

ORIGINAL ARTICLE

Content Validation and Reliability Test for Depression, Stigma, Social Support and Patient's Satisfaction Scale among Tuberculosis Patients in Serian Division, Sarawak

ZULKIFLI MOHD NOR FAIZAL*, SAHAK NOORZILAWATI, SAIMON ROSALIA

Department of Community Medicine and Public Health, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, 94300 Kota Samarahan Sarawak, Malaysia

*Correspondence: drkurin8821@gmail.com; Tel: +6012 8471027

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ABSTRAK

Kajian ini menilai kesahihan kandungan dan kebolehpercayaan konsistensi dalaman bagi empat instrumen pengukuran psikososial-PHQ-9 (kemurungan), Skala Stigma Tuberkulosis, Skala Pelbagai Dimensi Sokongan Sosial Yang Dirasai dan Borang Pendek Soal Selidik Kepuasan Pesakit dalam kalangan pesakit tuberkulosis (TB) di Bahagian Serian, Sarawak. Instrumen-instrumen ini diadaptasi daripada versi asalnya dan seterusnya divalidasi dalam kalangan pesakit TB di Bahagian Serian, Sarawak. Pengesahan kandungan dilakukan oleh lapan pakar dalam bidang kesihatan awam dan psikiatri, menggunakan Indeks Kesahihan Kandungan per item dan per skala, dengan semua item menunjukkan tahap persetujuan yang tinggi dari segi perkaitan, kejelasan, kesederhanaan dan ketiadaan kekaburan tanpa memerlukan sebarang pengubahsuaian. Kajian rintis ($n = 56$) kemudian dijalankan bagi menilai konsistensi dalaman, yang menghasilkan nilai alfa Cronbach antara 0.73 hingga 0.95, dengan skor kebolehpercayaan keseluruhan sebanyak 0.86, menunjukkan kebolehpercayaan yang baik hingga cemerlang. Dapatan kajian ini mengesahkan keteguhan psikometrik dan kesesuaian dari segi budaya instrumen-instrumen ini dalam menilai penentu psikososial dalam penjagaan TB. Instrumen yang telah disahkan ini menyediakan kerangka yang boleh dipercayai untuk penyelidikan dan intervensi akan datang dalam usaha meningkatkan penjagaan berpusatkan pesakit serta menangani cabaran psikososial dalam populasi TB.

Kata kunci: Penentu psikososial; pengesahan; tuberkulosis

ABSTRACT

This study evaluated the content validity and internal consistency reliability of four psychosocial measurement instruments-the PHQ-9 (depression), Tuberculosis Stigma Scale, Multidimensional Scale of Perceived Social Support and Patient Satisfaction Questionnaire Short Form (PSQ-18) among tuberculosis (TB) patients in the Serian Division of Sarawak. The instruments were adopted from their original versions and subsequently validated among TB patients in the Serian Division of Sarawak. Content validation, conducted by eight experts in public health and psychiatry, utilised item-level and scale-level content validity indices, with all items demonstrating strong agreement in relevance, clarity, simplicity and lack of ambiguity requiring no modifications. A pilot study ($n = 56$) was then carried out to assess internal consistency, yielding Cronbach's alpha values between 0.73 and 0.95, with an overall reliability score of 0.86, indicating good to excellent reliability. The findings confirmed the psychometric robustness and cultural appropriateness of these instruments for evaluating psychosocial determinants in TB care. These validated tools provide a reliable framework for future research and interventions aiming at enhancing patient-centred care and addressing psychosocial challenges in TB populations.

Keywords: Psychosocial determinants; tuberculosis; validation

INTRODUCTION

Tuberculosis (TB) is one of the oldest known human diseases, with anthropological evidence revealing its presence in skeletal remains dating back thousands of years (Hershkovitz et al. 2015). The causative agent of TB remained unidentified until March 24, 1882, when Dr. Robert Koch announced his discovery of the bacillus responsible for the disease at a meeting of the Berlin Physiological Society. This bacterium was later named *Mycobacterium tuberculosis* (Sakula 1982). Although TB is both preventable and treatable, it remains a major global health concern. In 2022, TB was the second leading cause of death from a single infectious agent, surpassed only by COVID-19. That year, the number of newly diagnosed TB cases reached 7.5 million, the highest figure reported since the World Health Organization (WHO) began global surveillance in 1995. Alarming, TB caused nearly twice as many deaths as Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) (WHO 2023). In Malaysia, the estimated TB incidence rate in 2019 was 92 cases per 100,000 population, with a mortality rate of approximately 4 deaths per 100,000 population annually (WHO 2020).

Depression is a common comorbid mental health condition among TB patients, with a significantly higher prevalence compared to the general population (Zhang et al. 2019). Globally, the prevalence of depression in TB patients has been reported to range from 16.8% to 62%, highlighting a substantial burden (Basu et al. 2012; Dahiya et al. 2017; Duko 2015; Issa et al. 2009; Kehbila 2016; Kumar et al. 2016; Masumoto et al. 2014; Rouf et al. 2021; Ugarte-Gil et al. 2013). In the Malaysian context, research on this issue remains limited. To date, only two published studies have examined the prevalence of depression among TB patients. A study conducted in Kedah reported a prevalence of 27.7%, whereas another study in Kuching found a significantly lower rate of 7.7% (Ying et al. 2018; Zakaria et al. 2022). The contrasting findings between these two studies may be attributed to the use of different instruments for assessing depression. The study

conducted in Kedah utilised the Beck Depression Inventory (BDI), whereas the study in Kuching employed the Patient Health Questionnaire-9 (PHQ-9). Differences in measurement tools can lead to variability in the reported prevalence of depression due to differences in sensitivity, scoring thresholds and construct emphasis. In addition, the study settings were not the same. The study in Kedah was conducted in respiratory clinics within government hospitals, while the Kuching study was carried out in primary health clinics. Patients who present to hospital-based respiratory clinics are generally those with more severe or complicated conditions, which may contribute to a higher likelihood of depressive symptoms. This difference in patient severity could explain why the prevalence of depression reported in Kedah was higher compared to Kuching. These contrasting findings underscore the need for further research to better understand the prevalence and contributing factors of depression among TB patients in Malaysia.

Several studies have demonstrated that TB patients who also exhibit symptoms of depression are at significantly higher risk of experiencing adverse treatment outcomes (Ambaw et al. 2018; Rouf et al. 2021; Ruiz-Grosso et al. 2020). For instance, Rouf et al. (2021) found that TB patients presenting with depressive symptoms at the initiation of treatment were 4.46 times more likely to experience treatment failure. Furthermore, those who continued to experience depression during the intensive phase of treatment faced an even greater risk, with a 34.5-fold increase in the likelihood of treatment failure. If left unaddressed, depression in TB patients can lead to greater functional impairment, reduced quality of life and an elevated risk of mortality (Ambaw et al. 2018). Despite these serious implications, mental health, particularly depression remains a neglected aspect of TB care in Malaysia. This gap is evident in the absence of targeted mental health interventions or strategies in the latest Clinical Practice Guidelines for the management of TB (MOH 2021) and the National Strategic Plan for Tuberculosis Control (MOH 2016).

This study aimed to evaluate the content

validity and internal consistency of four established psychosocial assessment instruments, which were the PHQ-9 that assessed depression, the Tuberculosis Stigma Scale (TSS), the Multidimensional Scale of Perceived Social Support (MSPSS) and the Patient Satisfaction Questionnaire Short Form (PSQ-18) among TB patients in the Serian Division of Sarawak. This study was underpinned by the Socioecological Model (SEM) proposed by Klasa et al. (2021), which recognised that health behaviours were influenced by multiple layers, including individual, social, human-moderated and environmental factors. As part of a larger study assessing depression among TB patients in Sarawak later, depression measured via the PHQ-9 was conceptualised as the dependent variable. Two predictors perceived social support (MSPSS) and perceived stigma (TSS) were positioned within the social determinants layer, as these constructs reflected interpersonal and community influences. Patient satisfaction with healthcare services (PSQ-18) was placed under the human-moderated environment layer, representing the influence of healthcare systems and service delivery on patient behaviour and psychological outcomes. Validating all four instruments was necessary to ensure that these measures were psychometrically sound, culturally relevant and appropriate for use among TB patients in Sarawak before being applied in the larger study. This validation represented the initial phase of a larger research initiative designed to investigate the prevalence of depression and its associated factors among TB patients across Sarawak. The findings from this phase will ensure that the selected instruments were culturally and contextually appropriate for use in this population, thereby supporting their application in subsequent epidemiological studies.

MATERIALS AND METHODS

Study Design

This quantitative cross-sectional study was conducted in two phases. The first phase

involved content validation to ensure the relevance, clarity and cultural appropriateness of the selected instruments for assessing depression and its associated psychosocial factors among TB patients. Expert evaluations were used to assess the content validity of the instruments. The second phase focused on assessing the internal consistency reliability of the instruments. Cronbach's alpha coefficients were calculated to determine the reliability of each scale, providing a measure of the internal consistency of the items within each instrument.

Study Instruments

In this study, a bilingual questionnaire was employed using the existing validated English and Malay versions of four instruments. No additional translation into Sarawak local languages was performed. Although validated Malay versions were available, the English versions were also commonly used in Sarawak, particularly in healthcare contexts and among older adults; therefore, both language versions required evaluation to ensure their suitability for the local TB population. The content validation and reliability assessment conducted in this study served to confirm that the existing English and Malay versions were linguistically clear, culturally appropriate and relevant for use among TB patients in Sarawak before being deployed in the larger study. The bilingual questionnaire was self-administered, with researchers available to clarify items when necessary to accommodate participants with varying literacy levels while maintaining response integrity.

Patient Health Questionnaire-9

The PHQ-9 is a validated clinical instrument designed to screen for and assess the severity of depressive symptoms in medical populations over the preceding two weeks. It consists of nine items, each mapped directly to the DSM-IV criteria for diagnosing depression, allowing for both symptom identification and severity classification. Responses are scored on a four-

point Likert scale, ranging from 0 (not at all) to 3 (almost every day), yielding a total score between 0 and 27. The cumulative score is then categorised into five distinct severity levels: minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19) and severe (20–27) (Karen & Autumn 2011; Kroenke et al. 2001). The internal consistency of the English version was 0.89, while the Malay version demonstrated an internal consistency of 0.70 (Kroenke et al. 2001; Sherina et al. 2012).

Tuberculosis Related Stigma Scale

The TSS comprises 23 items and includes two subscales: one evaluating community perceptions of TB stigma and the other assessing patients' experiences of TB stigma. For this study, only the Patient's Perspective subscale was utilised, consisting of 12 items. Each item is rated on a 4-point Likert scale, where 0 = strongly disagree, 1 = disagree, 2 = agree and 3 = strongly agree. Following data collection, stigma scores were computed, with higher scores indicating greater levels of perceived stigma. The total possible score ranges from 0 to 36, reflecting the overall stigma burden experienced by patients (Van Rie et al. 2008). The internal consistency of the English version was 0.88, while the Malay version demonstrated an internal consistency of 0.78 (Van Rie et al. 2008; Zakaria et al. 2022).

The Multidimensional Scale of Perceived Social Support

The MSPSS is a self-administered instrument designed to assess an individual's perceived level of social support. It evaluates the subjective experience of receiving social assistance, focusing on three distinct sources: family, friends and significant others. The MSPSS consists of 12 items, each categorised into one of the three subscales. Each subscale contains four items, systematically arranged to capture perceptions of support from each source. Responses are measured using a 7-point Likert scale, with scoring as follows: 1 = strongly disagree, 2 = disagree, 3

= mildly disagree, 4 = neutral, 5 = mildly agree, 6 = strongly agree, and 7 = very strongly agree. The total score ranges from 7 to 84, with higher values indicating greater perceived social support (Zimet et al. 1988). The internal consistency of the English version was 0.95, while the Malay version demonstrated an internal consistency of 0.89 (Dan et al. 2021; Ng et al. 2010).

The Patient Satisfaction Questionnaire Short-Form

The Short-Form PSQ-18 is a validated instrument designed to assess patients' satisfaction with healthcare services. It comprises 18 items, systematically evaluating seven key dimensions: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, accessibility and convenience. Each item is rated using a five-point Likert scale, ranging from 1 ("strongly agree") to 5 ("strongly disagree"), providing a structured approach to measuring patient experiences. To ensure accurate interpretation of satisfaction levels, items expressing dissatisfaction with healthcare services were reverse-coded, allowing for the computation of an overall satisfaction score. Higher scores indicate greater patient satisfaction with healthcare services. Following item scoring, responses were aggregated within each subscale and averaged, yielding seven distinct subscale scores, each reflecting specific aspects of patient satisfaction (Marshall & Hays 1994). The internal consistency of the English version was 0.77, while the Malay version demonstrated an internal consistency of 0.79 (Ganasegeran et al. 2015; Marshall & Hays 1994).

Content Validation

Content validity refers to the extent to which the items within a measurement instrument comprehensively and appropriately capture all relevant dimensions of the target construct. This evaluation is typically undertaken by a panel of three to ten subject matter experts (Polit et al. 2007), who assess the instrument's alignment

with the intended theoretical framework and research objectives. The content validation process ensures that each item is conceptually relevant, clearly worded and free from ambiguity, thereby enhancing the instrument's relevance and interpretability for the target population. To evaluate item adequacy, the expert panel employed a 4-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree", to rate each item's relevance, simplicity, clarity and ambiguity. The validity of individual items and the overall scale was quantitatively assessed using the Item-Level Content Validity Index (I-CVI), Scale-Level Content Validity Index based on Average agreement (S-CVI/Ave) and Scale-Level Content Validity Index based on Universal Agreement (S-CVI/UA). Experts were also invited to provide qualitative feedback and suggest modifications to enhance item quality and ensure the instrument met the needs of the intended respondent group. A total of eight expert panel members consented to participate in the content validation process. Initial invitations were extended via WhatsApp, followed by the distribution of formal appointment letters and the instrument to be evaluated through email upon receiving consent. Experts were provided with adequate time to conduct a thorough review of the instrument to ensure a comprehensive assessment. The panel comprised healthcare professionals with diverse expertise in the fields of TB and mental health, thereby ensuring content evaluation was informed by interdisciplinary perspectives. Details of the expert panel members were presented in Table 1.

The expert panel assembled for the content validation process comprised professionals from diverse institutional backgrounds, each contributing substantial experience and domain-specific expertise. The panel included public health medicine specialists from Universiti Malaysia Sarawak, the Sarawak State Health Department and the Kuching Divisional Health Office, who provided insights grounded in clinical and field-based public health practices. In addition, two psychiatrists from Hospital Sentosa were included to evaluate the instrument's alignment with mental health constructs, ensuring the appropriateness and relevance of items related to psychological dimensions.

Reliability Test

A pilot study was conducted in the Serian Division involving four TB treatment centres: Serian Hospital, Siburan Health Clinic, Balai Ringin Health Clinic and Teng Bukap Health Clinic. A total of 56 patients were recruited to participate. Written informed consent was obtained from all participants prior to enrolment. Internal consistency reliability of the measurement instruments was assessed using Cronbach's alpha coefficients. For reliability testing, a sample size of 30–50 participants was generally considered adequate for pilot studies and preliminary scale validation (Johanson & Brooks 2010). Therefore, the sample of 56 respondents in this pilot study exceeded the recommended minimum and was sufficient for evaluating the internal consistency reliability of the instruments.

TABLE 1: Members of the expert panel

Profession	Place of work	Total experience in the related profession (in years)
Public health medicine specialist	Universiti Malaysia Sarawak	43
Public health medicine specialist	Universiti Malaysia Sarawak	21
Public health medicine specialist	Universiti Malaysia Sarawak	14
Public health medicine specialist	Sarawak State Health Department	9
Public health medicine specialist	Sarawak State Health Department	7
Public health medicine specialist	Kuching Divisional Health Office	7
Psychiatrist	Sentosa Hospital	18
Psychiatrist	Sentosa Hospital	12

RESULTS

Content Validation

A total of 51 items representing four construct variables were subjected to expert validation by a panel of eight reviewers. The I-CVI scores for all constructs, evaluated across four key criteria: relevance, simplicity, clarity and ambiguity were found to be within acceptable thresholds. Similarly, the Scale-Level Content Validity Indices, assessed using both the average method (S-CVI/Ave) and the universal agreement (Polit & Beck 2006; Polit et al. 2007). No modifications, additions or deletions were made to any of the four constructs during the validation process, indicating strong consensus among the experts regarding the adequacy and coherence of the instrument's items. Table 2 showed the content validation results in detail.

Reliability Test

Table 3 presented the socio-demographic characteristics of the 56 TB patients enrolled in the pilot study. The mean age of participants was 47 years (SD = 16.39), with a median monthly income of RM1,000 (IQR = 1500). The sample comprised 69.6% males and 30.4% females. In terms of ethnicity, Bidayuh constituted the largest group (50%), followed by Iban (37.5%), Malay (10.7%) and Chinese (1.8%). Marital status data revealed that 48.2% were married, while the remaining 51.8% were either single, divorced or widowed. Regarding educational attainment, 50% of respondents had completed at least secondary education, 23.2% had primary education, 16.1% had attained tertiary-level qualifications and 10.7% reported having no formal education.

Reliability testing was conducted to assess the internal consistency of the instruments using Cronbach's alpha coefficients. All four domains demonstrated acceptable to excellent reliability. The perceived TB stigma domain yielded Cronbach's alpha values of 0.88, indicating good internal consistency. The perceived social support domain demonstrated excellent

TABLE 2: Content validation results

Section	Relevance			Simplicity			Clarity			Ambiguity		
	I-CVI	S-CVI/Ave	S-CVI/UA	I-CVI	S-CVI/Ave	S-CVI/UA	I-CVI	S-CVI/Ave	S-CVI/UA	I-CVI	S-CVI/Ave	S-CVI/UA
Level of depression	1.00	1.00	1.00	0.88-1.00	0.99	0.89	0.88-1.00	0.99	0.89	0.88-1.00	0.99	0.89
Perceived stigma	1.00	1.00	1.00	0.88-1.00	0.98	0.89	0.88-1.00	0.98	0.83	0.88-1.00	0.99	0.92
Perceived social support	0.88-1.00	0.99	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Patient's satisfaction	0.88-1.00	0.98	0.83	0.88-1.00	0.98	0.83	0.88-1.00	0.98	0.83	0.88-1.00	0.99	0.89

TABLE 3: Socio-demographic characteristics for pilot study (n = 56)

	Mean (SD)	Median (IQR)	n	%
Age (Years)	47.46 (16.39)			
Income (RM)		RM 1000 (500 - 2000)		
Gender				
Male			39	69.6
Female			17	30.4
Ethnicity				
Iban			21	37.5
Malay			6	10.7
Chinese			1	1.8
Bidayuh			28	50.0
Marital status				
Married			27	48.2
Not married/ Divorced/Widowed			29	51.8
Education level				
No formal education			6	10.7
Primary education			13	23.2
Secondary education			28	50
Tertiary education			9	16.1

reliability with a coefficient of 0.95, while the depression status and patient satisfaction domain achieved an alpha of 0.77 and 0.73, respectively, reflecting acceptable reliability. The overall Cronbach's alpha for the complete instrument was 0.86, signifying good internal consistency across domains. These reliability estimates were almost consistent with those reported in previous studies. The reliability test results were shown in Table 4.

DISCUSSION

This study assessed the content validity and internal consistency reliability of four psychosocial measurement instruments: depression status, perceived TB stigma, perceived social support, and patient satisfaction among TB patients in the Serian Division of Sarawak. The findings confirm that these instruments are psychometrically sound and culturally appropriate, providing a reliable framework for assessing psychosocial determinants among TB patients.

The content validation process, conducted by a panel of eight experts specialising in public

health and mental health, demonstrated strong agreement across all constructs. The I-CVI, S-CVI/Ave and S-CVI/UA values exceeded recommended thresholds, indicating high relevance, clarity, simplicity and lack of ambiguity in item wording. Importantly, no modifications were deemed necessary, reinforcing the structural and contextual appropriateness of these instruments for use in the Malaysian TB population, specifically Sarawak.

The results from the internal consistency reliability assessment further validate the robustness of the instruments. The Cronbach's alpha values for each domain ranged from acceptable to excellent, reinforcing the internal consistency reliability of the instruments. Perceived social support exhibited the highest reliability ($\alpha = 0.95$), consistent with previous studies (Dan et al. 2021), suggesting strong coherence among items measuring social support dynamics. The patient satisfaction domain demonstrated a Cronbach's alpha of 0.76, indicating acceptable reliability and aligning with prior findings (Marshall & Hays, 1994), confirming the instrument's adequacy in evaluating patient

TABLE 4: Reliability tests results

Domain	No. of items	Cronbach's Alpha (Previous study)	Cronbach's Alpha (Current study)	Comment
Depression status	9	0.89 (Kroenke et al. 2001) 0.70 (Sherina 2012)	0.77	Acceptable
Perceived TB stigma	12	0.88 (Van Rie et al. 2008) 0.78 (Zakaria et al. 2022)	0.88	Good
Perceived social support	12	0.95 (Dan et al. 2021) 0.89 (Ng et al. 2010)	0.95	Excellent
Patient satisfaction	18	0.77 (Marshall & Hays 1994) 0.79 (Ganasegeran et al. 2015)	0.76	Acceptable
Total	51		0.86	Good

perceptions of healthcare services. Similarly, the perceived TB stigma scale showed good reliability ($\alpha = 0.88$), consistent with earlier research (Van Rie et al. 2008), reinforcing its robustness in assessing stigma-related experiences among TB patients. The depression status domain demonstrated a Cronbach's alpha of 0.77, which is lower than that reported in a previous study (Kroenke et al. 2001). Consistent with our findings, a study conducted in Malaysian primary care clinics also documented a Cronbach's alpha of 0.70, suggesting that modest reliability values are not uncommon in local settings (Sherina 2012). The observed discrepancy in the reliability of the depression status measure may be attributed to variations in sample characteristics, contextual differences and measurement factors. Differences in sample size and sociodemographic diversity could have influenced item responses, leading to a slight reduction in internal consistency compared to previous studies. Additionally, response variability between clinical and community settings may have played a role, as patients' perceptions of depression symptoms are often shaped by their treatment experiences and interactions with healthcare providers. Factors such as differences in illness severity, accessibility to mental health support and cultural perceptions of depression could further contribute to this variation. Despite the lower Cronbach's alpha value, the measure remains within acceptable reliability thresholds, affirming its suitability for assessing depression in this population. Finally, the overall Cronbach's

alpha coefficient of 0.86 underscores the high internal coherence across all domains, enhancing confidence in the instruments' ability to capture psychosocial dimensions reliably.

Beyond statistical validation, these results underscore the contextual relevance of the instruments in TB care settings. By comprehensively assessing stigma, depression, social support and satisfaction with healthcare services, the study provides a multidimensional perspective on patient experiences and needs. This is particularly significant in resource-limited settings, where psychosocial determinants strongly influence treatment adherence and health outcomes. Integrating these validated tools into routine TB care could facilitate targeted interventions, improving both clinical management and programmatic strategies.

Nevertheless, some limitations must be acknowledged. While the pilot sample size ($n = 56$) was sufficient for preliminary reliability testing, its generalisability remains limited. Future studies with larger and more diverse populations across different Malaysian states would help strengthen external validity. Furthermore, although this study rigorously assessed content validity and internal consistency, other psychometric properties, including construct validity, test-retest reliability and criterion validity, were not examined and warrant further investigation. To add on, the demographic distribution in this pilot study, particularly the predominance of Bidayuh participants (50%), reflects the population

structure of the Serian Division, where the study was conducted. While the content validation process confirmed that the English and Malay versions of the instruments were culturally appropriate for TB patients in Serian, including those from Bidayuh, Iban, Malay and other ethnic groups, the findings should be interpreted within the context of this ethnic concentration. Cultural norms, perceptions of illness-related stigma, patterns of social support and interaction with healthcare services may vary across different Malaysian ethnic communities. Therefore, although the instruments demonstrated cultural appropriateness within this setting, their applicability to other Malaysian populations may differ.

In conclusion, the validated instruments exhibit strong content relevance and internal consistency, making them reliable tools for assessing psychosocial factors in TB care. Their application in broader studies can help identify psychosocial risk factors, refine patient-centred interventions, and enhance TB care frameworks. These instruments may also contribute to policy development and clinical decision-making, ensuring comprehensive support for TB patients in Sarawak and similar settings.

CONCLUSION

This study established the content validity and internal consistency reliability of four psychosocial measurement instruments used to assess depression, perceived TB stigma, social support and patient satisfaction among TB patients in the Serian Division of Sarawak. The content validation process, guided by input from an expert panel with diverse clinical and public health experience, demonstrated strong agreement across all evaluated criteria. Reliability testing further supported the psychometric soundness of the instruments, with Cronbach's alpha values ranging from acceptable to excellent across domains.

These findings underscore the appropriateness of the selected tools for application in TB-related research and clinical practice within similar

cultural and healthcare settings. By capturing key psychosocial dimensions, the instruments offer valuable insights that may inform tailored interventions aimed at improving treatment adherence, mental health support and overall patient satisfaction. Future research should expand on these findings by evaluating additional psychometric properties and examining their utility in larger and more diverse populations.

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Conflict of interest: The authors declare that there is no conflicts of interest regarding the publication of this paper.

Ethics Statement: This study received ethical approval from the Medical Research Ethical Committee of Universiti Malaysia Sarawak (UNIMAS/TNC(P1)/09 – 65/01 Jld.3 (77)) and the Medical Research & Ethics Committee, Ministry of Health Malaysia (NMRR ID-24-00406-DMM (IIR)). All procedures were conducted in accordance with ethical guidelines and regulatory standards, ensuring compliance with institutional and national research ethics frameworks.

REFERENCES

- Ambaw, F., Mayston, R., Hanlon, C., Medhin, G., Alem, A. 2018. Untreated depression and tuberculosis treatment outcomes, quality of life and disability, Ethiopia. *Bull World Health Organ* 96(4): 243-55. <https://doi.org/10.2471/BLT.17.192658>
- Basu, G., Chatterjee, C., Singh, R., Biswas, S. 2012. Depression and its correlates among Tuberculosis patients: Experience from a DOTS clinic of a sub divisional hospital of West Bengal. *Indian J Res Rep Med Sci* 2: 14.
- Dahiya, S., Khichi, S., Goel, P., Singh, A. 2017. Prevalence of depression among tuberculosis patients. *Sch J Appl Med Sci* 5(6C): 2212-5.
- Dan, W., Feng, Z., Lu, N. 2021. Psychometric Properties of the Multidimensional Scale of Perceived Social Support (MSPSS) among family caregivers of people with schizophrenia in China. *Psychol Res Behav Manag* 14: 1201-9. <https://doi.org/10.2147/PRBM.S320126>
- Duko, B. 2015. Prevalence and correlates of depression and anxiety among patients with tuberculosis at Wolaita Sodo University Hospital and Sodo Health Center, Wolaita Sodo, South Ethiopia, Cross sectional study. *BMC Psychiatry* 15: 214. <https://doi.org/10.1186/s12888-015-0598-3>
- Ganasegeran, K., Perianayagam, W., Manaf, R.A., Jadoo, S.A., Al-Dubai, S.A. 2015. Patient satisfaction in Malaysia's busiest outpatient medical care. *Scientific World J* 2015: 714754. <https://doi.org/10.1155/2015/714754>
- Hershkovitz, I., Donoghue, H.D., Minnikin, D. E., May, H., Lee, O.Y.C., Feldman, M., Galili, E., Spigelman, M., Rothschild, B.M., Bar-Gal, G.K. 2015. Tuberculosis origin: The Neolithic scenario. *Tuberculosis* 95: S122-6. <https://doi.org/10.1016/j.tube.2015.02.021>
- Issa, B.A., Yussuf, A.D., Kuranga, S.I. 2009. Depression comorbidity among patients with tuberculosis in a university teaching hospital outpatient clinic in Nigeria. *Ment Health Fam Med* 6(3): 133-8.
- Johanson, G.A., Brooks, G.P. 2010. Initial scale development: sample size for pilot studies. *Educ Psychol Meas* 70(3): 394-400. <https://doi.org/10.1177/0013164409355692>
- Karen L.S., Autumn L.K. 2011. Measures of depression and depressive symptoms: Beck Depression Inventory-II (BDI-II), Center for Epidemiologic Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire-9 (PHQ-9). *Arthritis Care Res* 63(11): S454-66. <https://doi.org/10.1002/acr.20556>
- Kehbila, J. 2016. Prevalence and correlates of depressive symptoms in adult patients with pulmonary tuberculosis in the Southwest Region of Cameroon. *Infect Dis Poverty* 5(1): 51. <https://doi.org/10.1186/s40249-016-0145-6>
- Klasa, K., Galaitsi, S., Wister, A. 2021. System models for resilience in gerontology: Application to the COVID-19 pandemic. *BMC Geriatrics* 21: 51. <https://doi.org/10.1186/s12877-020-01965-2>
- Kroenke, K., Spitzer, R.L., Williams, J.B.W. 2001. The PHQ-9. *J Gen Intern Med* 16(9): 606-13. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Kumar, K., Kumar, A., Chandra, P., Kansal, H.M. 2016. A study of prevalence of depression and anxiety in patients suffering from tuberculosis. *J Fam Med Prim Care* 5(1): 150-3. <https://doi.org/10.4103/2249-4863.184641>
- Marshall, G., Hays, R. 1994. The Patient Satisfaction Questionnaire Short Form (PSQ-18). Santa Monica, CA: RAND Corporation. <https://www.rand.org/content/dam/rand/pubs/papers/2006/P7865.pdf>. [Accessed on 14 June 2025].
- Masumoto, S., Yamamoto, T., Ohkado, A., Yoshimatsu, S., Querri, A.G., Kamiya, Y. 2014. Prevalence and associated factors of depressive state among pulmonary tuberculosis patients in Manila, The Philippines. *Int J Tuberc Lung Dis* 18(2): 174-9. <https://doi.org/10.5588/ijtld.13.0335>
- Ministry of Health (MOH). 2016. National Strategic Plan for Tuberculosis Control (2016-2020). https://www.moh.gov.my/images/04-penerbitan/pelan-strategik/NSP_12072018.pdf [Accessed on 13 June 2025].
- Ministry of Health (MOH). 2021. Clinical Practice Guidelines, Management of Tuberculosis, Fourth Edition. Malaysian Health Technology Assessment Section (MaHTAS). https://www.moh.gov.my/images/04-penerbitan/penerbitan-klinikal/panduan-amalan-klinikal/CPG-Management_of_Tuberculosis_4th_Edition.pdf [Accessed on 14 June 2025].
- Ng, C.G., Amer Siddiq, A.N., Aida, S.A., Zainal, N.Z., Koh, O.H. 2010. Validation of the Malay version of the Multidimensional Scale of Perceived Social Support (MSPSS-M) among a group of medical students in Faculty of Medicine, University Malaya. *Asian J Psych* 3(1): 3-6. <https://doi.org/10.1016/j.ajp.2009.12.001>
- Polit, D.F., Beck, C.T. 2006. The content validity index: Are you sure you know what's being reported? critique and recommendations. *Res Nurs Health* 29(5): 489-97. <https://doi.org/10.1002/nur.20147>
- Polit, D.F., Beck, C.T., Owen, S.V. 2007. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Res Nurs Health* 30(4): 459-67. <https://doi.org/10.1002/nur.20199>

- Rouf, A., Masoodi, M.A., Dar, M.M., Khan, S.M. S., Bilquise, R. 2021. Depression among Tuberculosis patients and its association with treatment outcomes in district Srinagar. *J Clin Tuberc Other Mycobact Dis* 25: 100281. <https://doi.org/10.1016/j.jctube.2021.100281>
- Ruiz-Grosso, P., Cachay, R., de la Flor, A., Schwalb, A., Ugarte-Gil, C. 2020. Association between tuberculosis and depression on negative outcomes of tuberculosis treatment: A systematic review and meta-analysis. *PLoS One* 15(1): e0227472. <https://doi.org/10.1371/journal.pone.0227472>
- Sakula, A. 1982. Robert Koch: Centenary of the discovery of the tubercle bacillus, 1882. *Thorax* 37(4): 246-51. <https://doi.org/10.1136/thx.37.4.246>
- Sherina, M.S., Arroll, B., Goodyear-Smith, F. 2012. Criterion validity of the PHQ-9 (Malay Version) in a primary care clinic in Malaysia. *Med J Malaysia* 67(3): 309-15.
- Ugarte-Gil, C., Ruiz, P., Zamudio, C., Canaza, L., Otero, L., Kruger, H., Seas, C. 2013. Association of major depressive episode with negative outcomes of tuberculosis treatment. *PLoS One* 8(7): e69514. <https://doi.org/10.1371/journal.pone.0069514>
- Van Rie, A., Sengupta, S., Pungrassami, P., Balhithip, Q., Choonuan, S., Kasetjaroen, Y., Strauss, R. P., Chongsuvivatwong, V. 2008. Measuring stigma associated with tuberculosis and HIV/AIDS in southern Thailand: Exploratory and confirmatory factor analyses of two new scales. *Trop Med Int Health* 13(1): 21-30. <https://doi.org/10.1111/j.1365-3156.2007.01971.x>
- World Health Organization (WHO). 2020. Global Tuberculosis Report 2020. <https://www.who.int/publications-detail-redirect/9789240013131>. [Accessed on 12 June 2025].
- World Health Organization. 2023. Global Tuberculosis Report 2023. <https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2023>. [Accessed on 12 June 2025].
- Ying, T.C., Aziz, N.A.A., Kamaluddin, R., Hamzah, Z. 2018. Prevalence of depression and associated factors among tuberculosis patients in primary care in the District of Kuching, Sarawak. *Sains Malaysiana* 49(5): 1089-96. <https://doi.org/10.17576/jsm-2020-4905-13>
- Zakaria, R., Amri, N.S., Mohamad, N. 2022. Stigma and depression among tuberculosis patients in Kedah, Malaysia. *IJUM Med J Malaysia* 21(4): Article 4. <https://doi.org/10.31436/imjm.v21i4.2055>
- Zhang, K., Wang, X., Tu, J., Rong, H., Werz, O., Chen, X. 2019. The interplay between depression and tuberculosis. *J Leukoc Biol* 106(3): 749-57. <https://doi.org/10.1002/ILB.MR0119-023R>
- Zimet, G.D., Dahlem, N.W., Zimet, S.G., Farley, G.K. 1988. The multidimensional scale of perceived social support. *J Pers Assess* 52(1): 30-41. https://doi.org/10.1207/s15327752jpa5201_2