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RESEARCH ARTICLE

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ASPECTS OF TUBERCULOSIS (TB) IN BRAZIL

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ABSTRACT

This article aims to update the literature on the construction of the history of the epidemiological surveillance service in the country. Since 1886, epidemiological surveillance has been standardized through strategies for the development of patient counting systems. In 1903, the Health Service was created affiliated with the Military Police in São Paulo. Vertically; the vaccination campaign against the Yellow Fever epidemic was carried out. This measure provoked a popular uprising. In the face of adverse health events, endemic control guidelines were established. Epidemiology is an important tool used in the health service to date. These findings are positive or negative consequences, given the plurality in the social context. These actions aim to improve the health of the population. Effective implementation measures in health services remain a public health challenge regarding the abandonment of patients in the treatment of tuberculosis.

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INTRODUCTION

Brief History of the Epidemiological Surveillance Service (ES)

In the seventeenth century, in Venice occurred the first notification of bubonic plague, this epidemic plagued the population. The Republic proposed the regular recording of information on people's health. The newly arrived immigrants made a great state. São Paulo is the most populous in the country, due to a process of industrialization and urbanization. From 1886, the Health Service originated. This organized the counting of patients who had communicable diseases. The totalization of patients in the State had repercussions on the development of norms for the fight against epidemics. With the creation of the Emilio Ribas Institute in São Paulo; there was an expansion of the surveillance system for infectious diseases after 1903. The first world war in 1939, compulsory notification of the disease was created in England. *A posteriori*, the initiative of the Center for Disease Prevention (CDC) in the United States of America (USA) recorded the polio epidemic in 1955. At the end of the 19th century, also in Brazil, the surveillance service was described as an application of epidemiology; this is an instrument in public health to this day.

In 1965, the Epidemiological Surveillance Unit emerged from the Division of Communicable Diseases at the World Health Organization (WHO) in the eradication of the smallpox epidemic. The Pan American Health Organization (PAHO) developed the first measures of factors conditioning endemic to health surveillance services in 1970. After a decade, in 1980, who establishes emerging and reemerging infectious diseases worldwide as a priority. The integration of information systems for the detection of suspected cases of the disease begins. TB is an infectious disease with a degree of upper airway contagion among bacilliferous patients with *Mycobacterium Tuberculosis*. The latency period between exposure and disease was observed with a determinant of the immune system in the individual. Prevalence is performed through endemic parameters in the occurrence of the population and time. The public health service has the responsibility together with the Surveillance Service to detect risk factors and adverse health conditions. Thus, it is prioritized the collection of information about morbidity and data analysis to carry out health interventions for the population. Routine actions in the Epidemiological Service established the occurrence of an adverse health event. Soon after, confirmation of the medical diagnosis introducing the patient information into the compulsory notification information base.

The collection of information about endemic diseases in the health service is analyzed and passed on to the State Surveillance System. This database was linked to the Ministry of Health. Thus, the dissemination of information is carried out in the Epidemiological Bulletin. The development of strategies for disease prevention and control is promoted. With the broad aspect of health shows the vulnerability of the population to contract the most diverse endemic diseases. The behavior of the disease is effected through natural conditions or human immune response (CAMPOS ET AL., 2013). The SVE consists of: surveillance of infectious diseases, pharmacovigilance, environmental surveillance, surveillance of traumas and injuries, surveillance of chronic diseases and global surveillance for emerging and reemerging diseases (MS, 2009). The strategies for the development of surveillance systems are standardized, according to the characteristics of a health adverse event. Thus, the guidelines of the infectious disease control program were established. The evaluation of health surveillance systems comprise: relevance of the situation that originated the intervention, effectiveness, efficiency, accessibility, acceptability, humanization, equity, coverage, adequacy and functionality of responses made in actions in the public health service (AQUINO ET AL., 2011). The evaluation process bases actions aimed at improving the health of the population. The improvement of the health service was carried out directly or indirectly between managers and users. The strategies in health assessment permeate the phases: planning and implementation measures in the Unified Health System (SUS). The outcome in performing the health assessment is the results of an intervention. Immediate products and the effects produced in the face of intervention. To conduct a study on the history of the epidemiological surveillance service of tuberculosis and its evolution over time.

MATERIALS AND METHODS

In this study, a bibliographic survey was conducted in the following databases: Scielo, Pubmed, DATASUS, Epidemiological Surveillance Service, Health Department, Ministry of Health and Bireme. The key words: tuberculosis, health service, epidemiology were used. Through the information base in national and international countries affiliated to the Unified Library System (SBU) of the State University of Campinas - Faculty of Medical Sciences (UNICAMP/FCM).

RESULTS AND DISCUSSION

The findings show an overview of TB, which despite this endemic disease being 100% cured, still remains a public health problem in the world (LAWN E ZUMLA, 2011). Approximately 1.7 million deaths under the cause of tuberculosis (TB). Brazil ranks 15th among the 22 emerging countries. The most affected continents: Asia and Africa (WHO, 2012). In the 19th century, the population was down by 25% in the United Kingdom. Data similar to the number of deaths in wars (WHO, 2006). Over time, the urbanization of cities, disordered population growth, poverty and poverty favored the contagion of bacillus *Mycobacterium Tuberculosis*. In 1921, the main preventive measure was the discovery of the BCG vaccine by Robert Koch (PAHO, 2010). After World War II in 1945; tuberculostatic medication was introduced (WHO, 1999). Monitoring in the systematization of drug use: rifampicin, isoniazid, pyrazinamide and ethambutol

(RHZE) is offered free of charge in the public service in Brazil (MS, 1999). Currently, patients who abandon TB treatment are more likely to develop an advanced form of the disease called Multi Drug Resistant Tuberculosis (MDR-TB). Most cases are in China, with 25.6% (LING ET AL., 2008). Since the 20th century, TB/HIV comorbidity has contributed to the increase in the rate of deaths (PAHO, 2010). When the individual with HIV-infected TB decreases by 64 to 66%. There is a loss in defense control in the body (HARRIES ET AL., 2010). The detection of cases in TB/HIV comorbidity for the AIDS diagnostic test contributed to a decrease in mortality rates, 22%. In 2009, Africa and Brazil tested FOR HIV in TB patients in 40% and 26%, respectively (WHO, 2012). The detection of patients who have confirmation of the diagnosis of TB among patients with symptoms of the disease. The sputum smear microscopy sensitivity test was 90% (MS, 2009). For 2005, the early detection of patients and the lack of accuracy in diagnostic tests corroborated in 70% new cases (PAHO, 2010). Also in the same year, 85% of patients presented cure as a result of treatment. There was a 50% decrease in deaths compared to 1990 (WHO, 2011).

Epidemiology of TB in Brazil

Since the 19th century, dispensaries have been organized to provide health education and medical and social care to the sick; in order to detect new cases of TB (ANTUNES, WALDMAN and MORAES, 2000). The main epidemiological indicator was the detection of new cases in a population in a certain period of time called: incidence coefficient. The accuracy of this estimate represents the quality of the health service (BRAGA, 2007). For the year 2010, new cases of the disease were 37.7 per 100,000 inhabitants. While in 2001 it was 43 per 100000 inhabitants in Brazil (DATASUS, 2013). During the years 2001 to 2010, the incidence rate decreased by 1.3%. TB has higher rates of brown or black males. In the age group from 35 to 64 years of age, with schooling below eight years of formal studies. Over time, patients institutionalized in prisons had an increase in the prevalence rate of TB. The prison population is susceptible to infectious diseases due to the exchange of homosexual partners, low immunity and exchange of syringes and needles in the use of injectable drugs (FERREIRA JUNIOR ET AL., 2013). There are few findings in the literature on the TB information system in the hospitalization of elderly patients institutionalized in nursing homes, which represent 5% of the entire TB-infected population (NOGUEIRA, 2001). The increased prevalence of Multiple Drug Resistant Strains (MDR) resulting, among other factors, from the destructuring of health programs (HOEPPNER And MARCINIUK, 2000), and the impoverishment of many nations (WHO, 2002). One aspect observed for the crecence of TB patients was between 2001 and 2010. Cases of multidrug-resistant tuberculosis (MDRR-TB/SS) had an increase in the incidence rate of 0.3 vs 1.6 in the country (OLIVEIRA ET AL., 2013). In the course of the 20th century, the improvement of living conditions in industrialized countries and the introduction, from the 1940s onwards, of highly effective chemotherapy, together with the development of technology for the operationalization of public health programs (STEAD, 1997). According to Menezes et al., (2006) state that the Northeast region and the State of Ceará present conditions conducive to the persistence of disseminated TB, due to the large depleted contingents. The incidence of pulmonary tuberculosis found in the municipality of Umirim was 5.8 per 10,000 inhabitants.

In southern Brazil, a study was conducted in the city of Pelotas-RS, the reported incidence of TB was 72.4 per 100,000 inhabitants (MENEZES et al., 1998). A study conducted in the city of Campinas-SP, in 2006, the incidence coefficient was 26.1 cases per 100,000 inhabitants. Lethality had a higher percentage in the recipient cases in females with 33.3% (CASELLATO, 2009). It is important to consider that the information from the incidence coefficients is limited, due to factors, such as: quality and extent of case search activities, bacteriological examinations, definition of "new case", as well as those patients "not notified" because of error or spontaneous cure (STYBLO, 1991). For the year 1994, the State of São Paulo had exclusive beds for the care of TB patients. This scenario was progressively changed, and they were changing their profile to general beds, with the implementation of the decentralization proposal in the Unified Health System (SUS) (Nogueira, 2001).

Aspects of TB Mortality: According to the World Health Organization (WHO), in 2009 the countries of mainland Asia and Africa had TB deaths of 11% and 23%, respectively. In Brazil, 88% of patients were detected by pct in 2010. Among these, the mortality rate was 2.4% (DATASUS, 2013).

The main factors that contribute to a high mortality rate are:

TB/HIV comorbidity, treatment abandonment and alcoholism. In addition, aspects of social inequality, accelerated urbanization, migratory processes, management deficiency in the Unified Health System (SUS) (MS, 2010). A study on mortality in the State of Espírito Santo from 1985 to 2004 showed a decrease of 5.6 vs. 3.19 deaths per 100,000 inhabitants (MOREIRA ET AL., 2008). Approximately 30% of the patients did not undergo hiv testing. The rate of positivity on the TB/HIV test was almost 10% (MS, 2009).

Generally, the investigation for underlying TB death is used the International Classification of Diseases (ICD-10) as:

respiratory tuberculosis and other tuberculosis (ICD-10, 2000). However, the lack of quality in data consistency, duplicates, lack of completeness in FIN interferes with the epidemiological analysis of information (SANTOS, 2004). Also, an important indicator is the detection of patients in the health service. The impact on this variable, a new case, occurs in a 5.5% decrease in the total number of patients in the 2007 cohort (BIERRENBACH, 2010). Another study conducted in the State of Santa Catarina, tb detection was 85.9% in the pulmonary form. Among these, 3.4% were deaths (BIERRENBACH ET AL., 2007). The PCT recommends standardized pharmacotherapeutic treatment for 6 months. Patients diagnosed with TB extrapulmonary form have a higher proportion in cases of TB/HIV comorbidity, mainly in the lymphatic route (MS, 2006). The indicators in Primary Health Care (PHC) show that hospitalization rates for respiratory diseases decreased from 257.5% to 7.4% between 2004 and 2009 (DATASUS, 2009).

TB/HIV comorbidity: One of the factors for the high incidence of the disease is HIV infection. Being the most important risk factor to convert latent tuberculosis into active tuberculosis (HIGLLIGHTS, 2001). Patients with TB and HIV comorbidity develop more severe forms of TB (COLLINS ET AL., 2002). The highest proportion of reported worldwide cases: in the South African region. On the other hand, the

United States of America has 26% of co-infected cases aged 15 to 49 years (COBERTT ET AL., 2003). Even in situations of inequality and poverty, patients achieve effective treatment in TB/HIV comorbidity. For the year 2000 the "Stop TB" Declaration was held in Amsterdam. An effective possibility of access in the public health service was proposed. Thus, the health of the population is maintained and the improvement of the quality of life of TB patients is expanded (COLOMBANI ET AL., 2004). Since 1993, the AIDS pandemic has worsened worldwide. Late diagnosis of TB favors HIV co-infection. The detection of new cases, infection control and standardized treatment is a preventive measure to combat TB/HIV (RAVIGLIONE ET AL., 2003). In individuals who have HIV co-infection, pharmacotherapeutic treatment with isoniazide performed at 6 months decreases the risk of TB by 33% (MS, 2009). A study conducted on the family focus and guidance to the community on TB control in the municipality of Bayeux, PB, in 2008, it was verified that 34.5% of health professionals request ed the user an evaluation of the service and 67.9% of the incident cases of TB were detected through contact at home (MARCOLINO ET AL., 2009). In due course, tb death is an event in the discovery of other problems in family health. The focus of guidance in the community helps control the disease.

Tuberculosis Control Program (PCT): For 1975, the Tuberculosis Control Program (PCT) was created through the National Development Plan (WHO, 1999). Only in 2004, the National Program against TB was established in 315 emerging municipalities (MS, 2004). The main strategy of disease control comprises six aspects of action: detection of patients with confirmation of the diagnosis of bacilloscopy and sputum culture, systematization of treatment, use of standardized medication and implementation of health policies (DOTS, 2008). After the implementation of the PCT, the coverage in the health service was 75% (MH, 2010). At the levels in Primary Care (PA), the Family Health Strategy (FHS) was established in partnership with the Unified Health Service (SUS). Thus, the user was allowed an expanded access in the service of: diagnosis, treatment for tb patients and detection in a situation of risk (CAMPOS ET AL., 2013). Integral prevention measures in tb treatment reduce expenditures on hospital admissions. (STOP-TB, 2009). In view of experiences in the area of public health, in other countries, they show us that even in adverse socioeconomic conditions, a well-structured control program can modify a scenario similar to that found in Brazil (SELIG ET AL., 2004). However, the highest public expenditures on treatment for tuberculosis patients are curative and non-preventive measures (ALMEIDA, 2001).

A study conducted in the city of Recife reveals that the incidence rate was 100 cases per 100,000 inhabitants (ALBUQUERQUE ET AL., 2007). Epidemiological analyses are performed through the verification of medical records in the identification of TB deaths. *A posteriori* the check in the information system is part of the routine in the health service.

An aggravating factor is the abandonment of patients in the treatment of TB. The prolonged period of treatment of the disease, with 6 months duration, when symptoms are attenuated, in the first months, facilitates patients not to complete treatment, and some cases evolve to death (WALLACE, 2003). Most deaths are in the category of tb treatment abandonment. According to Oliveira et al., (2005) the percentage of treatments with discharge due to

abandonment in the city of Campinas-SP was 11.2%. Thus, it perpetuates the transmission of the disease and has higher lethality coefficients. To prevent patients from abandoning TB treatment, who recommends medical diagnosis of "suspicious" cases, effectively in sputum smear sputum and sputum culture tests, free and sufficient drugs for all patients, and treatment supervision in basic health units.

Compulsory Notification Disease System

"Information creates actions" (CVE, 2013).

For the year 1998, the cases confirmed by the sputum smear microscopy and sputum culture test are recorded in the National Information System for Compulsory Diseases (SINAN) (CVE, 2013). Since 2007, the following variables were inserted in the Compulsory Notification Form (FIN): institutionalization, treatment supervision and contact. The completeness of the information was of patients with TB reported, especially in cases of MDR-TB (OLIVEIRA, BARTHLOMAY AND BARREIRA, 2013). For the analysis of epidemiological information it is necessary to perform an integration between the data systems: Hospital Admission System (SIH), Mortality System (SIM), and SINAN affiliated to the Ministry of Health by DataSUS to correct possible duplication of patients and avoid the homonym generated by the information system. (PCT, 2002). In the country, the diversity of the population Epidemiological Surveillance in the Northern Region. Above all, in indigenous areas it shows the magnitude of the disease. (BRAGA, 2007). In the period from 2004 to 2006, the southeast region showed the worst rate of completeness in the information bank, regarding the follow-up of TB patients (MALHAO ET AL., 2010).

Municipalities are responsible for detecting cases, incoming notifications, monitoring treatment until patients leave the information system. The Epidemiological Surveillance Service (SVE) has quality indicators in the detection of cases, such as specificity and sensitivity tests. The quality of information is important for patient follow-up, analysis of risk factors and morbidity burden. A study conducted from 2000 to 2004 reported that 26.3% of the information contained in the Compulsory Notification System (SINAN) had data duplication. 22.7% between 2005 and 2007 (BIERRENBACH ET AL., 2010). In 2001 and 2003, the municipalities that did not register patient closure results were 9.9% and 35% (BRAGA, 2007). The lack of completeness of information in SINAN interferes with tb incidence rates. For the year 2007, patients who had as a result of treatment transfer of health units was 38.2% (BIERRENBACH ET AL., 2010). A study on the evaluation of the completeness of the Tuberculosis Notifiable Diseases Information System, Brazil, 2001 – 2006 proposes strategies for monitoring and analyzing information through the training of health professionals, laboratories, technicians, drug dispensing units and health units (MALHÃO, 2010). As of 2007, the State Department of Health replaced the EPI-INFO DOS version database for the TBWEB Program. The "old" database presented numerous problems, such as: duplication of patient information, lack of communication of the various levels of epidemiological surveillance, lack of certification of a single record for each patient and non-communication of patient transfer and hospitalization (CVE, 2007). The challenge for the effective development of Tuberculosis Control Programs lies in areas of high prevalence of the disease in the country. Risk factors

should be invested in health education to prevent the reactivation of the disease and offer the patient an increase in quality of life.

Conclusions

TB is a long-standing disease, which allows health professionals to observe the outcome (death or cure) through biological factors and the conditioning factors of the natural history of the disease. Thus, we seek to know the aspects related to TB/HIV comorbidity, which is a challenge for public health, due to the *deficit* in the immune system of TB patients. These are more susceptible to HIV infection. The intervention in health levels: primary, secondary and tertiary are delimited by the evolution of the disease. Tuberculosis has 100% cure.

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