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ORIGINALS

Quality of life in people with tuberculosis in publics institution of Primary Care

Calidad de vida en personas con tuberculosis de una institución pública de Atención Primaria

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ABSTRACT:

Introduction: Much progress has been made in the diagnosis and treatment of tuberculosis, but there is a lack of comprehensive understanding of the factors associated with health-related quality of life (HRQoL) in people with this disease.
Objective: To determine the factors associated with the health-related quality of life of patients with tuberculosis in a care institution in the city of Cartagena, Colombia.
Method: An analytical cross-sectional observational study was conducted. The population was 120 patients with a diagnosis of tuberculosis, the sample according to the inclusion criteria was 93 patients.
Results: The average age of the participants was 40 years (SD= 8.5), and a greater proportion were men (66.7% (62)). The dimensions of quality of life best evaluated were Physical Function (62.4% (58)) and General Health (60.2% (56)). Being in the second phase of treatment was associated with a better perception of quality of life for the Physical Role dimension (OR= 15.47 (1.5-13.3)), the presence of comorbidity with a worse perception of General Health (OR=0.23 (0.08- 0.63)).
Conclusion: Treatment adherence and compliance improve clinical characteristics such as weight and have a positive impact on perception of quality of life. A higher educational level helps patients with tuberculosis to maintain better relationships and an emotional role, in contrast comorbidities can have an impact on a worse perception of pain among these patients.

Keywords: Quality of Life; Health; Tuberculosis; Patients; Primary Health Care.

RESUMEN:

Introducción: se ha avanzado mucho en el diagnóstico y tratamiento de la tuberculosis, pero hay una falta de comprensión completa de los factores asociados a la calidad de vida relacionada con la salud RS en personas con esta enfermedad.

Objetivo: Determinar los factores asociados a la calidad de vida relacionada con la salud de los pacientes con tuberculosis en una institución pública de atención primaria de la ciudad de Cartagena, Colombia. Método: estudio observacional de corte transversal analítico. La población fue de 120 pacientes con diagnóstico de tuberculosis que asisten a una institución de salud, la muestra acorde a los criterios de inclusión fue de 93 pacientes.

Resultados: La edad promedio de los participantes fue de 40 años (DE= 8,5), en mayor proporción hombres (66,7% (62)). Las dimensiones de la calidad de vida mejor evaluadas fueron la Función Física (62,4% (58)) y la Salud general (60,2% (56)). Estar en la segunda fase del tratamiento se asoció a una mejor percepción de calidad de vida para la dimensión Rol Físico (OR= 15,47(1,5-13,3)), la presencia de comorbilidad a una peor percepción de la Salud General (OR=0,23(0,08- 0,63)).

Conclusión: El seguimiento y cumplimiento del tratamiento mejoran características clínicas como el peso y tienen un impacto positivo en la percepción de la calidad de vida. Un mayor nivel educativo ayuda a los pacientes que tienen Tuberculosis a mantener mejores relaciones y por tanto, su rol emocional; en contraste las comorbilidades pueden tener impacto negativo en la percepción del dolor entre los pacientes.

Palabras claves: Calidad de vida; Salud; Tuberculosis; Pacientes; Atención Primaria de Salud.

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis, which primarily affects the lungs and can compromise various organs in the body. Around the world, it is estimated that more than 4,000 people die each day from TB, and over 30,000 become infected each year [1-4]. In Latin American countries, the mortality burden from this disease was recorded at 35,000 cases in 2023, with a reported increase in the number of cases of 6.6% compared to the previous year [5]. This highlights the importance of providing more efficient responses from health systems for the prevention and care of the disease, as well as comprehensive care for individuals receiving treatment [6].

One of the aspects affected in those suffering from TB is quality of life. Tuberculosis has a considerable impact due to the debilitating symptoms it entails, the physical and emotional limitations it imposes, and the need to undergo prolonged and complex treatment [6, 7]. When considering the factors that influence the perception of health-related quality of life (HRQoL) in individuals affected by tuberculosis (TB), healthcare providers have the opportunity to maximize available resources by prioritizing the specific needs of this patient group [7]. However, despite advances in the diagnosis and treatment of TB, there is a lack of complete understanding of the factors associated with HRQoL in people with this disease.

These factors may include socioeconomic characteristics, level of education, access to health services, social support, presence of comorbidities, severity of symptoms, treatment adherence, among others [8-10]. For example, a systematic review and meta-analysis conducted by Giraldo N. et al. [11], which included 35 studies, found that, compared to individuals without the diagnosis, the quality of life for these patients was significantly worse. The analysis revealed a difference of 51.5 points in physical function and mental health, 47.1 points in social indicators, 41.1 points in general health, 33.7 points in energy, 27.4 points in emotional performance, 24.9 points in physical performance, and 5.7 points in physical pain. All these differences were statistically significant [11].

Similarly, Álvarez D et al [12], reported significant differences by sex in the scores of all evaluated dimensions of quality of life, except for pain (p = 0.006). "They also reported differences based on the treatment phase, showing that patients in the maintenance phase scored better across all examined dimensions. These differences were statistically significant (p < 0.001) for all scales, except for the Global Health dimension (p = 0.091). The greatest differences in mean scores between groups were observed in the Physical Functioning scale (23.257) and in Pain (21.283) [12].

Understanding these factors is essential to improve care and support for affected individuals and to develop effective interventions to enhance their quality of life [13-15]. In Colombia, multiple public policies and protocols have been structured regarding the care of people with TB; however, it remains a prevalent disease, and its approach is focused on epidemiological and clinical aspects. In the city of Cartagena, no research has been found about quality of life of these patients, which constitutes a significant gap, especially in public network institutions that provide services to the more vulnerable populations of the city [16]. This study aims to provide elements from the patient's perspective that can supply the health system with insights to offer more comprehensive care.

Considering all of the above, this research aims to determine the factors associated with quality of life in tuberculosis patients treated in first-level public institutions in Cartagena, Colombia.

METHOD

Observational, cross-sectional analytical study during the first semester of the year 2023. The population consisted of 120 adults attending the tuberculosis program of a network of public institutions providing first-level health services in the city of Cartagena de Indias. Due to the size of the population, no sample size was calculated, and therefore no sampling was conducted. All patients who met the established criteria for the research were included, resulting in a sample of 93 adults. Any cognitive limitation that would hinder the completion of the instruments was an exclusion criterion. Initially, a pilot test was conducted, which included 20 patients with TB undergoing treatment and active in the program. The instruments were applied, and it was verified that they were properly.

The instruments used were: a sociodemographic and clinical form, which inquired about individual characteristics such as age, sex, education, occupation, socioeconomic status, religion, health insurance regime, and marital status, as well as some clinical characteristics such as the type of tuberculosis, phase and duration of treatment, comorbidities, and current weight.

To measure quality of life, the SF-36 questionnaire to assess quality of life, the SF-36 questionnaire was used. This instrument is the most widely employed tool for evaluating health-related quality of life in individuals with chronic diseases and has demonstrated good reliability [11, 16]. It consists of 36 items that assess quality of life in adult populations, focusing on functional status and emotional well-being perceived by the individual over the last four weeks. It is designed to detect both positive and negative aspects of health through 36 questions grouped into eight dimensions: physical function, physical performance, pain, general health, vitality, social function,

emotional performance, and mental health. The instrument includes the creation of a scale ranging from 0 (worst quality of life) to 100 (best quality of life) [11, 16].

To obtain the SF-36 scores, after administering the questionnaire, the direction of the responses was homogenized by recoding the 10 items that required it, in order to ensure that all items followed the gradient of 'higher score, better health status.' Subsequently, the sum of the items that make up the scale was calculated to obtain scores ranging from 0 to 100. For each dimension, the items were coded and transformed into a scale from 0 to 100. A cutoff value of 60 was assumed to categorize each dimension into good and poor quality of life. This instrument reported a Cronbach's alpha of 0.77 for this study.

For statistical analysis, SPSS 23® software was used. Initially, a univariate analysis was performed, calculating frequencies, measures of central tendency, and dispersion for the quantitative variables. Then, a multivariate analysis (logistic regression analysis) was conducted, using sociodemographic and clinical characteristics as independent variables and the dimensions of HRQoL evaluated as the dependent variable.

Ethical considerations

The ethical aspects outlined in Article 11 of Resolution 8430, which classifies research, were considered. This research is classified as risk-free for adult patients undergoing tuberculosis treatment, as no intervention or intentional modification of biological, physiological, psychological, or social variables was carried out, since the instruments used were questionnaires. Approved by the Research Ethics Committee. The participation of the patients is voluntary and informed, and they signed an informed consent guaranteeing their anonymity and the confidentiality of the data collected in accordance with Article 8 of the aforementioned Resolution [28].

RESULTS

Sociodemographic and clinical characteristics of the participants

Ninety-three patients with a diagnosis of Tuberculosis participated, with an average age of 40 years (SD = 8.5); males predominated (66.7% (n=62)), single participants (60.2% (n=56)), from socioeconomic stratum 1 (82.8% (n=77)), and from urban areas (48.4% (n=45)). Thirty-one point two percent (n=29) were high school graduates, 44.1% (n=41) were self-employed, and 39.8% (n=37) were Christian.

Regarding clinical characteristics, 88% (n=82) had pulmonary tuberculosis, 60.2% (n=56) were in the second phase of treatment, 57% (n=53) were underweight, and 68.8% (n=64) reported no comorbidities (Table 1).

Table 1: Distribution according to sociodemographic characteristics of TB patients in public primary care institutions. Cartagena 2023.

VARIABLE	N	%
Sex		
Female	31	33,3
Male	62	66,7

VARIABLE	N	%
Education		
No education	6	6,5
Incomplete primary school	18	19,4
Complete primary school	9	9,7
Incomplete secondary school	25	26,9
Complete secondary school	29	31,2
Technical or technologist	6	6,5
Occupation		
Housewife	15	16,1
Unemployed	27	29,0
Employed	7	7,6
Student	3	3,2
Independent	41	44,1
Socioeconomic Stratum		
1	77	82,8
2	9	9,7
3	7	7,5
Religion		
Catholic	31	33,3
Christian	37	39,8
Other	4	4,4
None	21	22,6
Marital Status		
Married	13	14,0
Separated	8	8,6
Single	45	48,4
Cohabiting	24	25,8
Widowed	3	3,2
Origin		
Migrant	19	20,4
Rural	18	19,4
Urban	56	60,2
Type of Tuberculosis		
Extrapulmonary	11	12,0
Pulmonary	82	88,0
Treatment Phase		
First phase	37	39,8
Second phase	56	60,2
Comorbidity		
Diabetes and Hypertension	7	7,6
Epilepsy	3	3,3
HIV	14	15,1
Other	4	4,4
None	64	68,8
Weight		
Underweight	53	57,0
Normal weight	40	43,0
TOTAL	**93**	**100,0**

Health-Related Quality of Life

Regarding the evaluated HRQoL dimensions, it was observed that the best-rated dimensions were Physical Function (62.4% (n=58)), General Health (60.2% (n=56)), and Mental Health (61.3% (n=57)). In contrast, the worst-rated dimensions were Vitality (82.8% (n=77)), Physical Role (74.2% (n=69)), and Social Function (59.1% (n=55)) (Table 2).

Table 2: Distribution by health-related quality of life dimensions of TB patients participating in the study. Cartagena 2023.

HRQoL Dimensions	Poor	%	Good	%
Physical Function	35	37.6	58	62.4
Physical Role	69	74.2	24	25.8
Body Pain	47	50.5	46	49.5
General Health	37	39.8	56	60.2
Vitality	77	82.8	16	17.2
Social Function	55	59.1	38	40.9
Emotional Role	47	50.5	46	49.5
Mental Health	36	38.7	57	61.3

The dimensions of Physical Function, Mental Health, and General Health reported the highest averages, indicating better results in health-related quality of life. On the other hand, the dimensions of Physical Role (31.2) and Emotional Role (48.4) showed the lowest averages. The Physical Role dimension stands out for its high variability (CV = 128.8%) (See Table 3).

Table 3: Distribution according to health-related quality of life of TB patients in a first-level healthcare institution in Cartagena 2023.

Dimensions	Average	Median	Standard Deviation	CV (%)	Q1	Q3
Physical Function	68.7	70	26.4	38.4%	50	90
Physical Role	31.2	31.2	40.2	128.8%	0	75
Body Pain	56.5	56.5	26.1	46.2%	41	80
General Health	64.8	64.8	22.3	34.5%	45	85
Vitality	50.4	50.4	9.5	18.8%	45	55
Social Function	59.0	59.0	22.6	38.3%	50	75
Emotional Role	48.4	48.4	44.9	92.8%	0	100
Mental Health	65.6	65.6	19.7	30.1%	52	80

Factors Associated with Quality of Life in Tuberculosis Patients

Patients with TB who are in the second phase of treatment are more likely to have a good quality of life in the Physical Role dimension (OR 95% CI 5.47 (1.5-13.3)). Likewise, patients with normal weight have 4.6 times more opportunity to have a good quality of life in the Body Pain dimension (OR 95% CI 4.6 (1.5-13.3)), and also have a 2.8 times higher chance of having a better perception in the Social Function dimension (OR 95% CI 2.85 (1.03-7.84)). Patients with a higher level of education, i.e., from secondary school onwards, have a greater chance of having a good Emotional Role (OR 95% CI 3.21 (1.13-9.11)). In contrast, having comorbidities increases the chance of having a poor perception of quality of life, for the General Health dimension (OR

95% CI 0.23 (0.08-0.63)). None of the variables studied were associated with the Vitality and Physical Function dimensions (Table 4).

Table 4: Factors Associated with HRQoL According to the Evaluated Dimensions in the TB Patients Participating in the Study. Cartagena 2023.

Sociodemographic Characteristics	Physical Function	Physical Role	Body Pain	General Health	Vitality	Social Function	Emotional Role	Mental Health
	OR I.C. 95%	*OR I.C. 95%*	*OR I.C. 95%*	*OR I.C. 95%*	*OR I.C. 95%*	*OR I.C. 95%*	*OR I.C. 95%*	*OR I.C. 95%*
Age over 40	0,418 (0,16-1,09)	0,577 (0,19-1,71)	1,71 (0,48-6,09)	0,97 (0,39-2,43)	1,35 (0,44-4,14)	0,97 (0,35-2,67)	1,85 (0,72-4,76)	0,46 (0,17-1,23)
Being male	1,95 (0,66-5,77)	1,29 (0,38-4,33)	2,6 (0,87-8,07)	1,15 (0,42-3,18)	0,26 (0,15-1,92)	0,601 (0,19-1,87)	1,51 (0,53-4,27)	0,72 (0,25-2,07)
Complete education or more	1,486 (0,52-4,20)	1,43 (0,45-4,49)	1,27 (0,46-3,52)	1,12 (0,32-3,24)	0,66 (0,17-2,60)	1,023 (0,37-2,81)	3,21 (1,13-9,11)	0,46 (0,16-1,34)
Having a partner	0,985 (0,38-2,52)	1,06 (0,37-3,02)	0,809 (0,32-2,06)	2,39 (0,88-6,49)	0,36 (0,11-1,15)	1,21 (0,44-3,25)	0,63 (0,25-1,59)	0,88 (0,35-2,23)
From an urban area	0,636 (0,23-1,70)	0,865 (0,29-2,56)	0,65 (0,19-2,24)	1,38 (0,51-3,71)	1,984 (0,63-6,20)	1,53 (0,54-4,30)	0,66 (0,25-1,72)	1,502 (0,58-3,87)
In second phase of treatment	1,75 (0,66-4,61)	5,47 (1,37-21,88)	1,37 (0,52-3,61)	1,31 (0,48-3,53)	0,86 (0,27-2,71)	1,84 (0,29-2,93)	2,12 (0,81-5,56)	2,36 (0,86-6,45)
Having a comorbidity	0,51 (0,19-1,35)	0,91 (0,28-2,97)	0,607 (0,23-1,61)	0,23 (0,08-0,63)	0,96 (0,3-3,83)	0,64 (0,44-3,60)	0,702 (0,26-1,85)	0,36 (0,13-1,21)
Normal weight	2,05 (0,71-5,93)	1,76 (0,57-5,44)	4,6 (1,50-13,30)	1,58 (0,55-4,58)	2,62 (0,75-9,15)	2,85 (1,03-7,84)	1,607 (0,58-4,40)	1,28 (0,46-3,53)

DISCUSSION

The findings of the study revealed that the treatment phase, education level, weight, and the presence of comorbidities are variables associated with quality of life in different dimensions.

The study reported that 66.7% of the study population were men, a figure consistent with national statistics [8] and the results of other researchers [9]. This supports the assertion that in our country, there is a significantly higher prevalence of TB cases in men compared to women, highlighting that the concept of masculinity may negatively influence men's willingness to seek medical care. This can lead to a delayed diagnosis, poor treatment outcomes, and a worse prognosis for the disease [11].

Regarding marital status, this study reveals a predominance of single patients (60%), with an average age of around 40 years and a secondary education level (31.2%). These findings are consistent with the results of a similar study conducted by Cajaschagua in Peru [18], which also found a high proportion of single individuals (61%) and those with secondary education (46%) among the evaluated patients. His findings report that married men tend to receive more support from their wives and family members to complete the treatment. In contrast, women with TB often face more limited support networks and remain responsible for daily household tasks, reflecting inequalities in social support networks, which ultimately may negatively affect their quality of life compared to men.

Regarding the economic activity of the study population, it was observed that a significant portion of the participants worked independently (44.1%) and had a low socioeconomic status (82.8%). These findings align with what is reported by the Global Fund [14], which states that the incidence and prevalence of TB are often linked to poverty and inequality. Many people affected by tuberculosis live in overcrowded

conditions, lack proper ventilation, and face nutritional challenges, which can complicate symptoms and limit treatment success [14, 19, 20].

This study identified a significant association between the dimension of the HRQoL (Health-Related Quality of Life) that involves the Physical Role and the phase of TB treatment. A higher probability of a positive perception of quality of life in the Physical Role dimension was found among those in the second phase of treatment (OR 5.47). These results align with the findings of Park S et al. [20], who found a significant positive relationship between the improvement of physical symptoms as a dimension of quality of life and treatment adherence and duration in a group of TB patients in Korea ($p < 0.001$). The study showed that those with a longer treatment duration experienced fewer physical symptoms ($p = 0.006$). These similarities are supported by the positive effect demonstrated by antituberculosis treatment, which reduces the main symptoms and aids physical recovery from the disease. The treatment leads to a marked reduction in bacterial load within the first two months and the consequent recovery of respiratory function, allowing for greater engagement in daily and work activities that may require moderate physical effort [19, 20].

Therefore, it is crucial to focus on structuring strategies that improve adherence and compliance with treatment, especially during the continuation phase. This is important to reduce the impact of physical symptoms resulting from the disease, which may limit the ability to carry out work activities and contribute to perpetuating the economic inequality and precariousness in which these individuals live, as the data revealed that a high percentage of them belong to a low socioeconomic status [14, 19-22]. These findings support the notion proposed by Otazu P [23], who suggests that economic factors such as family income and occupation are closely related to the quality of life of people affected by tuberculosis. Additionally, it is important to note that malnutrition and low weight observed in the participants of this study may also contribute to this complex dynamic.

In this regard, it is interesting to highlight that having a normal weight in this study is positively associated with a better perception of quality of life in the Body Pain dimension (OR 4.60). While this relationship has not been widely reported in the literature reviewed, it is important to note that the systematic review conducted by Giraldo N found that TB patients generally experience a lower quality of life compared to healthy individuals and report a higher percentage of Body Pain [11]. Additionally, previous research, such as the study by González R conducted with TB patients in Guadalajara [24], Mexico, has emphasized how Body Pain can affect patients' daily activities both at home and outside the home.

Therefore, it is important to note that active tuberculosis causes physical changes in weight due to the caloric expenditure required by the immune response to the bacillus infection. It has been shown that treatment follow-up helps reduce the bacterial load while also reducing weight loss, which alleviates negative symptoms such as pain [21, 22]. This highlights the importance of addressing pain as part of the symptoms of TB and its relation to quality of life in patients, in order to provide more comprehensive care within healthcare systems. Furthermore, there is a need for more research to fully understand this association.

The normal weight variable is also associated with a better perception of quality of life in the Social Function dimension (OR 2.85). A similar result is reported by De Souza L

et al. in a study conducted with TB patients in São Paulo [25], Brazil, where they found that patients with better perceived social support reported a better quality of life in the relationships dimension (r=0.68, p<0.0001). It is noteworthy that social relationships in individuals with tuberculosis may be shaped by the social perceptions of the disease. The stigmatizing image of thinness, historically associated with TB, can limit the enjoyment of the company of friends and family. Therefore, having a normal weight helps patients feel more satisfied with their image and perceive less rejection from the people in their close circle [23, 24].

Regarding education, the level of secondary education appears to play an important role. In this study, a higher level of education is associated with a better perception of Emotional Role (OR 3.21). In the context of healthcare, the educational role is always clear in the better management of the disease, as a higher level of education facilitates the understanding of recommendations and healthy measures for living at home and in other contexts in which people with a diagnosis interact. This also reduces levels of uncertainty that can generate negative emotions. For public health, these findings affirm the importance of providing proper education and support, especially to those with lower levels of education, in order to ensure the understanding and implementation of healthier practices and the enjoyment of life [19, 20].

The General Health dimension showed a significant association with the presence of comorbidities in this study, indicating that patients with comorbidities tended to have a less favorable perception of their general health (OR= 0.23). It is interesting to note that these findings are similar to results reported by Álvarez D who, in a group of TB patients from Hermosillo, Mexico, found that health-related quality of life was significantly lower among those with comorbidities [12]. Likewise, research by Juliasih N et al. in Indonesia reports that comorbidity also had a significant effect on general health. This suggests that the presence of multiple diseases decreases the likelihood of having a good perception of overall health, as it involves conditions in various organs that compound to negatively impact health [21].

In analyzing these results, it is essential to recognize the importance of addressing comorbidities in the management of tuberculosis. These comorbidities not only affect the physical health of patients but can also have a significant impact on their overall perception of well-being. This underscores the need to provide comprehensive care, addressing both tuberculosis and concurrent medical conditions. This approach can be crucial for improving patients' quality of life and ensuring effective management of their overall health [26, 27].

The main strength of this study lies in its focus on a vulnerable population facing a socially stigmatized disease, providing valuable information on quality of life perceptions from the patients' perspective. This helps shift the focus away from a purely pathological view and offers a more holistic approach to the care process. A key limitation, however, was the sample size. Therefore, future research should aim to involve a larger number of patients and explore additional variables.

CONCLUSIONS

The population was characterized by a predominance of males, those who were married or had partners, with secondary education, working independently, belonging

to the lowest socio-economic stratum, and adhering to Christianity. Clinically, comorbidities, the second phase of treatment, and pulmonary tuberculosis were predominant, with notable improvements in general health during this stage. It is important to emphasize that comorbidities play a significant role in the perception of quality of life, being associated with the dimension of body pain. Being in the second phase of treatment was also an important factor for better physical role perception, and the role of higher education was highlighted for improving emotional role perception.

The dimensions of the HRQoL (Health-Related Quality of Life) that were found to be associated in tuberculosis patients were physical role, body pain, general health, social functioning, and emotional role. These relationships could be highly useful when formulating public policies aimed at optimizing the health and quality of life of patients with tuberculosis.

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CONFLICT OF INTEREST

The Authors have no conflicts of interest to declare.

"The authors report that they did not use Artificial Intelligence, language models, machine learning, or similar technologies to create or assist in the preparation or editing of any of the contents of this document."

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