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Tuberculosis: are the future health care professionals prepared for adequate patient care?

Tuberculose: os futuros profissionais de saúde são preparados para o atendimento adequado do paciente?

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RESUMO | INTRODUÇÃO: Segundo a Organização Mundial da Saúde (OMS), um terço da população mundial está infectada pelo *Mycobacterium tuberculosis*[1]. A literatura mostra que a equipe multiprofissional responsável pelo manejo da tuberculose não está apta a lidar frente à reemergência da doença, além de atuarem de forma não integral e humanizada. **OBJETIVO:** Verificar se os universitários que serão inseridos na atenção primária estão aptos a identificar e manejar pacientes com tuberculose. Métodos e materiais: Foram aplicados questionários semiestruturados em alunos dos últimos períodos dos cursos da área da saúde. Os dados foram analisados através de estatística descritiva. **RESULTADOS:** A maioria dos entrevistados disseram já ter tido contato com o tema tuberculose durante a graduação. Em relação às manifestações, 65 (38,24%) consideraram como principais sintomas da tuberculose pulmonar tosse, emagrecimento, febre, perda de apetite, sudorese noturna e fraqueza. Em contrapartida, 97 (57,06%) consideraram a presença do escarro hemoptoico como manifestação principal. A minoria dos entrevistados soube definir corretamente um sintomático respiratório. **CONCLUSÃO:** Através da análise dos resultados é possível notar que a universidade é a principal fonte de conhecimento dos universitários sobre tuberculose. Identificou-se lacunas a serem preenchidas, como em relação às manifestações da doença, à dificuldade em identificar um sintomático respiratório, o desconhecimento da mudança do calendário vacinal e da obrigatoriedade da realização do teste rápido de HIV. Além disso, percebe-se que há dificuldade no manejo adequado dos pacientes. Diante dos resultados, é evidenciada a necessidade de aprimoramento do ensino em relação à tuberculose.

PALAVRAS-CHAVE: Tuberculose. Conhecimento. Estudantes.

ABSTRACT | INTRODUCTION: According to the World Health Organization (WHO), one third of the world's population is infected with *Mycobacterium tuberculosis*[1]. The literature shows that the multiprofessional team responsible for managing tuberculosis is not able to dealing with re-emergence of the disease, in addition acting in non-integral and humanized way. **OBJECTIVE:** To check if university students that will be inserted in primary care are able to identify and manage patients with tuberculosis. **METHODS AND MATERIALS:** Semi-structured questionnaires were applied to students of the last periods of health courses. Data were analyzed through descriptive statistics. **RESULTS:** Most of the interviewees said they have already had contact with the topic tuberculosis during graduation. Regarding the manifestations, 65 (38.24%) considered cough, weight loss, fever, loss of appetite, nocturnal sweating and weakness as the main symptoms of pulmonary tuberculosis. In contrast, 97 (57.06%) considered the presence of hemoptoic sputum as the main manifestation. The minority of the interviewees knew how to correctly define a respiratory symptomatic subject. **CONCLUSION:** Through the analysis of the results it is possible to notice that the university is the main source of knowledge of the university students about tuberculosis. One had identified gaps to be filled, as in relation to the manifestations of the disease, the difficulty in identifying a respiratory symptomatic subject, the lack of knowledge of the change in the vaccination schedule and mandatory rapid HIV testing. In addition, it is noticed that there is difficulty in the adequate management of the patients. In view of the results, there is a need to improve teaching in relation to tuberculosis.

KEYWORDS: Tuberculosis. Knowledge. Students.

Introduction

According to the World Health Organization one third of the world's population has been infected with *Mycobacterium tuberculosis* being recorded 9 million new cases and 1 million deaths in 2013[1]. About 80% of these cases are concentrated in 22 countries, including Brazil, which ranks 16th in absolute numbers of cases being responsible for 31% of tuberculosis cases in Latin America[2].

Approximately 70,000 new cases of tuberculosis were diagnosed in 2014 in Brazil, with a reduction in the incidence rate from 41.5 per 100 thousand inhabitants in 2005 to 33.5 per 100 thousand inhabitants in 2014[3].

Tuberculosis presents a long period of latency, mainly affecting the lungs, and patients who present the pulmonary bacilliferous form are potential transmitters[4,5]. Symptomatic respiratory are those who present cough for three weeks or more, which are often neglected by health care professionals[6,7].

Clinical manifestations of tuberculosis may occur in an acute and severe form (less common) or in a more insidious and slow form (more common). In insidious form, the main symptoms are low fever, nocturnal sweating, inappetence and inexpressive physical examination[8]. Diagnosis of tuberculosis is made mainly by sputum smear microscopy, which is indicated for all respiratory symptoms and, also, for monitoring during treatment, being mandatory at the end of the 2nd, 4th and 6th month of treatment, by identification of bacilli through cultivation and molecular method[5,9].

According to the data found in Oliveira et al[7], although the receipt of suspected cases were carried out in the primary care, the tuberculosis diagnosis was made in secondary and tertiary care in 73% of the patients with only 16% happening in the primary attention.

Coinfection with human immunodeficiency virus (HIV) and *Mycobacterium tuberculosis* is responsible for the difficulty in reducing the incidence of both infections. This relationship had a major impact on tuberculosis control programs because the HIV has contributed both to the increase in the number of tuberculosis cases and to the elevation of mortality rates among co-infected patients[5,4].

The multiprofessional team composed, basically, by physician, nurse, community health agent and nursing technician, plays an important role in the management of tuberculosis having as functions active search and identification of respiratory symptomatic, orientation regarding the treatment and the coping of the disease and strategies for performing early diagnosis. This is hampered by the "inability of health care professionals" to identify the disease, its signs and symptoms, in addition to its non-integral and humanized performance, the overload of health services and the lack of investments in an organized public health care policy become a hindrance to this investigation[10-12].

The World Health Organization (WHO) shows concern about the qualification of health care teams regarding to disease control actions especially in Primary Health Care[13]. In the face of that, emerge the need for managers to offer continuing education to professionals who work directly in the Tuberculosis Control Program[10].

The objective of this study was to analyze the knowledge of university students in the field of health care about tuberculosis in order to assess whether they are able to the tuberculosis management, since the number of studies produced in this area is low, encompassing only a few professionals from the basic health care team. The importance of this work is given by the fact that from the data obtained through this research there will be more information available that will allow the implementation of interventions aimed at increasing / consolidating the knowledge about the theme leading later to a better care for the community.

Methods and materials

The research carried out between April and May 2017, consisted of a descriptive quantitative population study, through using a semi-structured questionnaire covering the transmission, symptomatology, diagnosis, prevention and treatment of tuberculosis, targeting the students of the final years of health courses. An infectious disease specialist, a pulmonologist, and a family doctor validated the questionnaire and the suggestions for improvement were followed. Those who did not have more activities on campus due to their exclusive dedication to the internship, due to the impossibility of applying the face-to-face questionnaire, were excluded from this study.

The initial sample consisted of 218 students from the last periods of Nursing, Pharmacy, Physiotherapy, Medicine, Nutrition and Dentistry, though 170 students participated in the study (Table 1). Data were analyzed through descriptive statistics, construction of tables and graphs using Excel Office® software.

The Research Project is in line with Resolution 466/2012 of the National Health Council of the Ministry of Health and was approved by the Research Ethics Committee of UNIFAL-MG.

Only students who signed the Term of Free and Informed Consent (TFIC) performed the research.

Table 1. Number of students per course and period to which the questionnaire was applied

Course	Period to be applied the questionnaire	Number of students
Nursing	9th period	21
Pharmacy	9th period	24
Phisiotherapy	9th period	36
Medicine	7th period	27
Nutrition	7th period	28
Dentistry	9th period	34
TOTAL		170

Source: The Authors (2018).

Results

Age of the interviewees varied between 20 and 38 years (mean of 23 years). Of these, 150 (88.24%) reported having had contact with the topic of tuberculosis, most of them 128 (75.29%) in undergraduate studies, mainly through compulsory subjects.

As to the form of transmission, 95 interviewees (55.88%) answered that it occurs through aerosols containing the bacillus and 32 (18.83%) by sharing cutlery and glasses. When asked about which patients can transmit tuberculosis, 87 (51.18%) answered that the potential transmitters are those that present the pulmonary form with elimination of the bacillus. Among the interviewees, 132 (77.65%) were able to respond that not all people who are exposed to the etiological agent develop the disease (Table 2).

QUESTIONNAIRE/ANSWERS	No (%)
What is the form of transmission of Tuberculosis?	
a. Through contact with cutlery / glasses / other utensils	32 (18.83)
b. Through the kiss / hug / sexual relations	7 (4.12)
c. Through aerosols containing the bacillus	95 (55.88)
d. Through ingestion of food / water contaminated with bacillus	16 (9.41)
e. Do not know	5 (2.94)
Null	15 (8.82)
Which patients can transmit Tuberculosis?	
a. All patients with bacilli	15 (8,81)
b. Patients with pulmonary form, that are eliminating the bacillus	87 (51,18)
c. Patients with pulmonary form, even if they are not eliminating the bacillus	11 (6,47)
d. Patients who presented the active form of the disease, even if they have already started treatment more than 15 days	36 (21,18)
e. Do not know	14 (8,24)
Null	7 (4,12)

Source: The Authors (2018).

Regarding clinical manifestations, 65 (38.24%) considered cough, weight loss, fever, loss of appetite, nocturnal sweating and weakness as the main symptoms of pulmonary tuberculosis. On the other hand, 97 (57.06%) considered the presence of hemoptotic sputum as the main manifestation (Table 3). Regarding the definition of a respiratory symptomatic, 64 (37.65%) judged being that patient that shows cough for three weeks or longer.

Table 3. Results obtained in the research (No = 170)

QUESTIONNAIRE / ANSWERS	No (%)
What are the main symptoms of Pulmonary Tuberculosis?	
a. Cough, weight loss, diarrhea, fever, night sweats and sputum with blood	97 (57.06)
b. Cough, weight gain, increased appetite, fever and chest pain	0 (0.00)
c. Cough, weight loss, hair loss, weakness, diarrhea and fever	3 (1.76)
d. Cough, weight gain, fever, dyspnea, back and chest pain	3 (1.76)
e. Cough, weight loss, fever, loss of appetite, night sweats and weakness	65 (38.24)
Null	2 (1.18)

Source: The Authors (2018).

As to the diagnosis of pulmonary tuberculosis, 100 (58.82%) indicated being needed two positive sputum smear microscopies and an X-ray examination. For sputum smear microscopy, 92 (54.12%) adequately indicated the biosafety measures. In relation to the rapid HIV test in patients diagnosed with tuberculosis, 76 (44.70%) considered it mandatory to perform this test and 73 (42.94%) did not know about the mandatory test.

Regarding prevention, 27 (15.88%) considered adequate feeding and housing conditions, vaccination with BCG and treatment of latent infection as preventive measures for tuberculosis. We found that 67 (39.42%) considered it necessary to avoid sharing utensils with patients. On immunization with the BCG vaccine, 25 (14.71%) said that protection only occurs against severe forms of tuberculosis, however, 62 (36.47%) believe that the vaccine protects only for a certain period of time being necessary reinforcement after 10 years of the first dose (Table 4).

Table 4. Results obtained in the research (No = 170)

QUESTIONNAIRE / ANSWERS	No (%)
What are the ways to prevent Tuberculosis?	
a. Adequate food and housing conditions, BCG vaccination and avoid sharing utensils with patients	67 (39.42)
b. Adequate feeding and housing conditions, BCG vaccination, chemoprophylaxis and isolation of the patient in cold places	5 (2.94)
c. Isolating the patient in cold places, avoid sharing utensils with patients, and vaccinating with BCG	15 (8.82)
d. Adequate food and housing conditions, BCG vaccination, chemoprophylaxis and avoid sharing utensils with patients	49 (28.82)
e. Adequate food and housing conditions, BCG vaccination and chemoprophylaxis	27 (15.88)
Null	7 (4.12)
The BCG vaccine:	
a. Protects against all forms of tuberculosis	52 (30.58)
b. Protects only immunocompromised patients	2 (1.18)
c. Protects only against severe forms of tuberculosis	25 (14.71)
d. Protects against pulmonary tuberculosis only	22 (12.94)
e. Protects only for a certain period of time, requiring reinforcement after ten years of first dose	62 (36.47)
Null	7 (4.12)

Source: The Authors (2018).

Regarding supervised treatment (DOTS), 66 (38.82%) consider that supervision can be done only by health professionals while 22 (12.94%) consider that the community can contribute with the health care team.

In terms of therapeutic regimen for uncomplicated pulmonary tuberculosis, 101 (59.41%) considered the use of rifampicin, isoniazid, pyrazinamide and ethambutol hydrochloride to be adequate for 6 months.

Analyzing the role of epidemiological surveillance in obtaining data for the control and implementation of tuberculosis prevention programs, 133 (78.24%) answered that an epidemiological investigation should be performed between contacts of all new cases of tuberculosis, being a disease of compulsory notification and mandatory investigation. When they were asked about tuberculosis being or not a curable disease, 146 (85.87%) considered exist a cure for tuberculosis.

Of the 170 interviewees, only 165 answered the referring item to consider itself of being able or not able to attend tuberculosis in primary care. Of these, 84 (50.91%) considered themselves prepared to deal with tuberculosis and 81 (49.09%) disagree with being able to deal with tuberculosis.

Discussion

The cure of the patient with tuberculosis results from the appropriate drug association, considering correct dosages and time avoiding bacterial persistence and the development of drug resistance[6]. In our study, when asked about the possibility of cure of tuberculosis, most respondents considered it a curable pathology, which is compatible with the results obtained by Sánchez in which 78.3% of the research participants had the same response[14].

Transmission occurs by air in almost all cases from the inhalation of particles containing expelled bacilli and begins simultaneously with the first respiratory symptoms, decreasing after the beginning of effective treatment[6]. According to the Secretary of Health of Minas Gerais State, droplets deposited on objects such as clothes, sheets and household utensils are difficult to disperse in aerosols and thus are not an important factor in transmission[8].

It is noted in our results that there are still many doubts regarding the transmission of tuberculosis which is consistent with the study of Mussi, in which more than 90% of the research participants pointed out as a form of contagion of the disease the shared use of utensils, like glasses and cutlery. In the same study, 60% of the students said being the speech a form of transmission[15]. Already in Teixeira's work, half of the medical students identified as a form of transmission the speech, cough and sneeze, suggesting that there should be improvements in students' knowledge about tuberculosis transmission[16].

Although half of those interviewees knew how to define which patients are potential transmitters of the disease, 36 (21.18%) of those surveyed pointed out that even patients who started treatment more than 15 days ago are potential transmitters. That matches according to what Mussi says in which 85.5% of interviewees answered that tuberculosis bacillus contamination is possible when talking to people with tuberculosis who have been receiving treatment for more than a month[15].

According to the Manual of Recommendations for the Control of Tuberculosis in Brazil, the majority of people who are exposed to the bacillus resist to the disease and acquire partial immunity to the disease[6]. In the Sánchez study, 40.6% of the interviewees said that "anyone" can contract tuberculosis and only 10.3% said that "people with low immunity" are more susceptible to the disease[14]. In our study, most interviewees believe that not all individuals who come into contact with the etiological agent become ill, demonstrating that they are able to recognize tuberculosis as a disease with a preference for special populations.

In terms of the clinical manifestations the minority of the sample (38.24%) was able to identify them correctly which corresponds to the findings of Sobrinho, in which only 16.7% of the interviewed professionals were able to indicate the classic signs of the disease correctly[11]. Basu identified that 64.4% of the trainee doctors mentioned cough for two weeks or more as the main symptom of tuberculosis,

also citing hemoptysis[17]. In Al-Jabri's study 57% of medical students said that all patients with tuberculosis showed cough with hemoptotic sputum[18]. This evidences that the difficulty in identifying patients with tuberculosis is present in both academic and professional life.

The respiratory symptomatic is defined as the individual who presents cough for longer than three weeks, although in special populations there is a reduction for two weeks[6]. In our study, 37.65% of the interviewees considered symptomatic respiratory to be coughing for more than three weeks, while 28.82% considered the presence of cough for more than two weeks.

Definitive diagnosis of tuberculosis is made through direct sputum smear microscopy and radiological examination, which is requested to all patients with clinical suspicion of the disease[6]. The sample collection for sputum smear microscopy should be performed in an open and ventilated environment, using the N95 mask by the professionals[8].

Most of the interviewees pointed out being necessary two positive sputum smear microscopies and an X-ray examination to confirm the diagnosis. For the sputum smear microscopy, 54.12% considered that the collection should be performed in an open and ventilated environment, with the use of N95 mask by the health professional. This is in contrast to Mussi's findings, in which 100% of the students did not mention smear microscopy as the first test for the diagnosis of active pulmonary tuberculosis, and 97.2% of the students reported using N95 as a form of prevention against active tuberculosis[15]. In Temesgen's work, only 34.2% identified the use of mask by health care professionals as a preventive measure although only 21.1% stated that they use it[19].

The prevention of the disease occurs through the active search for new cases, adequate treatment, contactors control, educational actions for the population and health care professionals and vaccination with BCG, which does not prevent the development of the pathology, but rather avoids the development of severe forms[8-20]. In our research, only 15.88% of the interviewees considered feeding and housing conditions, which includes ventilated environment, vaccination with BCG and chemoprophylaxis

(treatment of latent infection) as preventive measures of tuberculosis. This evidences that a greater focus is needed on educational measures regarding the ways of preventing tuberculosis during graduation.

In terms of protection against tuberculosis through immunization with the BCG vaccine, only 25 (14.71%) adequately responded that the immunization occurs only for the severe forms of the disease. Our findings correspond to Mussi's work, in which 95.7% of participants answered incorrectly when asked about the efficacy of the BGC vaccine against pulmonary tuberculosis, and of Al-Jabri in which 88% of medical students considered the vaccine BCG as a form of 100% effective protection in all cases of tuberculosis[15-18]. A possible cause for this considerable error rate is the change in the vaccine schedule determined by Ordinance No 1602 of July 17, 2006. It says that the application of the extra dose of the vaccine at 10 years of age is no longer the case, since the average of the studied population is 23 years, that is, the majority received the second dose of the vaccine[21]. Such divergence shows that it is necessary a greater focus on the updates regarding the vaccination calendar at the undergraduate level.

The high prevalence of tuberculosis and HIV coinfection has made it mandatory to use the rapid anti-HIV test in patients diagnosed with tuberculosis[6]. With the analysis of the data, it was possible to observe that less than half (44.70%) of the interviewees know that the rapid HIV test is mandatory in patients with suspected tuberculosis, a fact that generates concern, since the rise of tuberculosis is intrinsically linked to the increase in the number of HIV cases[4].

The Directly Observed Treatment (DOT) can be performed in Health Care Units, at the patient's home and other places to be agreed, being supervised by professionals from the Family Health Program, family members and community members[7]. In our study, only 12.94% of the participants were able to define what the DOT consists of, this corroborates with the study by Sobrinho, in which most of the professionals were also unaware of DOT[11]. This scenario shows concern regarding the continuity of the treatment, since this is of long duration while the improvement of the symptoms is noticed in a few weeks favoring the abandonment.

One of the factors that predisposes the abandonment is the inadequate transmission of information about the duration of treatment by health care professionals, which agrees with Vieira, who identified a higher abandon rate in patients with self-administered treatment than in those with DOT[22-23]. This stresses the importance of community and professional education for a better understanding of the role of the population in the management and control of tuberculosis.

With regard to the basic therapeutic regimen for the treatment of tuberculosis, the Ministry of Health recommends that it be done in two phases, the first phase being intensive, with the drugs rifampicin, isoniazid, pyrazinamide and ethambutol hydrochloride, of 2 months and second phase of maintenance, consisting of rifampicin and isoniazid, lasting 4 months, totaling 6 months of treatment[6]. The majority of respondents pointed out the need for treatment for 6 months in cases of uncomplicated pulmonary tuberculosis, differing from what Sánchez says, in which 41.7% of the respondents stated that treatment should last approximately 9 months[14]. In Montagna's findings, 75% of interviewees considered necessary the use of a combination of antibiotics for a long period to be effective[24]. On the other hand, Al-Jabri, 94% of medical students believe that two weeks of antibiotic treatment are sufficient to obtain cure[18].

According to Ordinance No. 104, of January 25, 2011, tuberculosis is a disease of mandatory notification, being that all new cases, relapses and abandonment must be notified by means of the SINAN (Sistema de Agravos de Notificação) Notification System form, the epidemiological investigation of the contactors must be done[6]. In our research, most interviewees knew that such conduct should be performed.

Conclusion

With the accomplishment of this work it was possible to identify that the students of health care area present many gaps to be filled with in terms of tuberculosis, identified mainly in the characterization of the symptoms, forms of prevention, immunization and definition of DOT. In addition, it is noticed that the updates regarding the disease are not being effectively followed in higher education, which can contribute, to the difficulties encountered by the professionals in their clinical practice. Thus, the need to strengthen teaching in relation to tuberculosis and the implementation of teaching methods that contribute to the establishment of knowledge is highlighted.

Authors contribution

Paschoal GS has participated in the conception, planning, search and statistical analysis of the reasearch data, interpretation of the results, redaction of the scientific article and forward of the scientific article. Souza GS has participated in the conception, planning, search and statistical analysis of the reasearch data, interpretation of the results, redaction of the scientific article and forward of the scientific article. Pereira M has participated in the conception, planning, search and statistical analysis of the reasearch data, interpretation of the results, redaction of the scientific article and forward of the scientific article. Carvalho LPF has participated in the conception, planning, interpretation of the results and redaction of the scientific article.

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