



Journal of Nursing

Revista de Enfermagem

UFPE On Line

ISSN: 1981-8963

ORIGINAL ARTICLE

INTRA-HOSPITAL PULMONARY TUBERCULOSIS PREVENTION: KNOWLEDGE OF THE NURSING TEAM

PREVENÇÃO DA TUBERCULOSE PULMONAR INTRA-HOSPITALAR: O CONHECIMENTO DA EQUIPE DE ENFERMAGEM

PREVENCIÓN DE LA TUBERCULOSIS PULMONAR INTRAHOSPITALARIA: CONOCIMIENTOS DEL EQUIPO DE ENFERMERÍA

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ABSTRACT

Objective: verifying the knowledge of the nursing staff about the prevention of in-hospital pulmonary tuberculosis. **Method:** a quantitative and transverse study performed with 83 professionals in a medical clinic and an emergency room of a university hospital in the countryside of Minas Gerais/Brazil. The data were processed using the Statistical Package for Social Sciences version 18.0 Windows. The research project was approved by the Ethics Committee, Protocol 2212/2010. **Results:** most professionals understand the concept and forms of transmission of the disease, distinguished signs and symptoms, recognizing preventive measures, mentioned having received training and knew to which sector should be given the suspected or confirmed cases. **Conclusion:** the implementation of environmental control measures, early diagnosis and institution of a continuing education program is required. **Descriptors:** Pulmonary Tuberculosis; Transmission; Prevention and Control; Nursing.

RESUMO

Objetivo: verificar o conhecimento da equipe de enfermagem sobre a prevenção da tuberculose pulmonar intra-hospitalar. **Método:** um estudo quantitativo e transversal realizado com 83 profissionais em uma Clínica Médica e Pronto-Socorro de um hospital universitário no interior de Minas Gerais/MG. Os dados foram processados no programa *Statistical Package for Social Sciences* versão Windows 18.0. O projeto de pesquisa foi aprovado pelo Comitê de Ética, Protocolo 2212/2010. **Resultados:** a maior parte dos profissionais compreendeu o conceito e as formas de transmissão da doença, distinguiu sinais e sintomas, sabia as medidas de prevenção, mencionou ter recebido treinamento e sabia a qual setor deve ser notificado os casos suspeitos ou confirmados. **Conclusão:** é necessária a implantação de medidas de controle ambiental, diagnóstico precoce e instituição de um programa de educação permanente.

Descritores: Tuberculose Pulmonar; Transmissão; Prevenção e Controle; Enfermagem.

RESUMEN

Objetivo: evaluar el conocimiento del equipo de enfermería acerca de la prevención de la tuberculosis pulmonar intra-hospitalaria. **Método:** un estudio cuantitativo y transversal realizado con 83 profesionales en una clínica médica y sala de urgencias de un hospital universitario en Minas Gerais/Brasil. Los datos fueron procesados mediante El paquete estadístico para las Ciencias Sociales versión 18.0 de Windows. El proyecto de investigación fue aprobado por El Comité de Ética, Protocolo 2212/2010. **Resultados:** La mayoría de los profesionales a entender El concepto y las formas de transmisión de la enfermedad, distinguidos los signos y síntomas, las medidas preventivas, mencionaron haber recibido entrenamiento y saber qué sector se debe dar a los casos sospechosos o confirmados. **Conclusión:** se requiere La aplicación de medidas de control ambiental, El diagnóstico precoz y La institución de un programa de educación continua. **Descriptores:** Tuberculosis Pulmonar; Transmisión; Prevención y Control; Enfermería.

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INTRODUCTION

Since Pre-History, tuberculosis (TB) has affected the man; it is considered one of the oldest communicable diseases in the world. There are archaeological records of the disease among various peoples of antiquity, as in Egyptian mummies, which were found lesions that suggested the disease in the spinal cord, known as Evil Pot. In the Americas, although suggesting that the disease existed before colonization, it is generally agreed that there were the Europeans who brought in shipments, causing thousands of deaths in the indigenous populations, contact virgins with Koch's bacillus, the agent of the disease.¹

Tuberculosis is an infectious and contagious disease caused by *Mycobacterium tuberculosis*, also called Koch's bacillus. This complex *Mycobacterium* consists of several species: *M. tuberculosis*, *M. bovis*, *M. africanum* and *M. microti*. Other species of mycobacteria may produce similar clinical picture of tuberculosis, being necessary to the differential diagnosis culture and their identification by reference laboratories.²

In the world TB is considered as an important occupational respiratory disease. The risk may be particularly high when there is great exposure associated with inadequate biosecurity measures and poor efficiency of the health facility infection control program.³⁻⁴

The main problems faced by health professionals involve delay in diagnosis and laboratory confirmation and the precarious structural conditions of service. Multiple working hours, stress and overload are also cited as factors related.⁵

The establishment of precautionary measures against air pollution and the start of early treatment are essential for non-agent dispersion in the health facility. However, the lack of diagnosis of tuberculosis in patients admitted to hospital for other reasons is a big risk for the whole team to assist it. Failure to early suspicion of existence of tuberculosis and the consequent delay in the adoption of protective measures jeopardize its control, and may even trigger-hospital outbreaks of the disease.⁶

Nursing assistance to the patient of suspected TBC is sometimes hindered by the difficulty of the professional deal with the limitations. Such limitations include the fear of acquiring the disease, prejudice and specific knowledge deficiency about the disease.⁷ The nursing staff should be directed to a quality care to patients with tuberculosis,

with that target a better service and protection for both.⁸

Highlights the need for effective establishment of guidelines and conduct in hospital services in order to achieving adequate control of tuberculosis, especially in its severe forms that have a high potential lethality.⁹ In this perspective, inserted in this scenario, the nurse needs to seek for change and innovation in his daily work.¹⁰

It becomes necessary promoting improved knowledge about tuberculosis among nursing professionals so that assistance is made with more safety and quality. It is hoped that this research can provide support for the creation of prevention and early diagnosis strategies in cases of in-hospital TBC. Thus, this study aims to:

- Checking the knowledge of the nursing staff about the prevention of in-hospital pulmonary tuberculosis.

METHOD

A quantitative and cross-sectional study. The research was conducted at the medical clinic Wing B and emergency department of a university hospital in Montes Claros, located in the north of Minas Gerais. The institution has 171 inpatient beds and is a reference for the treatment of tuberculosis in the region. We decided to develop the study in such sectors as they represented in sites with greater number of patients with diagnosed or suspected of the disease, and the Ward B are the rooms for isolation and the ER is the site of entry of new patients.

All members of the nursing staff of the aforementioned sectors were invited to participate in the study, but there were excluded those who were on vacation - 8, maternity leave - and 2 medical certificate - 3. Thus, 83 professionals participated in this research.

The data collection instrument consisted of two parts: the first with data on the characterization of the respondents - age, gender, duration of professional activities and training; the second part consisted of questions about knowledge on prevention of in-hospital pulmonary tuberculosis. A pilot study was performed previously with workers from another hospital sector. The collection took place between January and March 2011.

The data collected were organized and analyzed in Statistical Package for Social Sciences (SPSS) version 18.0 Windows. And then condensed in tables and a figure and discussed in the literature.

The research project was approved by the Research Ethics Committee of the State

University of Montes Claros through Embodied Opinion 2212/2010, ensuring respect for the ethical aspects of researches involving human beings, according to the Declaration of Helsinki and Resolution No. 466/2012 of the National Health Council.

RESULTS

Regarding the socio-demographic profile, we observe that most, 37,4% (31) of the professionals of the nursing team belongs to the age group between 20 and 29, followed by 33,7% (28) in the range of 30-39, 21,7% (18) in the age group between 40 and 49 years old. Regarding gender, most professionals 59% (49) belongs to the female sex. About the

professional category, 75,9% (63) are nursing technicians, 20,5% (17) are nurses and 3,6% (03) are nursing assistants. Regarding the duration of professional activities, most professionals have from one to four years 26,5% (22) and five to nine years 26,5% (22).

Regarding the knowledge about in-hospital prevention of TCB, it is observed in Table 1 that, predominantly, professionals have the proper view of the concept and the ways of transmission of TB. However, the nursing assistants showed a lack of knowledge about the transmission and prevention measures, while the nurses and technicians have a better knowledge.

Table 1. Knowledge of nursing staff on the prevention of in-hospital TBC. Montes Claros, MG, Brazil, 2011.

Variable	Professional Category					
	Nurse		Nursing technician		Nursing assistance	
	n	%	n	%	n	%
Concept of TBC						
Correct	16	94,1	44	71,0	2	66,7
Incorrect	1	5,9	18	29,0	1	33,3
Total	17	100,0	62	100,0	3	100,0
Main signs and symptoms						
Correct						
Incorrect	16	94,1	48	77,4	3	100,0
Total	1	5,9	14	22,6	0	0,0
	17	100,0	62	100,0	3	100,0
Way of transmission						
Correct	14	82,4	36	57,1	1	33,3
Incorrect	3	17,6	27	42,9	2	66,7
Total	17	100,0	63	100,0	3	100,0
Measures of prevention						
Correct	10	58,8	32	51,6	1	33,3
Incorrect	7	41,2	30	48,4	2	66,7
Total	17	100,0	62	100,0	3	100,0

With regard to training on the prevention of in-hospital pulmonary tuberculosis (Table 2), 53% (44) of the study subjects said they

had received training, and 40,9% (18) claimed that this took place over a year.

Table 2. Distribution of the subjects of the research according to training on prevention of in-hospital pulmonary tuberculosis. Montes Claros, MG, Brazil, 2011.

Variable	n	%
Training on prevention of pulmonary tuberculosis		
Yes	44	53,0
No	39	47,0
Total	83	100,0
For how long		
0 - 1 month	8	18,2
2 - 6 months	8	18,2
7 - 12 months	10	22,7
> than 1 year	18	40,9
Total	44	100,0

Professionals, mostly, 39 (47,0%) state that the notification of cases must take place by the Hospital Infection Control Service (HICS)

and the Epidemiological Surveillance Unit in Hospital Scope (NUVEH) (Table 3).

Table 3. Distribution of subjects of research according to the knowledge about the notification of suspected cases of pulmonary tuberculosis. Montes Claros, MG, 2011.

Notification of cases	n	%
Hospital infection control service (SCIH)	13	15,7
Health Secretariat	8	9,6
SCIH e NUVEH	39	47,0
Health Secretariat and NUVEH	19	22,9
No answer	4	4,8
Total	83	100,0

As shown in Figure 1, the nurses, in their majority, considered the SCIH and NUVEH as the correct location for notification; as well as the nursing technicians; while nursing assistants also considered the health secretariat and the SCIH and NUVEH as sectors for which should report suspected cases of TCB.

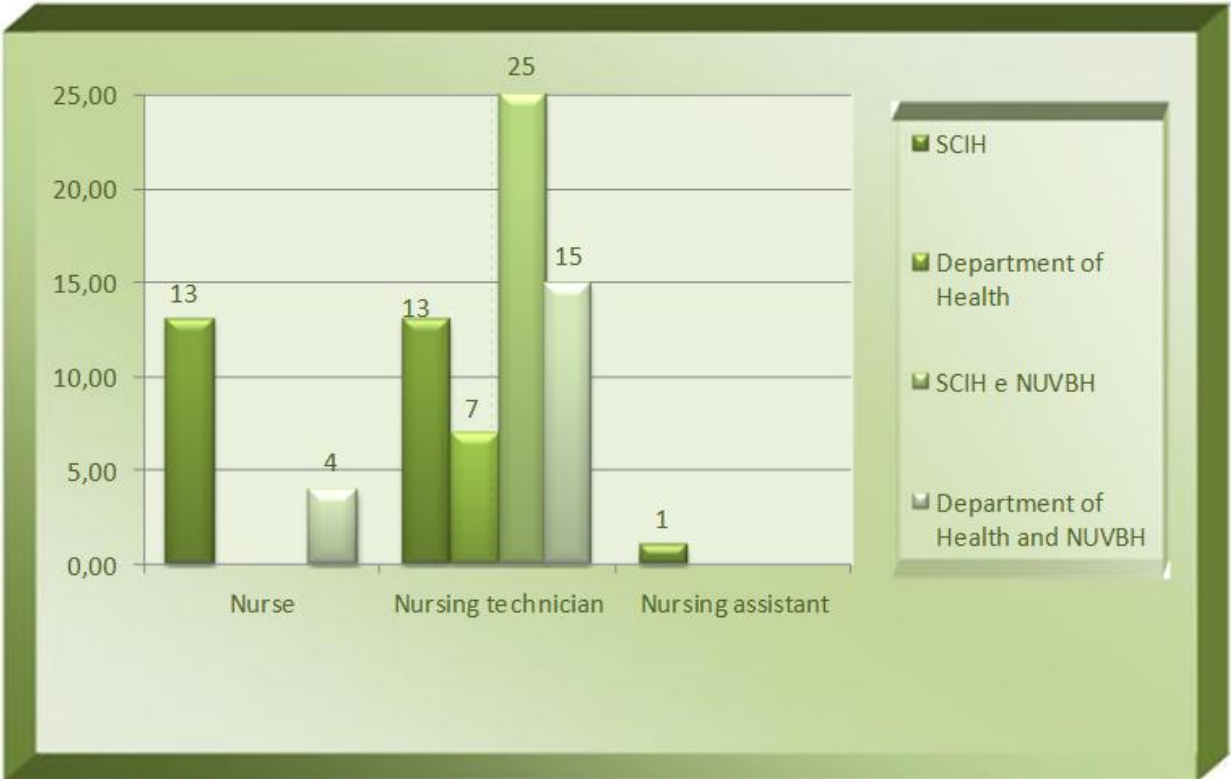


Figure 1. Distribution of study subjects in accordance with the notification of suspected cases of TBC by professional category. Montes Claros, MG, 2011.

Regarding the perception of the risk for infection (Table 4), most - 78 (94,0%) of the members of the nursing team found it great and that it depends on the stage of the disease and the personal protective equipment use (EPI).

Table 4. Distribution of subjects of research according to the perceived risk for infection of tuberculosis. Montes Claros, MG, 2011.

Perception of risk	n	%
The risk of contagion is small	2	2,4
There is no risk of contagion for professionals in the institution	1	1,2
The risk is great and is dependent on the phase of the disease and the use of EPI	78	94,0
No answer	2	2,4
Total	83	100,0

Professionals considered as problems that hinder the effective control of the transmission of in-hospital TBC: inadequate structure - 55 (66,1%), lack of PPE - nine (10,8%), non-adherence to the use of PPE - Eight (9,6%), lack of training - eight (9,6%), lack of guidance to patients and caregivers - 13 (15,6%), delay in delivery of test results - 16 (19,3%), masking refusal by the patient - two (2,4%). However, seven (8,4%) did not answer the question (Note: The sum of the

responses for the ne the percentage exceeds 100% due to multiple responses).

DISCUSSION

It was found a predominance of female professionals. Similarly, a study on the assessment of knowledge of professional nursing staff of a university hospital on the TBC and the protective measures to take care of the patient suspected pulmonary tuberculosis patients also identified a greater number of women in the study team: 78,54%

(220). This finding comes from the fact that, historically, the profession is carried out almost exclusively by women.¹¹

Professionals, mostly demonstrated satisfactory knowledge about the concept of TB, an infectious disease with slow evolution and chronic caused by *Mycobacterium tuberculosis* commonly known as Koch's bacillus (BK), whose primary target is the lungs.²

There was satisfactory knowledge about the signs and symptoms of the disease. This finding is positive, since the most practical way to search for and identification of TB patients is the systematic observation of events. Health professionals also must constantly be alert for the signs and symptoms and should refer suspected cases to conduct special tests such as sputum smear microscopy, especially if associated with cough and the other classic symptoms: night sweats, fever evening, asthenia, and anorexia and weight loss.¹¹

A retrospective epidemiological study reinforces the need for this knowledge. The weight loss, fever and productive cough were the signs and symptoms the reason for seeking assistance most often cited by customers at admission.¹²

As regards means of transmission, nurses and nursing technicians obtained a good success rate. This result was similar to that seen in work done in a hospital specializing in tuberculosis and AIDS, in the State of São Paulo. The 64 professionals, nurses, technicians and assistants, related sneezing and cough as the main means of transmission, and the correct answers ranged from 71,4 to 100% in the categories of workers.⁸ However, in this study, the auxiliary nursing incorrectly answered questions about the modes of transmission. This indicates that these professionals require more training.

Similar to the results found in this study, together with the auxiliary and distinct as the other professionals, in a study on vulnerability to tuberculosis related to the arrest of knowledge about the disease among 76 nurses, it was observed that they showed vulnerability linked to knowledge about the disease. Regarding the domains of knowledge, greater vulnerability was observed for the transmission of TBC.¹³ A similar find was also observed in another study about the level of knowledge of 159 health professionals on TB control measures. Regarding the transmission, 107 (67,2%) were unaware of airborne transmission and 109 (68,5%) were unaware of the clinical forms requiring respiratory isolation.¹⁴

This study showed that nurses and technical professionals, predominantly correctly, indicated the measures for intra-hospital prevention of tuberculosis. Corroborating this finding in a study on the prevention of tuberculosis, with health professionals and patients in two care units, it was established that the main form of prevention of TB reported by 45,5% of the professionals was the use of masks, which is among the most suitable.¹⁵ However, diverging from those findings, in research conducted in a university hospital in São Paulo, also with nursing professionals, 38,4% of workers said it was unlikely to impossible the spread of disease through contact direct with the carrier of TBC.¹⁶

In this study although predominated the correct answer, many professionals incorrectly answered on preventive measures. In agreement with this information, among respondents of other work, 53% reported using the N95 mask as biosecurity methods; however, it was observed that 30% could not answer correctly, and that 17% cited the use of common mask as needed during care to patients with pulmonary tuberculosis.¹⁷

Whereas, of inadequate response indicated by nursing assistants and significant amount of the other members of the nursing staff had satisfactory results in this regard in the present work, these professionals should be directed to effective care, permeated by precautions aimed at better assistance and protection for all involved in care. Caution and keep the private room with the door closed, preferably with ventilation negative pressure, and high efficiency filters in order to prevent respiratory droplets leaving the room; keep to a minimum the patient transport to other sectors; and use surgical mask when it is necessary.⁸

It is noteworthy that the nursing team has a primary role in the implementation of the rules of the Hospital Infection Control Committee (CCIH). This team is the most time interacting with customers, which requires the permanent adoption of preventive measures and frequent training. The constant interaction also provides opportunities and demand continuous health education as the transmission, prevention and control of tuberculosis bacilli¹⁸

When responding about the sectors responsible for notification, workers properly pointed to the spot. However, the distribution by professional category auxiliary had failed. Therefore, it is important that professionals know the importance of reporting, because it brings the possibility of achieving the goal to

be guaranteed for 100% of patients with known or suspected of the disease, respiratory isolation, opposite the responsibility of the institution and professionals to provide appropriate assistance to those patients.¹¹

In view of prevention of in-hospital tuberculosis fits the perception of risk, as large by the nursing staff in this investigation. This finding is not a relevant factor for adherence to prevention and personal protection, since the individual will only make use of equipment it is aware of the possibility of infection.⁸

The probability of a person exposed to *Mycobacterium tuberculosis* becoming infected is directly proportional to the concentration of infectious particles in the air and exposure time. However, it is known that this risk depends on the intensity, frequency and duration of exposure to bacilli. It is also related to the host's individual characteristics: age, nutritional status and immune, intercurrent diseases and other.¹⁹

About the problems that hinder the effective control of in-hospital pulmonary TB, various causes were cited by professionals' scenario for this study, whichever is inadequate structure. Similar fact was observed in the epidemiological monitoring of tuberculosis in a general hospital. Significant was the risk detected in clinical wards and adult emergence, which are the gateway of patients in diagnostic investigation of various medical specialties, however, were devoid of proper environmental control measures.⁴

Other causes were also detected, as the delay in diagnosis, laboratory confirmation, the laboratory identification of cases with resistant strains and treatment; precariousness in infrastructure service conditions and the lack of isolation beds; and not to use by health professionals, adequate respiratory protection are limiting factors in the prevention of in-hospital TBC.^{5,11} These causes have also been identified in other researches. In addition to these, the professionals indicated as unfavorable points to lack of staff training, lack of specialist doctors and nurses exclusively dedicated to the prevention and control of tuberculosis.²⁰

These results indicate that the lack of biosafety in tuberculosis considerably increases the risk of infection in healthcare workers. Therefore, it is extremely important to implement biosecurity measures in hospitals, as well as the investigation of latent infection with pulmonary tuberculosis in health care workers.²¹

It was mentioned the non-adherence to the use of PPE. The use of PPE represents the last

line of defense of the traders against tuberculosis infection, especially in institutions where that administrative and environmental control measures are deficient. PPE should be used in the following situations: in TB isolation rooms in bacillary phase, or suspected; during procedures with the potential to generate aerosols by coughing; and handling secretions contaminated with the bacillus of Koch.³

A study on the subject highlighted the need for professional awareness of the importance of preventive measures to exposure to biological agents against respiratory symptomatic patient. The adoption of these measures in health care facilities is critical to ensure the protection of professionals and patients. Simple and effective measures guided by administrative initiatives, environmental control and personal protection should be encouraged to contribute to increased adherence to biosecurity measures.²²

The lack of training was also mentioned as a problem for the prevention of in-hospital TBC, but only equivalent to 9,6% of the responses. In contrast to this result, in another study most professionals (67%) reported the lack of educational activities developed in the institution on biosafety in the management of tuberculosis patient.¹⁷

Although most members of the nursing staff say there training, it is important to point out that health professionals should have access to educational program and control measures implemented by the institution.²³ Establishments follow this recommendation have good results on the action of control and prevention of in-hospital tuberculosis. Thus, it is suggested a greater performance and development activities of continuing education, aiming to improve the knowledge about tuberculosis and nursing activities.^{24,22,13}

Institutions should have safe places for all individuals involved in care. The efficiency of the measures for prevention and control of tuberculosis depends on aspects that must be tuned: the evaluation of the effectiveness of the equipment, the management of patients with tuberculosis, supervision procedures and the permanent education.¹⁷ Thus, it provides an opportunity to security assistance both for professionals and for the assisted clientele, favoring the promotion of improvements in quality of care.

This study, despite having made possible to verify the knowledge of the nursing staff on the prevention of in-hospital pulmonary tuberculosis, has limitations. The setting of the investigation was restricted to an

institution and not ascertained probable statistical associations that could indicate more effectively the factors associated with knowledge of professionals, hindering also possible generalizations. Moreover, there is relative scarcity of specific works, especially recent ones, on the subject analyzed, which complicated the comparison and discussion of the findings. In this sense, studies that assess the local situation, the performance and the perception of the teams involved are essential to leverage fundamentally biological and reductionist view of disease as well as to support the assessment of the strategies adopted so far.²⁰

CONCLUSION

Professionals, mostly have enough knowledge on the investigated subject. However, nursing assistants showed deficits in some ways. Similarly, considerable portions of nurses and nursing technicians incorrectly answered on certain items. These findings require further attention on the performance of these workers and their knowledge.

The findings also suggest the need to implementing environmental control measures by the institution and its managers. Although there are administrative measures, they must be efficient in rapid diagnosis and specific care of the case, since the early confirmation enables the biosafety team. In addition, the creation and implementation of a continuing education program is necessary in order to training professionals about tuberculosis, the risks to which they are exposed and the effective implementation of precautions.

REFERENCES

1. Campos R, Pianta C. Tuberculose: histórico, epidemiologia e imunologia, de 1990 a 1999, e co-infecção TB/HIV, de 1998 a 1999, Rio Grande do Sul - Brasil. Bol da Saúde [Internet]. 2001 [cited 2013 Jan 05];15(1):61-71. Available from: http://www.esp.rs.gov.br/img2/v15n1_06tuberculose.pdf.
2. Brasil. Ministério da Saúde. Fundação Nacional de Saúde. Comitê Técnico-Científico Assessor para Co-infecção HIV-Tuberculose. Tuberculose - Guia de vigilância Epidemiológica. Brasília: Ministério da Saúde, 2002. 100p.
3. Gonçalves MLC. Transmissão nosocomial da tuberculose: diminuindo o risco. Bol Pneumol Sanit [Internet]. 2001 [cited 2013 July 06];9(2):21-6. Available from: <http://scielo.iec.pa.gov.br/pdf/bps/v9n2/v9n2a05.pdf>
4. Gonçalves BD, Cavalini LT, Valente JG. Monitoramento epidemiológico da tuberculose em um hospital geral universitário. J Bras Pneumol [Internet]. 2010 [cited 2012 July 06];36(3):347-55. Available from: http://www.scielo.br/pdf/jbpneu/v36n3/en_v36n3a13.pdf
5. Oliveira SMVL, Honner MR, Paniago AMM, Aguiar ESA, Cunha RV. Prevalência da infecção tuberculosa entre profissionais de um hospital universitário. Rev Latino-Am Enfermagem [Internet]. 2007 [cited 2013 July 16];15(6). Available from: www.scielo.br/pdf/rlae/v15n6/pt_09.pdf
6. Figueiredo RM, Caliar JS. Tuberculose nosocomial e o risco ocupacional: o conhecimento produzido no Brasil. Rev Ciênc Méd [Internet]. 2006 [cited 2013 Nov 14];15(4):333-8. Available from: <http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?IscScript=iah/iah.xis&src=google&base=LILACS&lang=p&nextAction=lnk&exprSearch=489249&indexSearch=ID>.
7. Bertazzone EC, Gir E, Ayashida M. Situações vivenciadas pelos trabalhadores de enfermagem na assistência ao portador de tuberculose pulmonar. Rev Latino-Am Enfermagem [Internet]. 2005 [cited 2013 Nov 04];13(3):374-81. Available from: <http://www.scielo.br/pdf/rlae/v13n3/v13n3a12.pdf>
8. Chiossi MF, Andrade D, Hass VJ, Souza PR. Repensando o cuidado intra-hospitalar da tuberculose: antigo problema nos dias atuais. Prática Hospitalar [Internet]. 2006 [cited 2013 Nov 12];8(44). Available from: <http://www.praticahospitalar.com.br/pratica/2044/pgs/materia2022-44.html>.
9. Viana PVS, Basta PC. Factors associated with death caused by tuberculosis in hospitalized patients. Rev enferm UFPE on line [Internet]. 2013 [cited 2013 Dec 19];7(12):6771-9. Available from: <http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/5045/pdf/4098>
10. Sampaio FC, Cadete MMM. The training of the nursing professional in the viewpoint of the nursing students: activities supported on the problematization. Rev enferm UFPE on line [Internet]. 2013 [cited 2013 Sept 18];7(1):657-64. Available from: <http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/view/3473/pdf/2124>
11. Avelar MCQ, de Paula TAC, Shimizu MI, Neves MA, Petrizzo CE. O conhecimento da equipe de enfermagem sobre cuidados com pacientes suspeitos ou portadores de

tuberculose pulmonar - estudo exploratório. Braz J Nurs [Internet]. 2006 [cited 2010 Nov 02];5(2). Available from:

<http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?!sisScript=iah/iah.xis&src=google&base=LILACS&lang=p&nextAction=lnk&exprSearch=490087&indexSearch=ID>>.

12. Oliveira HMMG, Brito RC, Kritski AL, Ruffino-Netto A. Perfil epidemiológico de pacientes portadores de TB internados em um hospital de referência na cidade do Rio de Janeiro. J Bras Pneumol [Internet]. 2009 [cited 2013 July 26];35(8):780-7. Available from:

www.jornaldepneumologia.com.br/portugues/artigo_detalhes.asp?id=1431

13. Mussi TVF, Traldi MC, Talarico JNS. Knowledge as a factor in vulnerability to tuberculosis among nursing students and professionals. Rev Esc Enferm USP [Internet]. 2012 [cited 2013 July 06];46(3):692-9. Available from:

<http://www.scielo.br/pdf/reeusp/v46n3/23.pdf>

14. Pires Neto RJ, Costa CO, Bastos Filho JBB, Lins JMM, Feitosa RGF, Leitão TMJS et al. Tuberculose em ambiente hospitalar: perfil clínico em hospital terciário do ceará e grau de conhecimento dos profissionais de saúde acerca das medidas de controle. Rev bras promoç saúde [Internet]. 2010 [cited 2013 July 16];23(3):260-7. Available from: <http://ojs.unifor.br/index.php/RBPS/article/view/2025/2320>

15. Souza CTV, Natal S, Rozemberg B. Comunicação sobre prevenção da tuberculose: perspectivas dos profissionais de saúde e pacientes em duas unidades assistenciais da Fundação Oswaldo Cruz. Rio de Janeiro, 2005. Available from: <http://www.fae.ufmg.br/abrapec/revistas/V5N1/v5n1a6.pdf>.

16. Souza JN, Bertolozzi MRA. The vulnerability of nursing workers to tuberculosis in a teaching hospital. Rev Latino-Am Enfermagem [Internet]. 2007 [cited 2013 June 18];15(2):259-66. Available from: <http://www.scielo.br/pdf/rlae/v15n2/v15n2a11.pdf>.

17. Ramos I. A biossegurança em tuberculose pulmonar e a prática de enfermagem em um hospital universitário do Rio de Janeiro, Brasil. R pesq cuid fundam online [Internet]. 2010 [cited 2013 July 26];2(supl):284-7. Available from:

http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/920/pdf_133

18. Guerra FGCM, Souza FBA, Tocantins FR. Cliente com tuberculose multirresistente

internado em hospital geral - intensificando as ações de enfermagem. Bol Pneumol Sanit [Internet]. 2003 [cited 2013 July 06];11(2):47-52. Available from:

<http://scielo.iec.pa.gov.br/pdf/bps/v11n2/v11n2a07.pdf>

19. Centers for Disease Control and Prevention. Guidelines for preventing the transmission of Mycobacterium tuberculosis in health-care settings. 2005;54(1):141.

20. Caliar JS, Figueiredo RM. Tuberculose: perfil de doentes, fluxo de atendimento e opinião de enfermeiros. Acta Paul Enferm [Internet]. 2012 [cited 2013 Jan 05];25(1):43-7. Available from:

http://www.scielo.br/pdf/ape/v25n1/en_v25n1a08.pdf

21. Couto IRR, Andrade M, Flach DMAM, Couto IBR. The risk of tuberculosis infection in the hospital environment. R pesq cuid fundam online [Internet]. 2013 [cited 2013 Nov 12];5(1):3472-77. Available from:

http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/1415/pdf_706

22. Costa MCP, Taminato M, Silva V, Grande AJ, Beretta ALRZ. Biosecurity during nursing care to patients with pulmonary tuberculosis. Acta Paul Enferm [Internet]. 2013 [cited 2013 Nov 12];26(4):307-12. Available from: http://www.scielo.br/pdf/ape/v26n4/en_v26n4a02.pdf

23. Franco C, Zanetta DMT. Tuberculose em profissionais de saúde: medidas institucionais de prevenção e controle. Arq Ciênc Saúde [Internet]. 2004 [cited 2013 July 11];11(4):244-52. Available from: <http://www.cienciasdasaude.famerp.br/racsol/Vol-11-4/10%20-%20id%2044.pdf>

24. Barros E JL. Permanent education as proposal for better practice in nursing/health care. J Nurs UFPE on line [Internet]. 2014 [cited 2014 Mar 04];8(2):1-3. Available from: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/viewFile/6090/pdf_4505.

Lima CA, Barbosa LA, Gonçalves RPF.

Intra-hospital pulmonary tuberculosis prevention...

Submission: 2014/04/17
Accepted: 2015/12/29
Publishing: 2015/02/15

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