

Incidence of Tuberculosis During The Covid 19 Pandemic in Guaranda in The Period 2019-2021

Francisco Xavier Poveda Paredes Msc¹, Carlos Andres Soliz Galeas², Genesis Irina Núñez López³

¹Email: ua.franciscopoveda@uniandes.edu.ec
0000-0002-2009-3502

²Email: ma.carlosasg20@uniandes.edu.ec
0000-0002-2084-7271

³Email: ma.genesisinl46@uniandes.edu.ec
0000-0002-2009-3502

ABSTRAC

Tuberculosis (TB) is a disease that has a high rate of mortality and patients who suffer from it suffer many complications. For this reason, great campaigns are carried out to promote and prevent this pathology. Over time, different protocols have been implemented to the collection, monitoring and treatment in order to eradicate this acid-resistant bacteria, with which the incidence of cases has been reduced; However, during this COVID19 pandemic, the recruitment of new TB patients has been affected due to the fact that several developing countries do not have the personnel or sufficient supplies to combat 2 pathologies in the most adequate way, in In this research, we write how the incidence of TB patients has been affected during the pandemic.

Keywords: Tuberculosis, incidence, Ecuador

1. Introduccion

The incidence of TB continues to be a public health problem despite the fact that it is a problem for which an exhaustive battle has been carried out through campaigns, protocols, etc; to achieve control of this acid-resistant bacterium (Paneque Ena & Rojas Linia, 2018).

It is also true that the campaigns have been of great help to control, treat and have a correct epidemiological record of this disease, but in the last 2 years this work has been affected to control this pathology due to the pandemic that hit our planet. (Antonio-Arques et al., 2021)

The COVID-19 pandemic has had a significant impact on healthcare worldwide, including the incidence of tuberculosis (TB). In Guaranda, Ecuador, a study conducted from 2019-2021 analyzed the incidence of TB during the pandemic. Although there is limited research on this topic, the study findings suggest that the pandemic may have contributed to a decrease in TB incidence due to changes in healthcare-seeking behaviors and the implementation of infection control measures. However, further research is needed to fully understand the impact of the pandemic on TB incidence. (Mayorga Aldaz, Olivo Torres, Tite Andi, & Morocho Quinchuela, 2022; Dávila Castillo, Benavides Salazar, & Escobar Gonzáles, 2022; Acurio Padilla, Gallegos Cobo, & Estrella López, 2022; Caicedo Rodríguez, Moina Veloz, & Tite Andi, 2022; Armijos Briones et al., 2022; Benites, Morales Cobos, & Sánchez Sánchez, 2022; Poveda Morales, Bonilla Veloz, & Freire Muñoz, 2022).

Despite the fact that the Organización Mundial de la Salud (WHO) tells us that continuous programs

to cope with the promotion and prevention of TB in the world continue to be implemented, but it has been hindered in developing countries such as Ecuador where the COVID pandemic is 19 where the rate of patient uptake and treatment are affected by shortages of supplies, medicines and with first-line medical staff focused on controlling the COVID19 pandemic; however new protocols have been implemented to control the spread of TB even the WHO states that the number of deaths in TB patients is expected to decrease by 90% and the incidence of a 80% (Avila Legal, 2021) (OPS, 2021)

In Ecuador there are few studies carried out about the appearance of new cases of patients with TB during the period 2020-2021 this was the main reason why this research was done, so we set ourselves the main objective of describing the incidence of patients with TB during the COVID19 pandemic in the city of Guaranda.

2. Materials and Methods

It has been conducted descriptive, longitudinal and retrospective observational study, type series of cases, due to the low frequency of the disease in which statistical data has been collected from zone 5 district 02D01 in 3 consecutive years the same that will serve us to evaluate what is the magnitude of the problem during these years.

We have carried out a review in the database of the Ministries of Public Health (MSP), as a method of data collection, with the respective authorization of the relevant authorities; This paper has a quantitative approach since our objective is to analyze the statistical data obtained, analyze them and conclude how the uptake of TB cases has been

affected during the pandemic.

3. Results

Tuberculosis is a disease caused by the bacillus of the genus *Mycobacterium*, called *Mycobacterium Tuberculosis*. The most important reservoir is healthy infected people, people who harbor the bacteria in their body without any symptoms or external signs that can identify it. Only when an infected healthy person develops a disease, it becomes a source of infection.

The most common transmission mechanism is the aerogenous pathway, especially the small aerosol droplets of 1-5 microns in diameter produced by the px during daily activities such as talking, laughing and especially coughing, these small droplets contain a number of bacilli (1 to 5 of each drop), these reach the alveoli, where they can develop freely. Local defenses enter the area and usually control the infection, if this does not occur primary tuberculosis will occur. Therese Karla. Nel Jason L. ., (2020)

Guest susceptible to illness

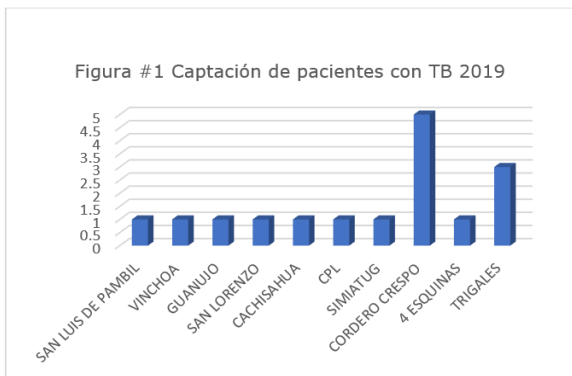
The susceptibility of the host is conditioned by the state of its nonspecific and specific resistance mechanisms (immunity). (Iacobino et al., 2020)

The most vulnerable age to get sick are children under 5 years and adults over 65-70 years. Between 6 and 14 years there is less predisposition to get sick.

It seems that men are somewhat more likely than women, but possibly this fact may be influenced by the social habits of each sex, it is also known that it is more susceptible in alcoholics and homeless people, HIV patients.

Once the tuberculosis infection is acquired, there are a series of circumstances that facilitate the development of the disease and are called risk factors, related to the state of host immunity. (Alves et al., 2020)

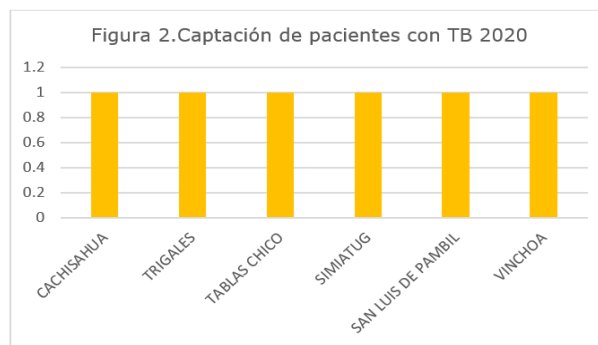
Plan for the prevention and control of tuberculosis in Ecuador



Source: MSP District 02D01 Prepared by C.Soliz, G. Núñez and F. Poveda. (2022)

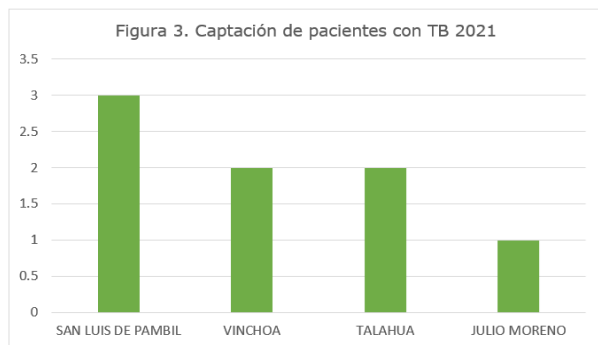
Figure 1. We can observe the new cases detected by each subcenter of the province bolivar in the year 2019 being the health center cordero crespo with 5 patients with TB the one that captured the most new cases in that year

The Ministry of Public Health (MSP) is constantly updated with new evidence and global strategies for prevention, diagnosis, treatment and control in the last edition 2018, in which molecular biology techniques (xpert/MTB/RIF) were introduced for the diagnosis and detection of tuberculosis resistance; It also has a national technical advisory committee on TB in which they discuss issues of case analysis, treatments and development of guidelines to follow for zonal health coordination. (TUBERCULOSIS GAZETTES – Ministry of Bless you Public, 2018)



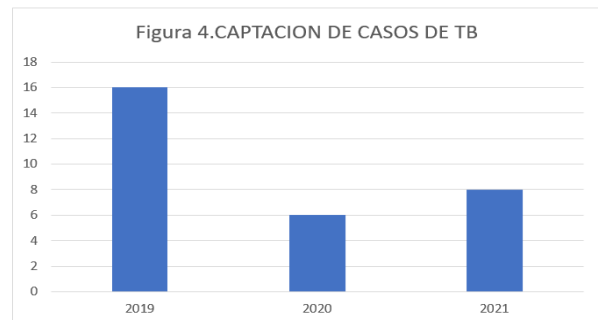
Source: MSP District 02D01 Prepared by C.Soliz, G. Núñez and F. Poveda. (2022)

Figure 2. We can observe the new cases detected by each subcenter of the province of Bolívar in 2020 having each of the 6 subcenters that presented a positive case of TB



Source: MSP District 02D01 Prepared by C.Soliz, G. Núñez and F. Poveda. (2022)

Figure 3. We can observe the new cases detected by each subcenter of the province bolivar in the year 2021 being the health center cordero crespo with 5 patients with TB the one that captured the most new cases in that year



Source: MSP District 02D01 Prepared by C.Soliz, G. Núñez and F. Poveda. (2022)

Figure 4. We can observe the new cases detected by each subcenter of the province of Bolívar in the years 2019, 2020, 2021, in which it gives us data that the highest number of cases captured in 2019 were when more cases were captured with 16 new patients with TB

4. Discussion

While the district studied continues to be one with relatively low incidence of tuberculosis compared to others, the trend in the last year has not been downward. According to the historical epidemiological curve, the lowest rate occurred in 2019, and from 2020 the trend has been upward. The findings show a decrease in the incidence of Tuberculosis between the periods 2019-2020 and a growth in 2020-2021. These results are important because they show advances in disease control. The data analyzed were robust, as there were no changes in definitions, diagnostic procedures and intensity of case search. It is considered that the increase in TB incidence rates in the city of Guaranda corresponds to a combination of factors such as the economic crisis, the relative decrease in the priority of TB in the overall health problems of the district, the reduction of some necessary resources, changes in the organization of control measures, deteriorating surveillance and awareness of the risk of infection and the general weakening of the quantity and quality of case tracing actions.

From another point of view, not agreeing that the reduction in the incidence of TB cases during the pandemic is a good thing because we consider that the decrease in cases is not due to optimal control of the disease, we deduce that this is because the uptake of cases has been reduced by various factors, one of the main ones of the COVID 19 pandemic which is prioritized for the country implementing most of the infrastructure, supplies, medication and medical personnel to control the pandemic and it could be said that the protocols for the recruitment of TB patients were neglected. The sites that most reduced their incidence of TB are those that correspond to non-densely populated areas, with less overcrowding and better performance of health programmatic processes. There is no doubt about the effect of poverty on the incidence of TB, since the socioeconomic and sociocultural factors of the population play a decisive role in explaining why the reduction in cases occurs in places where there is less agglomeration, ventilation and natural lighting than in homes that favor a low risk of infection. (Herrera M. & Herrera M., 2020)

5. Conclusion

In the city of Guaranda, TB was more frequent in the San Luis de Pambil health areas in the 2019-2021 period. The disease predominates in the elderly, but a slight increase is observed in young adults. The trend in case reporting rates in the first half of the study period was downward, while in the second half it was ascending. This study analyzed some of the factors that could have contributed to this phenomenon finding that the increase occurs in some specific regions and that the causes are

heterogeneous between them.

Bibliography

- Armijos Briones, F. M., Castillo González, J. I., Armijos Moreta, J. F., Boada Zurita, C. D. R. (2022). Treatment alternatives to gingival hyperpigmentation using neutrosophic correlation coefficients (revisited). *Neutrosophic Sets and Systems*, 52, 317-323. DOI: 10.5281/zenodo.7374385.
- Acurio Padilla, P. E., Gallegos Cobo, A. E., Estrella López, B. C. (2022). Neutrosophic analysis of risk factors in the etiology of cerebral palsy. *Neutrosophic Sets and Systems*, 52, 299-308. DOI: 10.5281/zenodo.7374367.
- Alves, J. D., Arroyo, L. H., Moraes Arcoverde, M. A., Cartagena-Ramos, D., Zamboni Berra, T., Seles Alves, L., Vieira Ramos, A. C., Fuentealba-Torres, M., Simionato de Assis, I., Fiorati, R. C., Nunes, C., & Arcêncio, R. A. (2020). Magnitude of social determinants in tuberculosis mortality risk in Central-West Brazil. *Sanitary Gazette*, 34(2), 171–178.
<https://doi.org/10.1016/J.GACETA.2019.01.004>
- Antonio-Arques, V., Franch-Nadal, J., & Caylà, J. A. (2021). Diabetes and tuberculosis: a syndemic complicated by COVID-19. *Clinical Medicine*, 157(6), 288–293.
<https://doi.org/10.1016/J.MEDCLI.2021.04.004>
- Avila Guaman, R. A. (2021). Impact of the COVID-19 pandemic on the tuberculosis control program of the Saraguro Basic Hospital, Ecuador, 2020. *Institutional Repository - UCV*.
<https://renati.sunedu.gob.pe/handle/sunedu/2924838>
- Dávila Castillo, M. R., Benavides Salazar, C. F., Escobar Gonzáles, E. J., Pérez Mayorga, B. C. (2022). Neutrosophic study of bullying due to parental sexual identity. *Neutrosophic Sets and Systems*, 52, 291-298. DOI: 10.5281/zenodo.7374356.
- Benites, R. M., Morales Cobos, J. D., Sánchez Sánchez, J. E. (2022). Neutrosophic linguistic scale for the assessment of knowledge of natural and traditional medicine in dental students. *Neutrosophic Sets and Systems*, 52, 324-329. DOI: 10.5281/zenodo.7374393.
- Caicedo Rodríguez, J. O., Moina Veloz, Á. P., Tite Andi, S. T. (2022). Neutrosophic cognitive maps for the analysis of the factors in the proper diagnosis of conversion disorder. *Neutrosophic Sets and Systems*, 52, 309-316. DOI: 10.5281/zenodo.7374377.
- GACETAS TUBERCULOSIS – Ministry of Public Health. (n/d). Retrieved August 14, 2022, as of <https://www.salud.gob.ec/gacetatas-tuberculosis/>
- Herrera M., T., & Herrera M., T. (2020). The possible causes of the increase in the incidence of tuberculosis in Chile. *Revista Chilena de Enfermedades Respiratorias*, 36(1), 51–61.
<https://doi.org/10.4067/S0717-73482020000100051>

Iacobino, A., Fattorini, L., & Giannoni, F. (2020). Drug-Resistant Tuberculosis 2020: Where We Stand. *Applied Sciences* 2020, Vol. 10, Page 2153, 10(6), 2153. <https://doi.org/10.3390/APP10062153>

Paneque Ena, & Rojas Linia. (n/d). Tuberculosis throughout History: an enemy of humanity | *Rev. habanera cienc. méd.*;17(3): 353-363, May.-Jun. 2018. | LILACS | CUMED. Retrieved June 30, 2022, as of <https://pesquisa.bvsalud.org/portal/resource/pt/biblio-978535>

Therese Karla., & Nel Jason L. (2020). Previous and active tuberculosis increases risk of death and prolongs recovery in patients with COVID-19. *Infectious Diseases*, 52(12), 902–907.

https://doi.org/10.1080/23744235.2020.1806353/SUPPL_FILE/INFD_A_1806353_SM0463.DOCX

PAHO. (2021). Tuberculosis in the Americas. Regional Report 2020. Tuberculosis in the Americas. Regional Report 2020. <https://doi.org/10.37774/9789275324479>

Poveda Morales, T. C., Bonilla Veloz, S. E., Freire Muñoz, D. A. (2022). Relevance of the obstacles to the achievement of food sovereignty in Ecuador, analysis through the neutrosophic soft set. *Neutrosophic Sets and Systems*, 52, 330-337. DOI: 10.5281/zenodo.7374403.

Annexes

District Authorization 02D01 Guaranda MSP

