Prevalence of tuberculosis mortality in the mexican state of Veracruz during 2010-2017

Review Article

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SUMMARY

Pulmonary tuberculosis is a global health problem, especially in the Asian continent; in America, Mexico is one of the countries with the highest prevalence; the state of Veracruz, according to statistics published in 2017, is the state of the republic with the highest number of new cases of pulmonary tuberculosis per year and the second state with the highest number of deaths due to pulmonary tuberculosis per year; it is evident that these estimates ensure the need to carry out epidemiological studies to determine the sociodemographic and health factors that could determine the high prevalence; in the same way, it is necessary to take into account this information for the realization of awareness campaigns and the development of preventive models that reduce the prevalence of pulmonary tuberculosis in the state of Veracruz.

Keywords: Pulmonary tuberculosis, Veracruz, mortality

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INTRODUCTION

Pulmonary tuberculosis (PT) is an infection caused by Mycobacterium tuberculosis; it is a disease that has accompanied human race since its beginning and represents an important cause of morbidity and mortality throughout the world, especially in the lower socio-economic strata (Daniel, 2000). PT presents in two main forms: active disease and latent infection (Cardona, 2004). In the latter there is no clinical symptomatology but it is transmissible, because the immune response is able to contain the growth of the pathogen but not to eliminate it, so that the bacteria persists in the organism maintaining a low or no replicative activity (Lawn, 2011).

Mycobacterium tuberculosis is an obligate aerobic bacillus, with no mobility, very slow growth (Wolinsky, 1990). It does not produce a polysaccharide capsule, its cellular envelope is unusual; starting from the interior to the outside, it presents a cytoplasmic membrane covered by an extensive layer of peptidoglycans linked to polysaccharides, which are esterified with mycolic acids (60% of the weight of the cell wall), formed by free lipids, glycolipids and peptidoglucolipids (Cowman, 2012); This structure, which gives it a waxy appearance, also induces a high hydrophobicity, resistance to detergents, a good number of antibiotics, the usual staining and affinity for the acid-resistant acid stain of Ziehl Neelsen and Kinyoun (Bloom, 2002). On the other hand, the chains of peptides are antigens responsible, in an important way, for the stimulation of the cellular immune response of the host; in fact, they are used to prepare purified protein derivatives - PPD - used to evaluate exposure to M. tuberculosis (Schnappinger, 2016, Delgado, 2014).

For the year 2010, the World Health Organization estimated that there were 8.8 million new cases of PT, especially in the Asian continent that encompasses 59% of cases (WHO, 2014); in the American continent, the prevalence of PT is lower than in the rest of the world, with an estimated 3% of reported cases. In that year, 267,147 new cases were presented in the American Continent, although 56% of the cases occurred in Brazil (GTR, 2015).

In Mexico, in 2010 there were 19,445 cases of tuberculosis of any presentation, of which 81.5% were PT (60.8% in men and 39.2% in women), with a mortality of 15.6% (DGE, 2014); PT was associated with various pathologies in Mexico, mainly Diabetes Mellitus (23.5%) and Malnutrition (13.3%). The prevalence of PT in Mexico has had an oscillating behavior between 1990 and 2010 (Figure 1), although a 28.8% reduction can be seen in relation to its highest point, which occurred in 2007. The mortality rate in the same period was reduced from 8.0 to 2.2 cases per 100,000 inhabitants between the years 1990 and 2010, with a reduction of 73%.
In 2010, the prevalence of PT was higher in Baja California Norte (rate of 54.8 per 100,000 inhabitants), followed by the states of Guerrero, Tamaulipas and Sonora; the state of Veracruz ranked 8th in the country, with an annual rate of 27.8 per 100,000 inhabitants, above the national average (17.8 per 100,000 inhabitants). In that same year, the PT mortality rate in the state of Veracruz occupied the 5th national place, with 3.82 cases per 100,000 inhabitants, above the national average (2.2 per 100,000 inhabitants). Table 2 illustrates the behavior of incidence rates, mortality, cure and detections in the state of Veracruz, between the years 1990-2011.

The aforementioned information allows to have a general image of the behavior of PT in the world, in Mexico and in the state of Veracruz until before 2010; it is evident that although the prevalence of PT is low in the American continent, including Mexico, the incidence of PT in the state of Veracruz is one of the highest in the

![Figure 1. Prevalence of PT in Mexico between 1990 and 2010 (taken from Information Platform, SSA, 2011).](image1)

![Figure 2. Incidence, mortality and detection rates of PT in the state of Veracruz, Mexico, between 1990 and 2011 (taken from Information Platform, SSA, 2011).](image2)
country, which is why it is important to know its epidemiological behavior and its relation to the associated mortality rate.

**Morbimortality for PT in the state of Veracruz: period 2010-2017**

The Unique System for Epidemiological Surveillance of Mexico (SUIVE) estimated that currently there are about 15,000 new cases of PT each year, with about 2,000 deaths. These figures have remained constant during the last 7 years, with 15,457 new cases in 2011 and 16,913 new cases in 2016, according to the SUIVE and the General Directory of Epidemiology of the Ministry of Health in Mexico. It is worrisome that for the year 2016, Veracruz occupies the first place in the country in terms of number of new cases by PT, followed by Baja California, Nuevo Leon, Chiapas, Guerrero and Tamaulipas (figure 3).

![Figure 3. Number of new cases of PT in the year 2016.](image)

Own elaboration based on information of the SUIVE and DGE of the SSA 2017.

The number of new cases of PT in the state of Veracruz has had a fluctuating behavior in the period 2011-2016, as can be seen in Figure 4.
The main interest of this research is to know the epidemiological behavior of the mortality rate for PT in Mexico and especially the state of Veracruz during the period 2010-2017. According to statistics of the SUIVE 2017, the number of deaths by PT in Mexico has had a downward behavior between 2011 and 2016, going from 2,115 deaths in 2011 to 1,665 deaths in 2016, with a reduction of 21.28%. In that sense, Veracruz is the 2nd state of the Mexican Republic, surpassed only by Baja California Norte but closely followed by Nuevo León, Chiapas and Sonora. The mortality by PT in the state of Veracruz has remained relatively constant during the period 2011-2016, as can be seen in figure 5.
CONCLUSION

Pulmonary tuberculosis is an infectious disease frequently associated with sociodemographic factors prevalent in various parts of the world; although its frequency is especially high in the Asian continent, Mexico is one of the most prevalent American countries (Flores, 2004).

The state of Veracruz is, at the national level, the first place in number of new cases by PT and the second place in relation to the number of deaths per year, maintaining constant figures in the last 25 years; the statistic data found in the period 2010-2016 are relatively similar to those reported by epidemiological institutions before 2010, with a relative reduction in the number of deaths.

The reason why the state of Veracruz is highly prevalent in TP may be due to sociodemographic factors, especially the hot and humid climate that prevails in most of the state, as well as the low educational level and overcrowding with poor prevailing hygiene conditions throughout the state, mainly in rural communities.

The World Health Organization forged a goal for 2030 to reduce and, if possible, eradicate tuberculosis in the world (GTR, 2014); it is evident that in order to achieve this, the epidemiological behavior of the disease in the world and in each country must be known (Angulo, 2014). Mexico, being a country with a high incidence of tuberculosis, is a site that catches the attention of epidemiological researchers, especially in the states of Veracruz, Nuevo León, Sonora and Chiapas, which are currently leading statistical data in terms of number of new cases and number of deaths associated with pulmonary tuberculosis and relatable diseases.

Based on what is illustrated in this review, it is necessary to carry out adequate awareness campaigns among the population of Veracruz, as well as adequate and low-cost programs for the detection and treatment of new cases. There is a lot to work on, but epidemiological studies are an invaluable help to know where we are now and where we want to go.

REFERENCES


