



SELF-REPORT ON THE HEALTH OF PATIENTS WITH TUBERCULOSIS AND DIABETES: CONTRIBUTION TO THE INTEGRATED MANAGEMENT OF COMORBIDITIES

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ABSTRACT

Objective: to analyze the self-report of the health of patients with tuberculosis and diabetes *mellitus*, through the search for care, identification of symptoms and diagnostic tests performed by them, in order to contribute to the integrated management of comorbidities. **Methods:** quantitative, analytical study, carried out in a municipality of Minas Gerais, Brazil. Data were collected through telephone contact with people with diabetes, already diagnosed, through 10 family health teams in the municipality; and people with tuberculosis, under treatment, identified in the Notifiable Diseases Information System. **Results:** 411 patients with diabetes were contacted, with 159 respondents, and among the 72 patients with tuberculosis, 16 answered the phone calls. Through self-report, 34% of patients with concomitant diabetes and cough were identified, most of them women, 72%; Among patients with tuberculosis, 37% had fasting blood glucose in the last three months, 12% had self-reported diabetes. **Final considerations:** the results showed weaknesses in the care provided in health services related to the integrated management of tuberculosis and diabetes. Knowing the relationship between these diseases is necessary in order to contribute to facing them as a public health problem. Nursing plays an important role in the propagation of knowledge and actions that envision the integrated management of tuberculosis and diabetes in the search for the specificity of care.

Keywords: Tuberculosis. Diabetes mellitus. Primary health care. Nursing care. Phone interview.

INTRODUCTION

Ineffective glycemic control in people with diabetes *mellitus* (DM) considerably increases the risk of contracting tuberculosis (TB) and is associated with adverse outcomes during treatment^(1,2), which may extend beyond the six months recommended by the National Tuberculosis Control Program (NTCP) in Brazil⁽³⁾. On the other hand, drug therapy for TB can induce glucose intolerance or worsen glycemic control in people with DM⁽⁴⁾.

According to the World Diabetes Foundation, in low-income countries, including Brazil, the increase in the number of patients with DM causes the simultaneous occurrence of TB-DM comorbidities to increase considerably⁽⁵⁾. This, in turn, would hamper the

World Health Organization (WHO) goal of reducing the global incidence of TB by 90%, or less than 10 cases per 100,000 inhabitants, by 2035, and could impede the world's long-term ambition, to eliminate TB as a public health problem⁽⁶⁾.

A recent systematic review and meta-analysis study estimated the global prevalence of DM among TB patients in databases and concluded that 15.3% had associated comorbidities. In South and Central America, this prevalence was lower (7.7%), but still significant⁽²⁾. These findings corroborate the study carried out in Brazil, in which DM-TB comorbidity was identified in 7.2% of the cases studied⁽⁷⁾.

The implementation of integrated management between DM and TB has been a

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recommendation of the World Health Organization since 2011⁽⁸⁾, and aims to improve care for patients with comorbidities, control the diseases and optimize treatments for both diseases. Studies show that screening for DM in TB patients should be considered mainly in low-income countries, and should be done in an integrated manner, sensitive to cultural importance and social determinants. In addition to addressing patients' needs holistically, integration would enable treatment programs to be leveraged to jointly deal with chronic and communicable diseases^(2,9).

In this context, nursing has important attributions in optimizing the institution of integrated management between TB and DM, as a public policy, as it is premised on the provision of care in a holistic way. The provision of inter-programmatic and multidisciplinary actions among comorbidities is influenced by the training of health professionals, commonly mediated by nurses⁽¹⁰⁾.

In Brazil, coping with this problem is still incipient, with few studies on the subject, with a lack of knowledge on the part of health professionals about the integrated management of DM-TB, as well as by patients about the possibility and impacts of this association⁽¹¹⁾. Understanding the health situation of patients with TB and DM in the health services to which they are inserted is essential to support the implementation of integrated management care among comorbidities, especially in Primary Health Care (PHC), the preferred entry point of the users in the Unified Health System (SUS)⁽¹²⁾.

Thus, the objective of the study was to analyze the self-report of the health of patients with tuberculosis and diabetes *mellitus*, through the search for care, identification of symptoms and diagnostic tests performed by them, aiming to contribute to the integrated management of comorbidities.

METHODS

This is a quantitative, analytical study through documental research. The study included the population with TB and DM registered in the Family Health Strategy (FHS) Teams in a metropolitan region of the state of Minas Gerais - MG, Brazil.

The municipality under study had an estimated population of 338,197 inhabitants in 2020 and a history of significant social vulnerability. In 2018, according to the Notifiable Diseases Information System (SINAN), the municipality reported 84 cases of TB, of which 8% were associated with DM and 35.7% were ignored or blank⁽¹³⁾.

Sample calculation for selection of Health Units and participants

A total of 55 FHS teams work in primary health care, representing around 60% of the coverage of the Family Health Program (FHP). The other portion is referred for secondary care in Basic Reference Units (BRU). Thus, it would be unfeasible to draw a diagnostic survey of the entire population. Therefore, inferential statistics were used with selection by conglomerate of the units that make up the 55 teams, using a universal statistic of 20% on the total sample of this population. This analysis pointed out that 10 teams would be needed to make the sample representative. In this way, a convenience sample was carried out, with the teams listed and numbered sequentially from 01 to 55 and then an electronic draw was made.

According to the Primary Care Information System (PCIS) in 2019, the municipality had 6631 patients with DM, which would also make it impossible screening the entire population. The sample size calculation of patients with DM was performed using the statistical program Statcalc from Epiinfo, version 7.2.3.1, using the following parameters: population of people with DM in the city; estimated frequency of TB incidence among the population with DM in Brazil⁽⁷⁾ and worldwide⁽¹⁾: 15%; CI: 5%; leading to a population cut of between 190 and 232 patients with DM. However, we chose to select a larger number of patients in view of the risk of considerable loss of participants.

Thus, as an inclusion criterion, 411 patients with DM, already diagnosed, over 18 years of age were recruited. For TB patients, all active and incident cases were selected and registered in SINAN in 2019, totaling 72 notified patients. Patients with DM and TB younger than 18

years of age and patients with TB who had the extrapulmonary form or latent TB were excluded from the study.

Data collection and processing

In order to obtain the information, a telephone interview was carried out with the patients identified and being followed up by the FHS, participants in the study for a period of three months. Telephone contacts were guided by a script prepared by the authors. Patients with DM were asked about the presence of cough lasting two weeks or more in the last three months; presence of other symptoms such as weight loss, low fever or adynamia; whether there was a demand for care at the health services and whether these symptoms were reported to the health professionals; if so, whether tests were requested (sputum smear and chest X-ray); and if the professional suggested the diagnostic hypothesis of TB for the patient.

Patients with TB were asked about: performing a fasting blood glucose test in the last three months; complaints of weight loss, dry mouth and others; search for care in health services and reported these symptoms to the health professionals; if so, if there was a request for fasting blood glucose, oral glucose intolerance test or glycated hemoglobin; whether the professional suggested the diagnostic hypothesis of DM for the patient.

For access to information sources, identification and access to patients' contacts, electronic and manual medical records were consulted, used in the selected FHS units, for patients with DM, due to the absence of an information system that contained these data; and the Notifiable Diseases Information System (SINAN) for the investigation of TB patients, which records all TB patients undergoing treatment, stratified by municipality also was consulted.

An important indicator of health status is known as Health Self-Report (HSR), which has been a tool widely used in population surveys on health and well-being, in addition to being a relevant predictor of the use of health services⁽¹⁴⁾. A relevant technique for monitoring HSR is the telephone interview, especially after

2006, when the Surveillance System for Risk and Protection Factors for Chronic Diseases by Telephone Survey (Vigitel) was established⁽¹⁵⁾.

The alternative for the self-reported report of the patients, by telephone, occurred due to the lack of information related to the symptoms of DM and TB, recorded in the manual or electronic medical records available. The use of telephone intervention is considered an alternative technology to the conventional one; it has low cost, easy access, and its use has shown positive results in relation to the improvement of the health conditions of users with DM⁽¹⁶⁾.

The calls were recorded after reading and consenting to the Informed Consent Term (ICT) authorized by the patient at the beginning of the call. The telephone contacts of users with DM and TB were acquired in the health units to which they were registered. The objective of the study was presented and the questions were asked briefly and objectively. The calls lasted, on mean, four minutes. The interviewers tried to be calm and speak slowly. If the participants so wished, a new interview time was scheduled. Prior training was carried out among the interviewers, carried out by the main researcher and two nursing undergraduate scientific initiation grants, to standardize the speeches, reduce errors and provide effective communication. In addition, a pilot study was carried out with the study subjects, and these data were not analyzed. Five telephone contact attempts were stipulated for each patient, at different times. When the call was not completed, the patient was considered unavailable.

Data collection took place between January and March 2020, when the COVID-19 pandemic began, which implied the need for social distancing and ended up restricting patients' access to and demand for health services for situations of emergency health status in general.

To verify the distribution of the bilateral screening of the parameters/variables of DM and TB, pointed out in the survey, the absolute and relative frequencies were described, by sampling and by sex.

Data were entered into spreadsheets using the Microsoft Office Excel® software, version

2010, under independent double typing, and then submitted to descriptive statistical analysis using the Epi-info® software (Epi-info version 3.5.2 of 2010). The variables were categorized into yes and no.

The research followed the ethical principles established in Resolution 466/2012 of the National Health Council, being approved by the Research Ethics Committee of the Federal University of Minas Gerais, under opinion 2,974,855, and by Plataforma Brasil, under the Presentation Certificate for Ethical Assessment, CAAE: 97788718.2.0000.5149.

RESULTS

Telephone calls were made to 411 patients with DM assisted by the 10 FHS teams in the city, of which 159 (38.6%) responded to the interview. Table 1 presents the patients with DM, separated by sex. Of the total, 26 (47.2%) reported symptoms such as weight loss, fever and adynamia, and 55 (34.5%) reported coughing lasting two weeks or more in the last three months.

Table 1. Screening for tuberculosis in patients diagnosed with diabetes *mellitus*, by sex, in the city of Minas Gerais, Brazil, in 2019.

	Sampling		Men		Women	
	N	%	N	%	n	%
Blood glucose screening in the last 3 months (n = 16)	55	34,6	15	27,3	40	
Symptoms (weight gain, very dry mouth, very hungry or urinating a lot) (n = 16)	26	47,3	4	15,4	22	84,6
Report on possible diabetes mellitus (n = 16)	27	50	4	14,8	23	85,2
Self-reported diagnosis of diabetes mellitus (n = 16)	14	34,2	3	21,4	11	78,5
	10	71,4	3	30	7	70
	4	28,6	-	-	4	100
	3	7,32	-	-	3	100

Source: Data extracted from the study.

It was identified that half of the patients with cough symptoms sought the health service and reported it to the physician or nurses and only 14/41 (34.15%) underwent diagnostic tests for TB (Chest X-ray or sputum smear).

The majority of respondents with DM with a report of cough in the last three months, 40/55 (72%) were women, as they were also the majority who sought care and reported to the health professional, 23/27 (85%). It should be noted that the use of the Rapid Molecular Test

(RMT) was not questioned as an exam to be requested by the professional, as it was already known that this exam was not being carried out, due to operational problems of the local health department, despite being an important exam of diagnosis.

Table 2 presents the TB patients, separated by sex, questioned about fasting blood glucose screening and other variables selected in the study.

Table 2. Screening for diabetes *mellitus* in patients diagnosed with tuberculosis by sex, in the municipality of Minas Gerais, Brazil, in 2019.

Amostragem	Homens		Mulheres			
	N	%	n	%	n	%
Blood glucose screening in the last 3 months (n = 16)	6	37,5	4	40	2	33,33
Symptoms (weight gain, very dry mouth, very hungry or urinating a lot) (n = 16)	3	18,75	2	20	1	16,67
Report on possible diabetes mellitus (n = 16)	3	25	3	30	1	16,67
Self-reported diagnosis of diabetes mellitus (n = 16)	4	25	3	30	1	16,67

Source: Data extracted from the study.

There were 72 patients with TB reported in the municipality in 2019, 26/72 (36.11%) in the Deprived of Liberty Population (DLP) and not assessed. Another portion, 11/72 (15.5%) died or was transferred to another municipality. Thus, of the remaining 35 patients, 16 of them (45.7%) responded to calls and were enrolled in the study. The remaining 19 (44.3%) did not answer the calls. It is observed that 18.7% (3) had symptoms of diabetes, and that 25% (4) were already known to be diabetic. Another 25% (4) were suspected of having diabetes. Less than half of the TB patients seen at the consultations (6/16) 37.5% were screened for DM through fasting glucose testing.

DISCUSSION

After analyzing the survey on the self-perception of the health status of patients with DM and TB, the main results were identified as the low demand of symptomatic patients for health services, in addition to health professionals not requesting the necessary tests for screening bidirectional DM-TB, which is quite worrying. The implementation of a pilot model for bidirectional screening in Mexico proved to be feasible and was based on local clinical protocols with a focus on education, instructed mainly by nurses⁽¹⁷⁾. A similar study was used in another study, with favorable results for the quality of care that are not recorded in the medical records⁽¹⁸⁾.

The telephone interview, as a data collection technique, has low cost and ease of application of the questions. Furthermore, in recent years there has been an expansion of domestic and cell phones, allowing contact with the patient⁽¹⁶⁾. A major challenge faced in the use of this type of strategy was the loss of patients who did not respond to telephone calls, which was mainly due to the large number of non-existent telephones. It should be noted that there was no refusal to respond to interviews by users.

Ordinance 3263, of December 11, 2019, establishes the financial incentive of federal funding for the implementation and strengthening of actions for the registration of SUS users, within the scope of PHC. This is an action of the Previn Brasil Program, which will be calculated based on the information recorded

in the Health Information System for Primary Care (SISAB)⁽¹⁹⁾. With this, it is expected to optimize the quality and quantity of patient records in the PHC, facilitating their access by telephone.

The findings showed low demand by people with DM for care due to the presence of a cough lasting two weeks or more, in the last three months, especially among men. A study carried out in northeastern Brazil found that most adult men did not regularly visit PHC services, did not perform laboratory tests frequently and were unaware of the National Policy for Integral Attention to Men's Health. Among the main causes for this situation are the delay in being attended, the absence of symptoms, the fear of discovering a serious illness, and the lack of reception by health professionals. In addition, lack of time, incompatibility of schedules, impatience and shame of exposing themselves, were mentioned⁽²⁰⁾. Thus, it is necessary to pay attention to the specificities of this population group, in order to facilitate the overcoming of these obstacles and favor the monitoring of health status, especially when affected by diseases that require prolonged care, such as TB and DM.

In a similar way, there was a low request for TB diagnostic tests, for the population with DM who is presenting cough, showing that this symptom is often ignored by the health user and also by the health professional. This lack of knowledge about the association between TB and DM was reported in other studies^(11,21). In this context, it is worth mentioning the active search for respiratory symptoms, carried out in Primary Care, as part of the TB coping plan, being one of the indicators of disease control, which estimates the number of respiratory symptoms per year at 1% of the population. In other words, this would be the number of people who, at some point in the year, would have an indication to undergo sputum smear microscopy because they had a cough for more than three weeks⁽³⁾.

A study by the National Health Survey (NHS), carried out by the Brazilian Institute of Geography and Statistics (IBGE), in 2019, in partnership with the Ministry of Health, showed that 76.2% of the population (159.6 million) had consulted a physician in the last 12 months,

showing a considerable increase compared to 2013 (71.2%). Of these, the proportion was higher for women (82.3%) compared to men (69.4%)⁽¹⁹⁾. These are findings that give evidence of greater awareness of the population, especially women, for health care and the use of the health system.

As described, 25% of TB patients have self-reported DM, the majority being men. This number coincides with and even exceeds other prevalences of DM in TB patients, in national studies^(7,11,21). According to the laboratory results of the National Health Survey, carried out between 2014 and 2015, the prevalence of DM in the Brazilian adult population was 8.4%, being higher in women, the elderly and obese. The prevalence of self-reported DM for the Brazilian population aged 18 years or older was 6.2%⁽²²⁾.

The findings showed a low percentage of TB patients who underwent glucose testing in the last three months, contrary to the recommendations of the TB Control Manual, which recommends, during TB treatment, in people with established DM, special attention should be given to glycemic control⁽³⁾. Furthermore, rifampicin interacts with the levels of oral hypoglycemic agents, which can lead to decompensation of the DM condition^(2,5).

It is noteworthy that 18% of TB patients self-reported symptoms associated with DM and did not present the diagnosis, which may suggest that other TB patients may have concomitant DM, but were not investigated. Patients with classic symptoms of hyperglycemia, such as polyuria, polydipsia, polyphagia, and weight loss, should be submitted to random blood glucose measurements, regardless of fasting, with no need for confirmation by means of a second measurement, in case of random blood glucose ≥ 200 mg/dl⁽²²⁾. Fasting glucose is indicated as the first choice to detect cases of DM^(1,22,23), while glycosylated hemoglobin has the advantage of estimating the mean blood glucose concentration in the last 60 to 90 days, being a good parameter to monitor glycemic control^(5,22).

One of the most important aspects of successful TB treatment in DM patients is to sensitize the patient to obtain glycemic control as early as possible and maintain it throughout

the TB treatment, minimizing drug interactions or side effects.⁽⁴⁾ In this sense, nursing emerges as a profession that provides care aimed at glycemic control, encouraging self-care and adherence to patient treatments.

It is important to note that during the phone calls, all users who reported having symptoms of TB or DM were identified and counter-referred to the health unit enrolled in the FHS program for assessment of health professionals and possible case detection. Thus, this agreement between the research and the service favors the continuity of care for the SUS users.

The study had limitations, such as the impossibility of a self-reported survey in the population deprived of liberty, where an important part of TB cases is found in the municipality. In this sense, it is important to emphasize that prison spaces are fast conductors of the spread of respiratory diseases and symptoms such as cough and fever can easily be confused with COVID-19, and not be properly investigated. A study by Sanchez and collaborators pointed to the advance of COVID-19 in the prison population, with the profile of these patients, mostly men (70%) between 18 and 39 years old (50% of deaths from the virus), with comorbidities such as diabetes, AIDS and TB⁽²⁴⁾.

Another limitation refers to the possibility of user memory bias regarding the appearance and identification of TB and DM symptoms. To control this occurrence, clear questions to users and description of symptoms and exams were used, when the interviewee did not understand. In addition, other comorbidities, such as cardiovascular and pulmonary diseases, were not asked to study participants during the interviews, which may be confounding variables for the outcome of the study. However, they are limitations that do not disqualify the study, which offers important contributions to advance in the strategies of coping with the problem.

Since associated DM and TB increase the risk and impair the treatment of both comorbidities, it is essential that integrated management occurs through bidirectional screening, screening TB in patients with DM and DM in patients with TB^(1,8), which is not yet observed in the professional practice of nurses, and it is hoped, with this study, to contribute to its incorporation⁽²⁵⁾.

FINAL CONSIDERATIONS

The results of this study showed important weaknesses in the care provided at the BHU related to the integrated management of DM and TB, evidenced by the low request for screening tests and diagnosis of diabetes or tuberculosis due to complaints of symptoms of patients with any of these diseases, already diagnosed. These are findings that signal the urgency of training health professionals about this association.

It should be noted that both DM and TB are conditions that require prolonged treatment and care and require patient commitment, which imposes the need to create a bond that contributes to his adherence, which cannot be neglected by professionals. In this sense, nursing emerges as an inter-programmatic TB-DM and interdisciplinary link.

The use of the telephone interview proved to be a viable resource to obtain information on the population's health status in a fast, accessible and continuous way, being an option even to search for missing information in the medical records. However, it has limitations, such as incorrect user registrations, which can be mitigated by a more efficient information system, such as SISAB.

The integrated management of TB and DM needs to be incorporated as a public policy, with coordinated actions between the Ministry of Health, health services, professionals and patients. This study provides information that can contribute to facing this problem. It is suggested that further studies be carried out in other regions, considering the specificities of each location and its population.

AUTORRELATO DA SAÚDE DE PACIENTES COM TUBERCULOSE E DIABETES: CONTRIBUIÇÃO AO MANEJO INTEGRADO DAS COMORBIDADES

RESUMO

Objetivo: analisar o autorrelato da saúde de pacientes com tuberculose e com diabetes *mellitus*, por meio da procura por atendimento, identificação de sintomas e realização de exames diagnósticos pelos mesmos, visando contribuir com o manejo integrado das comorbidades. **Métodos:** estudo quantitativo, analítico, ocorrido em município de Minas Gerais, Brasil. Os dados foram coletados por meio de contato telefônico a pessoas com diabetes, já diagnosticadas, por meio de 10 equipes de saúde da família do município; e a pessoas com tuberculose, em tratamento, identificadas no Sistema de Informação de Agravos de Notificação. **Resultados:** Foram contactados 411 pacientes com diabetes, com 159 respondentes, e entre os 72 pacientes com tuberculose, 16 atenderam às ligações telefônicas. Por meio do autorrelato foram identificados 34% de pacientes com diabetes e tosse concomitantes, maioria mulheres, 72%; Entre os pacientes com tuberculose, 37% realizaram glicemia de jejum nos três últimos meses, 12% possuíam diabetes autodeclarada. **Considerações finais:** os resultados mostraram fragilidades no atendimento prestado nos serviços de saúde relacionadas com o manejo integrado tuberculose-diabetes. Conhecer a relação entre essas doenças faz-se necessário a fim de contribuir para o enfrentamento das mesmas como problema de saúde pública. A enfermagem tem função importante na propagação do conhecimento e de ações que vislumbrem o manejo integrado da tuberculose e diabetes na busca da especificidade do cuidado.

Palavras-chave: Tuberculose. Diabetes *mellitus*. Atenção primária à saúde. Cuidados de Enfermagem. Entrevista por telefone.

AUTOINFORME DE LA SALUD DE PACIENTES CON TUBERCULOSIS Y DIABETES: CONTRIBUCIÓN AL MANEJO INTEGRADO DE LAS COMORBILIDADES

RESUMEN

Objetivo: analizar el autoinforme de la salud de pacientes con tuberculosis y diabetes *mellitus*, con base en la demanda por atención, identificación de síntomas y realización de exámenes diagnósticos, con finalidad de contribuir para el manejo integrado de las comorbilidades. **Métodos:** estudio cuantitativo y analítico ocurrido en municipio de Minas Gerais, Brasil. Los datos fueron recolectados de personas con diabetes ya diagnosticadas, vía contacto telefónico por diez equipos del programa Salud de la Familia del municipio, y de pacientes con tuberculosis en tratamiento, identificados en el Sistema de Información de Agravos de Notificación. **Resultados:** fueron contactados 411 pacientes con diabetes, con devolución de 159 encuestados, y 72 pacientes con tuberculosis, con devolución de 16. El autoinforme permitió identificar que 34% de pacientes presentaban diabetes y tos

concomitantes y que 72% eran mujeres, mientras que de los pacientes con tuberculosis 37% realizaron glucemia de ayuno en los tres últimos meses y 12% poseían diabetes autodeclarada. **Consideraciones finales:** los resultados mostraron fragilidades en la atención prestada en los servicios de salud relacionados con el manejo integrado tuberculosis-diabetes. Es necesario conocer la relación entre esas enfermedades si se pretende contribuir al enfrentamiento de esas enfermedades como problema de salud pública. La enfermería tiene la importante función de propagar el conocimiento y las acciones que tienen por objetivo el manejo integrado de la tuberculosis y diabetes en la búsqueda de la especificidad del cuidado.

Palabras clave: Tuberculosis. Diabetes mellitus. Atención primaria de salud. Atención de Enfermería. Entrevista por teléfono.

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