SHORT COMMUNICATION

Validation of an instrument to measure the knowledge, behavior, and perception regarding tuberculosis

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ABSTRACT

The survey, as a research instrument, is vital for collecting and obtaining data in an orderly and effective manner. The objective of the study was to validate an instrument for collecting reliable and valid data on the knowledge, behavior, and perception of patients with tuberculosis. The study was descriptive and cross-sectional with a design that included validation in two stages. First, consensus was reached among six experts regarding a 21-item questionnaire, which evaluated three dimensions: knowledge (12 items), behavior (3 items), and perception (6 items). Second, a pilot test was conducted with a sample of 30 patients to assess the categories of adequacy, clarity, coherence, and relevance.

As to the values of adequacy and relevance, 19 out of 21 items (90.5 %) matched, indicating a high level of adequacy and relevance, with an Aiken's V value of 0.981429. At the clarity level, 18 out of 21 items (85.7 %) matched, indicating a high level of comprehensibility, with an Aiken's V value of 0.970952. As to coherence, 18 out of 21 items (85.7 %) matched, indicating a high level of consistency, with an Aiken's V value of 0.98381. The reliability, measured by Cronbach's alpha, was 0.95 for knowledge, 0.83 for behavior and 0.89 for perception.

It is concluded that the validated instrument at Hospital Militar Central measured valid and reliable results regarding the knowledge, behavior, and perception of tuberculosis.

Keywords: Knowledge; Behavior; Perception; Tuberculosis (Source: MeSH NLM).

INTRODUCTION

The validity of a research study depends on the instruments used to collect and obtain reliable data, aimed at solving the stated problem. For this reason, surveys are essential research instruments in numerous scientific studies in the health field. The validity and reliability of these instruments will ensure the reproducibility of the results in other similar research. Thus, the findings obtained will ensure success in the planning of epidemiological strategies for various diseases, and health regulations will be formulated to facilitate better decision-making by health authorities [1].

Scientific studies on tuberculosis (TB) have identified a lack of knowledge, behavioral issues, and misperceptions of this disease among patients and their caregivers. These factors foster social stigma, delay diagnosis, and cause problems related to low treatment adherence. All of this undermines health programs for controlling the disease, as well as healthcare systems overall [2-4].

Consequently, TB remains a serious public health problem [5]. Despite epidemiological control measures, the increasing incidence and mortality have not been curbed, and TB has emerged as one of the 10 leading causes of death globally [6]. Therefore, it is necessary to continue searching for the causes and factors that limit or delay the achievement of the strategic goals established by the World Health Organization (WHO), especially the strategic objective of TB elimination by 2050 related to the Sustainable Development Goals (SDGs) [7]. Several researchers have confirmed that the leading cause of therapeutic failure in TB management is poor adherence or noncompliance with treatment, in addition to the irrational use of medications [8].

Consequently, the study of adherence has been identified by national and international organizations as a critical factor in achieving the objectives established for TB control, with the aim of reducing therapeutic failure due to noncompliance with medication [9]. This, in turn, leads to the waste of financial resources but, most discouraging, the poor quality of life of affected patients [10].

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This study aimed to design an instrument to obtain valid and reliable data on the knowledge, effective behavior, and perception of patients with pulmonary TB, for application in research focused on improving adherence to TB pharmacotherapy. Since knowledge, behavior, and perception are factors that may hinder adherence to anti-TB treatment, the availability of comprehensive and user-friendly instruments for data collection in the target population is important [11-3].

THE STUDY

A descriptive cross-sectional study was conducted in two stages: an expert consensus [14] and a pilot test. It included six professionals with expertise in analytical studies and TB care (four pulmonologists and two nurses). The pilot test involved 30 patients with drug-susceptible TB, selected by convenience sampling [15], during 2023, at the Department of Pulmonology at Hospital Militar Central. Approval was also requested from the Institutional Review Board of Hospital Militar Central and informed consent was obtained from each participant.

The instrument used was a questionnaire with 21 items organized into three dimensions: knowledge (12 items), behavior (3 items), and perception (6 items) [16,17], which were modified and reviewed by expert consensus, according to the Expert Judgment Form. The procedure began with an initial phase in which six experts rated the dimensions of knowledge, behavior, and perception, and also validated the categories of adequacy, clarity, coherence, and relevance adapted for military patients with specific cultural, habitual, and occupational characteristics. In a second stage, a pilot test [18] was carried out by applying the validated instrument to 30 patients in the Department of Pulmonology at Hospital Militar Central. For the validity analysis, AIKEN's V coefficient [19] was used according to the results provided by each expert, with values ranging from 0 to 1. To assess internal consistency and reliability, Cronbach's alpha coefficient was used, which allowed determination of the percentage of error in estimating the attribute value [20].

The initial results obtained after evaluation by the experts were as follows, according to category: adequacy = 0.981429 (Table 1), clarity = 0.970952 (Table 2), coherence = 0.98381 (Table 3), and relevance = 0.981429 (Table 4). Finally, some questions in the instrument were revised due to wording issues, and the final questionnaire consisted of 21 questions grouped into three dimensions: knowledge (items 1 to 12), behavior (items 13 to 15), and perception (items 16 to 21). In the second stage, the following results were obtained: the knowledge with a Cronbach's alpha of 0.95; the behavior with a Cronbach's alpha of 0.83, and the perception with a Cronbach's alpha of 0.89.

Table 1. Results of content validity for adequacy

Questions	E 1	E 2	E 3	E 4	E 5	E 6	Aiken's V	95 % CI
1	4	4	4	4	4	4	1	0.82-1.00
2	4	4	4	4	4	4	1	0.82-1.00
3	4	4	4	4	4	4	1	0.82-1.00
4	4	4	4	4	4	4	1	0.82-1.00
5	4	4	4	4	4	4	1	0.82-1.00
6	4	2	4	2	4	3	0.72	0.49-0.88
7	4	4	4	4	4	4	1	0.82-1.00
8	4	4	4	4	4	4	1	0.82-1.00
9	4	4	4	4	4	4	1	0.82-1.00
10	4	4	4	4	4	4	1	0.82-1.00
11	4	4	4	4	4	4	1	0.82-1.00
12	4	4	4	4	4	4	1	0.82-1.00
13	4	4	4	4	4	4	1	0.82-1.00
14	4	3	4	3	4	4	0.89	0.67-0.97
15	4	4	4	4	4	4	1	0.82-1.00
16	4	4	4	4	4	4	1	0.82-1.00
17	4	4	4	4	4	4	1	0.82-1.00
18	4	4	4	4	4	4	1	0.82-1.00

Questions	E 1	E 2	E 3	E 4	E 5	E 6	Aiken's V	95 % CI
19	4	4	4	4	4	4	1	0.82-1.00
20	4	4	4	4	4	4	1	0.82-1.00
21	4	4	4	4	4	4	1	0.82-1.00
							0.981429	

Table 2. Results of content validity for clarity

Questions	E 1	E 2	E 3	E 4	E 5	E 6	Aiken's V	95 % CI
1	4	4	4	4	4	4	1	0.82-1.00
2	4	4	4	4	4	4	1	0.82-1.00
3	4	4	4	4	4	4	1	0.82-1.00
4	4	4	4	4	4	4	1	0.82-1.00
5	4	4	4	4	4	4	1	0.82-1.00
6	4	2	3	2	4	4	0.72	0.49-0.88
7	4	4	4	4	4	4	1	0.82-1.00
8	4	3	4	3	4	4	0.89	0.67-0.97
9	4	4	4	4	4	4	1	0.82-1.00
10	4	4	4	4	4	4	1	0.82-1.00
11	4	4	4	4	4	4	1	0.82-1.00
12	4	4	4	4	4	4	1	0.82-1.00
13	4	4	4	4	4	4	1	0.82-1.00
14	4	2	4	2	4	4	0.78	0.55-0.91
15	4	4	4	4	4	4	1	0.82-1.00
16	4	4	4	4	4	4	1	0.82-1.00
17	4	4	4	4	4	4	1	0.82-1.00
18	4	4	4	4	4	4	1	0.82-1.00
19	4	4	4	4	4	4	1	0.82-1.00
20	4	4	4	4	4	4	1	0.82-1.00
21	4	4	4	4	4	4	1	0.82-1.00
							0.970952	

Table 3. Results of content validity for coherence

Questions	E 1	E 2	E 3	E 4	E 5	E 6	Aiken's V	95 % CI
1	4	4	4	4	4	4	1	0.82-1.00
2	4	4	4	4	4	4	1	0.82-1.00
3	4	4	4	4	4	4	1	0.82-1.00
4	4	4	4	4	4	4	1	0.82-1.00

Questions	E 1	E 2	E 3	E 4	E 5	E 6	Aiken's V	95 % CI
5	4	4	4	4	4	4	1	0.82-1.00
6	4	3	4	3	3	4	0.83	0.61-0.94
7	4	4	4	4	4	4	1	0.82-1.00
8	4	4	4	4	4	4	1	0.82-1.00
9	4	4	4	4	4	4	1	0.82-1.00
10	4	4	4	4	4	4	1	0.82-1.00
11	4	4	4	4	4	4	1	0.82-1.00
12	4	4	4	4	4	4	1	0.82-1.00
13	4	4	4	4	4	4	1	0.82-1.00
14	4	3	4	3	4	3	0.83	0.61-0.94
15	4	4	4	4	4	4	1	0.82-1.00
16	4	4	4	4	4	4	1	0.82-1.00
17	4	4	4	4	4	4	1	0.82-1.00
18	4	4	4	4	4	4	1	0.82-1.00
19	4	4	4	4	4	4	1	0.82-1.00
20	4	4	4	4	4	4	1	0.82-1.00
21	4	4	4	4	4	4	1	0.82-1.00
							0.98381	

Table 4. Results of content validity for relevance

Questions	E 1	E 2	E 3	E 4	E 5	E 6	Aiken's V	95 % CI
1	4	4	4	4	4	4	1	0.82-1.00
2	4	4	4	4	4	4	1	0.82-1.00
3	4	4	4	4	4	4	1	0.82-1.00
4	4	4	4	4	4	4	1	0.82-1.00
5	4	4	4	4	4	4	1	0.82-1.00
6	4	3	4	1	4	3	0.72	0.49-0.88
7	4	4	4	4	4	4	1	0.82-1.00
8	4	4	4	4	4	4	1	0.82-1.00
9	4	4	4	4	4	4	1	0.82-1.00
10	4	4	4	4	4	4	1	0.82-1.00
11	4	4	4	4	4	4	1	0.82-1.00
12	4	4	4	4	4	4	1	0.82-1.00
13	4	4	4	4	4	4	1	0.82-1.00
14	4	3	4	3	4	4	0.89	0.67-0.97
15	4	4	4	4	4	4	1	0.82-1.00

Questions	E 1	E 2	E 3	E 4	E 5	E 6	Aiken's V	95 % CI
16	4	4	4	4	4	4	1	0.82-1.00
17	4	4	4	4	4	4	1	0.82-1.00
18	4	4	4	4	4	4	1	0.82-1.00
19	4	4	4	4	4	4	1	0.82-1.00
20	4	4	4	4	4	4	1	0.82-1.00
21	4	4	4	4	4	4	1	0.82-1.00
							0.981429	

DISCUSSION

When the 21-item instrument was designed and validated, optimal validity and reliability values were obtained, allowing it to be used in research studies. Similar values were found for adequacy and relevance: 19 (90.5 %) of the 21 items received a rating of 4, indicating high suitability and relevance. Regarding clarity, 18 (85.7 %) of the 21 items showed a high level of comprehensibility. As to coherence, 18 (85.7 %) of the 21 items showed a high level of consistency. In addition, reliability measured using Cronbach's alpha indicated high accuracy of the instrument.

Similar studies, such as that by Muñoz-Sánchez A. et al., reported comparable levels of adequacy (97.3 %), comprehensibility (98.3 %), relevance (94.7 %), and a moderate level of reliability (0.65) [20]. Ahumada K. et al. also obtained similar results, with an Aiken's V of 0.95, demonstrating content validity, and a reliability of 0.59, considered acceptable for this type of study [6]. Furthermore, the results reported by Laurente et al. indicate that patients have a low level of knowledge regarding TB associated with their educational level [3,4].

In conclusion, this is the first study conducted at the Hospital Militar Central to validate an instrument that measures three dimensions—knowledge, behavior, and perception—regarding TB among military personnel. This instrument may prove useful for improving pharmacotherapy outcomes in patients with TB and for serving as a basis to develop policies that strengthen control measures in TB programs targeting this population.

The validated instrument can be used in analytical studies with special populations aimed at verifying whether there is a real association between patients' educational level and their knowledge about transmission routes, prevention measures, as well as their attitudes and perceptions toward TB.

Finally, the instrument has very good statistical validity and reliability, which ensures optimal results and facilitates health decision-making. This will strengthen strategies and actions aimed at improving the health conditions of patients and the population worldwide, contributing to the eradication of TB and aligning with the new Sustainable Development Goals (SDGs).

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