
3. Scatena LM, Villa TCS, Ruffino Netto A, Kritski AL, Figueiredo TMRM, Vendramini SHF, et al. Difficulties in the accessibility to health services for tuberculosis diagnosis in Brazilian municipalities. Rev Saude Publica [Internet]. 2009 [cited 2016 out 20];43(3):389-97. Available from: <http://dx.doi.org/10.1590/S0034-89102009005000022>.
4. Monroe AA, Gonzales RIC, Palha PF, Sassaki CM, Ruffino Netto A, Vendramini SHF, et al. Envolvimento de equipes da atenção básica à saúde no controle da tuberculose. Rev Esc Enferm USP [Internet]. 2008 [cited 2016 out 20];42(2):262-7. Available from: <http://dx.doi.org/10.1590/S0080-62342008000200008>.
5. Cardozo González RI, Monroe AA, Arcêncio RA, Oliveira MF, Ruffino Netto A, Villa TCS. Performance indicators of DOT at home for tuberculosis control in a large city, SP, Brazil. Rev Lat Am Enfermagem [Internet]. 2008 [cited 2016 out 20];16(1):95-100. Available from: <http://dx.doi.org/10.1590/S0104-11692008000100015>.
6. Rodrigues ILA, Monteiro LL, Pacheco RHB, Silva SED. Abandono do tratamento de tuberculose em co-infectados TB/HIV. Rev Esc Enferm USP [Internet]. 2010 [cited 2016 out 20];44(2):383-7. Available from: <http://dx.doi.org/10.1590/S0080-62342010000200020>.
7. Sá LD, Oliveira AAV, Souza KMJ, Palha PF, Nogueira JA, Villa TCS. Abandono do tratamento e elenco de serviços no cuidado ao doente de tuberculose. Revista de enfermagem UFPE on line [Internet] 2010 [cited 2016 out 20];4(3):1515-22. Available from: <http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/1216>.
8. Almeida PF, Giovanella L, Mendonça MHM, Escorel S. Desafios à coordenação dos cuidados em saúde: estratégias de integração entre níveis assistenciais em grandes centros urbanos. Cad Saude Publica [Internet]. 2010 [cited 2016 out 20];26(2):286-98. Available from: <http://dx.doi.org/10.1590/S0102-311X2010000200008>.
9. Ten Asbroek AH, Bijlsma MW, Malla P, Shrestha B, Delnoij DM. The road to tuberculosis treatment in rural Nepal: A qualitative assessment of 26 journeys. BMC Health Serv Res [Internet]. 2008 [cited 2016 out 20];8:7. Available from: <http://dx.doi.org/10.1186/1472-6963-8-7>.

10. Meintjes G, Schoeman H, Morroni C, Wilson D, Maartens G. Patient and provider delay in tuberculosis suspects from communities with a high HIV prevalence in South Africa: A cross-sectional study. *BMC Infect Dis* [Internet]. 2008 [cited 2016 out 20];8:72. Available from: <http://dx.doi.org/10.1186/1471-2334-8-72>.
11. Rintiswati N, Mahendradhata Y, Suharna, Susilawati, Purwanta, Subronto Y, et al. Journeys to tuberculosis treatment: a qualitative study of patients, families and communities in Jogjakarta, Indonesia. *BMC Public Health* [Internet]. 2009 [cited 2016 out 20];9:158. Available from: <http://dx.doi.org/10.1186/1471-2458-9-158>.
12. Brunello ME, Andrade RL, Monroe AA, Arakawa T, Magnabosco GT, Orfão NH, et al. Tuberculosis diagnostic pathway in a municipality in south-eastern Brazil. *Int J Tuberc Lung Dis* [Internet]. 2013 [cited 2016 out 20];17(10 Suppl 1):41-7. Available from: <http://dx.doi.org/10.5588/ijtld.13.0296>.
13. Instituto Brasileiro de Geografia e Estatística [Internet]. Brasília: Ministério do Planejamento, Orçamento e Gestão; 2016 [cited 2016 out 20]. Censo 2010. Available from: <http://censo2010.ibge.gov.br/>.
14. Secretaria Municipal de Saúde, Prefeitura Municipal de Ribeirão Preto. Relatório de gestão 2014 [Internet]. Ribeirão Preto: Secretaria Municipal de Saúde; 2015 [cited 2016 out 20]. Available from: https://www.ribeiraopreto.sp.gov.br/ssaude/pdf/2014relatorio_gestao.pdf.
15. Tamaki EM, Tanaka OY, Felisberto E, Alves CKA, Drumond Junior M, Bezerra LCA, et al. Metodologia de construção de um painel de indicadores para o monitoramento e a avaliação da gestão do SUS. *Cien Saude Colet* [Internet]. 2012 [cited 2016 out 20];17(4):839-49. Available from: <http://ref.scielo.org/rkxht6>.
16. Arakawa T, Arcêncio RA, Scatolin BE, Scatena LM, Ruffino-Netto A, Villa TCS. Accessibility to tuberculosis treatment: assessment of health service performance. *Rev Lat Am Enfermagem* [Internet]. 2011 [cited 2016 out 20];19(4):994-1002. Available from: <http://dx.doi.org/10.1590/S0104-11692011000400019>.
17. Naidoo P, van Niekerk M, du Toit E, Beyers N, Leon N. Pathways to multidrug-resistant tuberculosis diagnosis and treatment initiation: a qualitative comparison of patients' experiences in the era of rapid molecular diagnostic tests. *BMC Health Serv Res* [Internet]. 2015 [cited 2016 out 20];15:488. Available from: <http://dx.doi.org/10.1186/s12913-015-1145-0>.
18. Andrade RLP, Scatolin BE, Wysocki AD, Beraldo AA, Monroe AA, Scatena LM, et al. Tuberculosis diagnosis: primary health care or emergency medical services? *Rev Saude Publica* [Internet]. 2013 [cited 2016 out 20];47(6):1149-58. Available from: <http://dx.doi.org/10.1590/S0034-8910.2013047004650>.
19. Campos CEA, Fonseca ACF, Pessini ML. Análise dos percursos assistenciais de pacientes com tuberculose por equipes de saúde em três capitais brasileiras. Que lições os profissionais podem tirar? *Cad Saude Colet* [Internet]. 2016 [cited 2016 out 20];20(2):188-94. Available from: http://www.iesc.ufrj.br/cadernos/images/csc/2012_2/artigos/csc_v20n2_188-194.pdf.
20. Oblitas FYM, Loncharich N, Salazar ME, David HML, Silva I, Velásquez D. Nursing role in tuberculosis control: a discussion from the perspective of equity. *Rev Lat Am Enfermagem* [Internet]. 2010 [cited 2016 out 20];18(1):130-8. Available from: <http://dx.doi.org/10.1590/S0104-11692010000100020>.
21. Menegueti MG, Nicolussi AC, Scarparo AF, Campos LF, Chaves LDP, Laus AM. Dimensionamento de pessoal de enfermagem nos serviços hospitalares: revisão integrativa da literatura. *Rev. Eletr. Enf.* [Internet]. 2013 [cited 2016 out 20];15(2):551-63. Available from: <http://dx.doi.org/10.5216/ree.v15i2.18559>.
22. Souza KMJ, Sá LD, Silva LMC, Palha PF. Nursing performance in the policy transfer of directly observed treatment of tuberculosis. *Rev Esc Enferm USP* [Internet]. 2014 [cited 2016 out 20];48(5):874-82. Available from: <http://dx.doi.org/10.1590/S0080-6234201400005000014>.
23. Souza MSPL, Pereira SM, Marinho JM, Barreto ML. Characteristics of healthcare services associated with adherence to tuberculosis treatment. *Rev Saude Publica* [Internet]. 2009 [cited 2016 out 20];43(6):997-1005. Available from: <http://dx.doi.org/10.1590/S0034-89102009005000085>.
24. Rodrigues GO, Sá LD, Nogueira JA, Damascena LCL, Gomes ALC, Villa TCS. A expansão do tratamento supervisionado (TS) para o controle da tuberculose na Paraíba (1999/2005). *Rev. Eletr. Enf.* [Internet]. 2008 [cited 2016 out 20];10(3):632-42. Available from: <http://www.fen.ufg.br/revista/v10/n3/v10n3a09.htm>.
25. Lopes LM, Magnabosco GT, Andrade RLP, Ponce MAZ, Wysocki AD, Ravanholi GM, et al. Coordenação da assistência prestada às pessoas que vivem com HIV/AIDS em um município do Estado de São Paulo, Brasil. *Cad Saude Publica* [Internet]. 2014 [cited 2016 out 20];30(11):2283-97. Available from: <http://dx.doi.org/10.1590/0102-311X00091213>.