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# Translation and Psychometric Validation of the Mental Health Literacy Scale in Hindi (MHLS-HI): A Cross-Sectional Study of a Four-Factor Structure Among Hindi-Speaking Indian Adults

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**Research Article**

**Keywords:** mental health literacy, psychometric validation, cross-cultural adaptation, confirmatory factor analysis, stigma, India

**Posted Date:** July 21st, 2026

**DOI:** https://doi.org/10.21203/rs.3.rs-10397304/v1

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**Additional Declarations:** No competing interests reported.

# Abstract

Background. Mental health literacy (MHL) is a key, modifiable determinant of help-seeking and a recognised lever against India's large mental-health treatment gap, there is a need to develop a rigorously validated measure of MHL in Hindi because Hindi is the most widely spoken language in India. This study translated and validated the Mental Health Literacy Scale (MHLS) into Hindi (MHLS-HI).

Methods. In a cross-sectional psychometric validation, the 35-item MHLS was adapted using WHO and Beaton forward–backward translation procedures and three rounds of expert content review. Hindi-speaking adults (N = 290; M age = 28.24 years; 67.2% male) completed the MHLS-HI, the PHQ-9 and the Affiliate Stigma Scale (ASS). Content validity (CVI), internal consistency (Cronbach's α, McDonald's ω), construct validity (correlations) and known-groups validity (education) were examined, and the factor structure was tested using a split-sample exploratory factor analysis (EFA; n = 145) and confirmatory factor analysis (CFA; n = 145). All analyses were recomputed in R (seed fixed; assumptions checked).

Results. Content validity was strong (S-CVI/Ave ≥ .90 across rounds). The MHLS-HI was internally consistent (α = .85, 95% CI [.82, .88]; ω = .90). It correlated negatively with affiliate stigma (r = − .45, 95% CI [− .54, − .35]) and depressive symptoms (r = − .20, 95% CI [− .31, − .09]), supporting construct validity, and discriminated educational groups (Welch $F(2, 177.1) = 10.51$, $p < .001$, $\eta^2 = .05$). EFA yielded four factors (50.8% variance). On the holdout, a four-factor model (Help-Seeking Attitudes, Stigma and Personal Beliefs, Recognition, Knowledge of Where to Seek Information) fitted markedly better than a unidimensional model (CFI = .83 vs .53; RMSEA = .085 vs .137; $\Delta\chi^2(6) = 299.0$, $p < .001$). Discriminant validity was supported (all HTMT ≤ .46; Fornell–Larcker met), and the scale showed approximate measurement invariance across gender.

Conclusions. The MHLS-HI is a reliable, content- and construct-valid measure whose mental-health-literacy scores are best represented as four correlated dimensions rather than a single total, converging with multidimensional MHLS solutions reported internationally. It offers a usable, culturally grounded tool for research and dimension-specific intervention in Hindi-speaking India.


# Background

Mental disorders are among the leading contributors to the global burden of disease, and in India the scale of unmet need is striking. The National Mental Health Survey of India estimated that close to one in ten adults lived with a current mental morbidity, while the treatment gap for mental disorders ranged from roughly 70% to over 90% (Gautham et al., 2020). Demand-side barriers — low mental health literacy, stigma, and limited perceived need — are repeatedly identified alongside the shortage of specialists as drivers of this gap, and successive Indian policy statements have called for population-level literacy and de-stigmatisation as core responses.

Mental health literacy (MHL) — "knowledge and beliefs about mental disorders which aid their recognition, management or prevention" (Jorm et al., 1997; Jorm, 2012) — provides a coherent

framework for these demand-side determinants (Furnham & Swami, 2018). Jorm's formulation distinguishes several components: recognition of disorders, knowledge of causes and risk factors, of self-help and of professional help, attitudes that facilitate recognition and appropriate help-seeking, and knowledge of how to seek mental-health information. Among the instruments developed to operationalise this construct, the Mental Health Literacy Scale (MHLS; O'Connor & Casey, 2015) is distinctive in covering all of Jorm's domains within a single 35-item measure, and it has become the most widely used MHL instrument internationally (O'Connor, Casey, & Clough, 2014).

As the MHLS has been adapted across languages, however, its internal structure has proved unstable. Although it was introduced with a single total score, subsequent validations have reported solutions ranging from unidimensional to five- and six-factor models: a four-factor structure in the Slovenian general population (Krohne et al., 2022), multifactorial solutions among Chinese nurses (Wang et al., 2022) and French students (Montagni & González Caballero, 2022), as well as Portuguese (Dias Neto et al., 2021) and Turkish (Günaydın, 2024) samples; five-factor Persian solutions (Heizomi et al., 2020); and divergent results in Arabic and Urdu adaptations (Al-Qerem et al., 2024; BinDhim et al., 2023; Akhter et al., 2020). This heterogeneity suggests that the MHLS's structure is sensitive to linguistic and cultural context and that the original single-score interpretation may not generalise — an unresolved question with direct implications for how MHL is measured and targeted.

Over the last twenty years, various instruments have been developed to measure various constructs of MHL. Among those is the Mental Health Literacy Questionnaire (MHLq), which was developed in Portugal. It tests various constructs such as knowledge, stereotyping, self-help practices, and help-seeking behavior and has proved reliable in the study of adolescent samples (Campos et al., 2016). Pant (2022) conducted an attempt to adapt the MHLq to young Hindi-speaking adults in India, but only some factors showed empirical support for the instrument, and further adaptation seemed necessary for the Indian population of adults.

In India, MHL research has documented limited recognition and pervasive stigma, particularly in rural communities (Kermode et al., 2009; Armstrong et al., 2011), and cultural and linguistic barriers continue to impede recognition and help-seeking (Arampady et al., 2025; Devi et al., 2025); yet measurement has been constrained by the absence of validated local-language instruments. Hindi is the most widely spoken language in India and the third most spoken worldwide, but no validated Hindi version of the MHLS has been available. This gap limits both epidemiological description of MHL among Hindi speakers and the evaluation of literacy-based interventions in the population that most needs them.

The present study therefore aimed to translate and validate the MHLS into Hindi (MHLS-HI) for use among Hindi-speaking adults. Specific objectives were to (a) adapt the MHLS into Hindi using established cross-cultural procedures; (b) evaluate content validity; (c) assess internal consistency; (d) establish construct validity through associations with depressive symptoms and affiliate stigma; (e) test known-groups validity across educational attainment; and (f) examine the factor structure using split-

sample EFA and CFA. Two a priori hypotheses were specified: MHLS-HI scores would correlate negatively with depressive symptoms and with affiliate stigma.

## Methods

# Design

A cross-sectional survey design within a psychometric validation framework was used. Reporting follows the STROBE guideline for cross-sectional studies, supplemented by COSMIN reporting standards for studies of measurement properties.

## Participants

Participants were Hindi-speaking Indian adults aged 18 years to 70 years of age, recruited by purposive sampling through universities, community settings, workplaces and online channels, between November 2025 and May 2026. Eligibility required the ability to read and comprehend Hindi and provision of informed consent; individuals who could not complete the instruments independently, who had a current clinically confirmed schizophrenia-spectrum disorder or manic episode, or left any items unanswered on any instrument were excluded. Of 292 records collected, two were ineligible on age (16 and 17 years) and were excluded, yielding a final analytic sample of N = 290 with complete data. Because recruitment used an open, purposive strategy across online and offline channels without a fixed sampling frame, the total number of people approached could not be determined and a precise response rate cannot be reported; of the 292 questionnaires returned, 290 (99.3%) were eligible and analysed. For the full sample, the subject-to-item ratio (≈ 8.3:1) and an N exceeding 200 met established adequacy criteria for factor analysis (Comrey & Lee, 1992; MacCallum et al., 1999). However, further the sample were randomly split into two independent sub-groups for exploratory and confirmatory factor analysis. Post hoc, this sample afforded at least 80% power (α = .05, two-tailed) to detect correlations of r ≈ .16 and small-to-medium group differences; the two factor-analytic sub-samples (n = 145 each) were nonetheless modest, a power constraint considered in the Limitations.

## Measures

Mental Health Literacy Scale (MHLS; O'Connor & Casey, 2015). The MHLS comprises 35 items; items 1–15 use a four-point response format and items 16–35 a five-point format, with 12 items reverse-scored (10, 12, 15, 20–28). Total scores range from 35 to 160, with higher scores indicating greater MHL. The original scale showed good internal consistency (α = .87).

Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). The PHQ-9 is a nine-item measure of depressive-symptom severity (0–27). The Hindi version (Bhardwaj et al., 2023) was administered. A negative association with MHL was hypothesised.

Affiliate Stigma Scale (ASS; Mak & Cheung, 2008). The 22-item ASS assesses internalised stigma on a four-point format (total 22–88). The validated Hindi version (Kumari et al., 2020) was used; a negative association with MHL was hypothesised.

## Procedure

Written permission was obtained from the original authors. Translation followed World Health Organization (2023) and Beaton et al. (2000) procedures: two independent forward translations into Hindi, synthesis, back-translation, and expert reconciliation to achieve conceptual rather than literal equivalence. Content validity was established over three expert-panel rounds. A pilot study (n = 20) confirmed comprehensibility before main data collection, conducted online and offline. The study was approved by the institutional ethics committee (approval details in Declarations); participation was voluntary and confidential, and participants scoring ≥ 10 on the PHQ-9 received signposting to support services. To limit response bias, all instruments were self-administered anonymously in both online and offline formats and included reverse-keyed items; residual common-method and social-desirability influences are considered in the Limitations.

# Data analysis

Analyses were conducted in R with a fixed random seed and full session information recorded for reproducibility. Content validity was indexed by item- and scale-level CVIs (relevance rated ≥ 3 of 4). Internal consistency was estimated using Cronbach's α (with bootstrap 95% confidence intervals) and McDonald's ω. Normality was assessed using Shapiro–Wilk tests; because the distributions departed from normality, Spearman coefficients are reported alongside Pearson correlations, and Welch's correction was applied to the group comparison. Construct validity used Pearson correlations with the PHQ-9 and ASS. Known-groups validity used a one-way ANOVA across education, with Levene's test, Welch's correction and Games–Howell post-hoc comparisons; $\eta^2$ indexed effect size. The factor structure was examined using a random split-sample design: EFA (principal-axis factoring, oblimin rotation, parallel analysis; n = 145) and CFA (maximum likelihood; n = 145), in which a four-factor model was compared with a unidimensional model. Estimates are reported with 95% confidence intervals and exact p-values; α was set at .05 (two-tailed).

Construct-level validity was further examined on the full sample through composite reliability (CR) and average variance extracted (AVE), with discriminant validity assessed by the Fornell–Larcker criterion (Fornell & Larcker, 1981) and the heterotrait–monotrait ratio (HTMT; Henseler et al., 2015). Measurement invariance across gender was tested by multi-group CFA (configural, metric and scalar models), applying $\Delta CFI \leq .010$ and $\Delta RMSEA \leq .015$ as criteria (Chen, 2007).

## Results

Sample characteristics are summarised in Table 1 (participant flow, Fig. 1). Participants' mean age was 28.24 years (SD = 10.87; range 18–70); most were male (67.2%), graduate-educated (47.2%) and urban (76.6%).

Content validity. Across three expert rounds (9, 7 and 5 experts), the scale-level content validity index (averaging method) was .92, .90 and .95, each exceeding the .80 criterion (Polit & Beck, 2006), with item-level indices spanning .57–1.00 (Table 2). Qualitative feedback guided minor linguistic revisions.

Reliability. The 35-item MHLS-HI showed good internal consistency (α = .85, 95% CI [.82, .88]; ω = .90); the criterion measures were also reliable (ASS α = .96; PHQ-9 α = .85; Table 3). No item deletion materially increased α.

Descriptives and construct validity. Descriptive statistics appear in Table 4, and the score distributions in Fig. 2 (MHLS-HI M = 113.26, SD = 15.36). Both a priori hypotheses were supported: MHLS-HI correlated negatively with affiliate stigma (r = − .45, 95% CI [− .54, − .35], p < .001) and with depressive symptoms (r = − .20, 95% CI [− .31, − .09], p < .001); stigma and depression were positively associated (r = .25, 95% CI [.13, .35]; Table 5; Fig. 3).

Known-groups validity. Because variances were heterogeneous (Levene F(2, 287) = 6.03, p = .003), Welch's ANOVA was used; MHLS-HI scores differed by education, F(2, 177.1) = 10.51, p < .001, $\eta^2$ = .05, 95% CI [.01, .10]. Graduates and postgraduates scored higher than the school-level group (Games–Howell ps ≤ .001), while graduates and postgraduates did not differ (Table 6; Fig. 4).

Factor structure. On the EFA sub-sample, sampling adequacy was good (KMO = .81; Bartlett's $\chi^2(190)$ = 1,286, p < .001). Parallel analysis retained four factors, and a four-factor oblimin solution accounted for 50.8% of the variance with clean simple structure (Table 7; scree, Fig. 5). On the independent holdout, the four-factor model fitted far better than a unidimensional model (CFI = .83 vs .53; RMSEA = .085 vs .137; SRMR = .10 vs .13; $\Delta\chi^2(6)$ = 299.0, p < .001), with lower AIC and BIC (Table 8). All standardised loadings were significant (.36–.83), and inter-factor correlations were small to moderate (.14–.50). The four factors — Stigma and Personal Beliefs, Help-Seeking Attitudes, Recognition of Mental Health Problems, and Knowledge of Where to Seek Information — are depicted in Fig. 6. Although incremental fit fell short of the conventional .90 benchmark, the four-factor model's clear superiority over the single-factor alternative indicates that MHL in this sample is better represented as four correlated dimensions than as one total score.

Convergent and discriminant validity. A full-sample four-factor CFA (N = 290) fitted acceptably (CFI = .87, TLI = .85, RMSEA = .075, 90% CI [.07, .08], SRMR = .077). Composite reliability was adequate for three of the four factors (CR = .89, .79, .77 and .63 for Help-Seeking Attitudes, Stigma and Personal Beliefs, Recognition, and Knowledge of Where to Seek Information). Average variance extracted reached the .50 convergent-validity threshold for Help-Seeking Attitudes (AVE = .53) but fell below it for the remaining factors (AVE = .43, .41, .37), consistent with the moderate item loadings. Discriminant validity was

nonetheless clearly supported: the Fornell–Larcker criterion held for every factor pair, and all heterotrait–monotrait ratios were well below the .85 threshold (maximum HTMT = .46) (Table 9).

Measurement invariance. Multi-group CFA across gender supported configural invariance (CFI = .86, RMSEA = .079). The metric step was borderline on the ΔCFI criterion (ΔCFI = − .011, marginally beyond − .010) but acceptable on ΔRMSEA (.001), and the scalar step met both criteria (ΔCFI = − .007, ΔRMSEA = .000). Measurement invariance across gender was therefore approximately supported; given the modest female subsample (n = 95), latent-mean gender comparisons should be made cautiously (Table 10).

## Discussion

This study provides the first psychometric validation of a Hindi version of the MHLS. The MHLS-HI demonstrated strong content validity, good internal consistency, theoretically coherent construct validity, and known-groups validity across education; critically, its scores were best represented as four correlated dimensions rather than a single total.

The structural finding is the study's central contribution. The four-factor solution — help-seeking attitudes, stigma and personal beliefs, recognition, and knowledge of where to seek information — and its decisive superiority over a unidimensional model align closely with the four-factor Slovenian validation (Krohne et al., 2022) and with the multifactorial Chinese and French solutions (Wang et al., 2022; Montagni & González Caballero, 2022). Read alongside this literature, the MHLS-HI adds South Asian evidence to a growing consensus that the MHLS's original single-score interpretation does not travel well across cultures, and that MHL is more faithfully captured as a set of related but distinct competencies (O'Connor et al., 2014). That the model's incremental fit remained below the .90 convention — as it did, with comparable indices, in several of these adaptations — is itself informative: it suggests residual cross-cultural item behaviour rather than a defect unique to the Hindi version, and points to item-level refinement as the next step. The multidimensional conclusion therefore rests on relative model evidence ($\Delta\chi^2(6) = 299.0$, $p < .001$; lower AIC and BIC) and reasonable RMSEA (.085) and SRMR rather than on absolute incremental-fit cut-offs.

Construct validity was supported by the predicted inverse associations of MHL with affiliate stigma and depressive symptoms. The medium-to-large MHL–stigma association is consistent with theoretical accounts in which literacy and stigma are reciprocally linked (Corrigan & Watson, 2002; Jorm, 2012; see also Simões de Almeida et al., 2023), and it is notable that stigma and personal beliefs emerged as a distinct, substantial factor in the Hindi structure. In the Indian context, where stigma is a particularly salient barrier to care (Kermode et al., 2009), this dimensional separation is practically useful: it allows stigma-related literacy to be profiled and targeted in its own right rather than being absorbed into a global score.

The graded relationship between education and MHL replicates a robust demographic pattern and supports the scale's known-groups validity. The effect was small-to-medium ($\eta^2 = .05$); the absence of a

graduate–postgraduate difference suggests that the principal literacy gain is associated with the transition beyond school-level education, with implications for where curriculum-based literacy efforts may yield most.

## Implications

Clinically, the MHLS-HI offers practitioners and public-health workers a validated, dimension-specific tool for profiling literacy strengths and deficits among Hindi speakers. For training and education, the education gradient supports embedding MHL content in secondary and undergraduate curricula, where literacy- and stigma-focused interventions have shown durable effects (Freţian et al., 2021). For policy, the prominence of the stigma dimension reinforces the value of the two-pronged knowledge-plus-stigma approach advocated in Indian mental-health policy.

# Limitations

Several limitations qualify these findings. The sample was younger, more often male and more highly educated than the general population, and drawn from limited settings, so the validation should not be read as a population estimate of MHL; generalisation to rural, older or less-educated Hindi speakers requires further study. The CFA sub-sample (n = 145), although adequate, was modest, and incremental fit fell below conventional thresholds, so the four-factor structure is best regarded as well-supported but provisional pending replication in larger, more representative samples. The cross-sectional, single-administration design precluded test–retest reliability; measurement invariance across gender was only approximately supported and was constrained by the modest female subsample, while invariance across residence and mode of administration remains untested and should precede subgroup comparisons. Reliance on self-report invites common-method and social-desirability influences, and common-method variance cannot be excluded as a partial contributor to the observed construct-validity correlations. These analyses are exploratory rather than pre-registered. Lastly, this is not an official approved translation.

## Conclusion

The MHLS-HI(modified version of the MHLS) is a reliable and valid Hindi measure of mental health literacy whose scores are best interpreted across four correlated dimensions rather than as a single total. By providing a culturally grounded, dimension-specific instrument for India’s largest language community, it enables both the measurement of mental health literacy and the design of targeted, stigma-aware interventions where the need is greatest. Future research should establish test–retest reliability and replicate the four-factor structure in a larger, more representative sample, including invariance across residence and mode of administration.

## Declarations

**Ethics approval and consent to participate.** The study was approved by the Institutional Ethics Committee (IEC) of the School of Behavioural Sciences and Forensic Investigations, Rashtriya Raksha University (Ref.No.: RRU/SBSFI/ECM3/25/11). All procedures accorded with the 1964 Declaration of Helsinki and its later amendments. Written informed consent (offline) or mandatory digital consent (online) was obtained from all participants prior to participation.

**Consent for publication.** Not applicable (no individually identifiable data are reported).

**Availability of data and materials.** The de-identified dataset, the full R analysis script and the session information supporting the findings are provided as supplementary materials and will be deposited in a public repository on acceptance; they are also available from the corresponding author on reasonable request, subject to the consent terms approved by the IEC.

**Competing interests.** The authors declare that they have no competing interests.

**Funding.** This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

**Authors' contributions.** HT: Data curation, Analysis, Methodology Validation, Visualisation, Writing & editing, GKS: Conceptualisation, Formal Analysis, Methodology, Resources, Supervision, Visualisation, Writing – review & editing. All authors read and approved the final manuscript.

**Acknowledgements.** The authors thank the expert translator: Arghya Chakraborty and Rohini Sharma, and expert panellists: Aditi Chowdhary, Ayoleena Roy, Kantadorshi Parashar, Mohit Kumar, Raveena Saroye, Shubhdip Kaur, Sunny Kumar Sharma, Vaidehi Rana and Jay Datt Bhatt for their contributions to content validation, and all participants and Matt O'Connor (author MHLS) for permission to translate and validate the scale.

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# Tables

**Table 1** *Sociodemographic Characteristics of the Sample (N = 290)*

| Variable | Category | n | % |
|---|---|---|---|
| Gender | Male | 195 | 67.2 |
| | Female | 95 | 32.8 |
| Education | School (≤ higher secondary) | 75 | 25.9 |
| | Graduate | 137 | 47.2 |
| | Postgraduate and above | 78 | 26.9 |
| Occupation | Student | 156 | 53.8 |
| | Employed | 90 | 31.0 |
| | Self-employed | 26 | 9.0 |
| | Homemaker | 7 | 2.4 |
| | Unemployed | 11 | 3.8 |
| Residence | Rural | 68 | 23.4 |
| | Urban | 222 | 76.6 |

*Note.* Age M = 28.24, SD = 10.87, range 18–70.

**Table 2** *Content Validity Indices Across Three Expert-Review Rounds*

| Round | Experts (n) | I-CVI range | S-CVI/Ave | S-CVI/UA |
|---|---|---|---|---|
| Round 1 | 9 | 0.69–1.00 | .92 | .20 |
| Round 2 | 7 | 0.57–1.00 | .90 | .43 |
| Round 3 | 5 | 0.80–1.00 | .95 | .77 |

*Note.* I-CVI = item-level CVI; S-CVI/Ave = scale-level CVI (averaging); UA = universal agreement. Criterion S-CVI/Ave ≥ .80.

**Table 3** *Internal-Consistency Reliability*

| Scale | k | α | 95% CI | ω |
|---|---|---|---|---|
| MHLS-HI total | 35 | .85 | [.82, .88] | .90 |
| Affiliate Stigma Scale | 22 | .96 | [.95, .97] | .97 |
| PHQ-9 | 9 | .85 | [.82, .88] | .89 |

*Note.* 95% CI for α from 1,000 bootstrap samples; ω = McDonald's omega.

**Table 4** *Descriptive Statistics for Study Variables (N = 290)*

| Variable | M | SD | Median | Skewness | Kurtosis |
|---|---|---|---|---|---|
| MHLS-HI total | 113.26 | 15.36 | 112 | 0.40 | 0.15 |
| Affiliate Stigma Scale | 42.04 | 13.07 | 44 | 0.88 | 1.89 |
| PHQ-9 | 6.09 | 5.17 | 5 | 0.93 | 0.43 |

*Note.* MHLS-HI observed range 72–158 (possible 35–160).

**Table 5** *Intercorrelations Among MHLS-HI, ASS and PHQ-9 (N = 290)*

| Variable pair | Pearson r | 95% CI | Spearman ρ | p |
|---|---|---|---|---|
| MHLS-HI – ASS | −.45 | [−.54, −.35] | −.47 | < .001 |
| MHLS-HI – PHQ-9 | −.20 | [−.31, −.09] | −.23 | < .001 |
| ASS – PHQ-9 | +.25 | [.13, .35] | +.26 | < .001 |

*Note.* Effect sizes per Cohen (1988). Spearman CIs from 2,000 bootstrap resamples.

**Table 6** *MHLS-HI Total by Educational Attainment (Welch's ANOVA)*

| Education level | n | M | SD | 95% CI |
|---|---|---|---|---|
| School (≤ higher secondary) | 75 | 108.0 | 11.4 | [105.4, 110.6] |
| Graduate | 137 | 115.0 | 17.1 | [112.1, 117.9] |
| Postgraduate and above | 78 | 116.0 | 14.2 | [112.8, 119.2] |

*Note.* Welch $F(2, 177.1) = 10.51$, $p < .001$, $\eta^2 = .05$, 95% CI [.01, .10]; post-hoc Games–Howell.

**Table 7** *EFA Pattern Loadings for the 20-Item MHLS-HI (n = 145)*

| Item (abbreviated) | F1 | F2 | F3 | F4 | $h^2$ |
|---|---|---|---|---|---|
| 29 Move next door to a person with MI | .72 | | | | .49 |
| 30 Socialise with a person with MI | .71 | | | | .60 |
| 31 Make friends with a person with MI | .79 | | | | .65 |
| 32 Work closely with a person with MI | .85 | | | | .72 |
| 33 Person with MI marrying into family | .79 | | | | .69 |
| 34 Vote for politician with MI history | .64 | | | | .50 |
| 35 Employ a person with MI history | .73 | | | | .55 |
| 23 Avoid people with MI to prevent it | | .48 | | | .36 |
| 24 Would not tell anyone if I had MI | | .66 | | | .54 |
| 25 Seeing a professional = not strong | | .70 | | | .50 |
| 27 Would not seek professional help | | .68 | | | .46 |
| 28 Professional treatment not effective | | .73 | | | .53 |
| 3 Recognition of major depression | | | .57 | | .38 |
| 4 Recognition of personality disorders | | | .85 | | .69 |
| 5 Recognition of dysthymia | | | .67 | | .48 |
| 6 Recognition of agoraphobia | | | .56 | | .39 |
| 7 Recognition of bipolar disorder | | | .53 | | .34 |
| 16 Where to seek MI information | | | | .79 | .63 |
| 17 Confidence using device to seek info | | | | .52 | .37 |
| 18 Confidence attending appointments | | | | .40 | .28 |

*Note.* Principal-axis factoring, oblimin rotation; loadings < .30 suppressed. F1 = Help-Seeking Attitudes; F2 = Stigma & Personal Beliefs; F3 = Recognition; F4 = Knowledge of Where to Seek Information. Total variance = 50.8%. MI = mental illness.

**Table 8** *CFA Model Comparison (Holdout n = 145)*

| Model | $\chi^2$ | df | CFI | TLI | RMSEA [90% CI] | SRMR |
|---|---|---|---|---|---|---|
| Unidimensional | 633.4 | 170 | .53 | .48 | .137 [.13, .15] | .13 |
| Four-factor | 334.4 | 164 | .83 | .80 | .085 [.07, .10] | .10 |

*Note.* ML estimation. Four-factor preferred: $\Delta\chi^2(6) = 299.0$, $p < .001$; $\Delta$AIC = 287; $\Delta$BIC = 269. Thresholds: CFI/TLI ≥ .90; RMSEA < .08; SRMR < .08 (Hu & Bentler, 1999).

**Table 9** *Composite Reliability, AVE and Discriminant Validity (Full-Sample CFA, N = 290)*

| Factor | CR | AVE | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 1. Stigma & Personal Beliefs | .89 | .53 | (.73) | | | |
| 2. Help-Seeking Attitudes | .79 | .43 | .23 | (.65) | | |
| 3. Recognition | .77 | .41 | .42 | .16 | (.64) | |
| 4. Knowledge of Where to Seek Info | .63 | .37 | .37 | .21 | .45 | (.61) |

*Note.* Full-sample CFA: CFI = .87, RMSEA = .075, SRMR = .077. CR = composite reliability; AVE = average variance extracted. Diagonal (parentheses) = √AVE; below diagonal = inter-factor correlations. Fornell–Larcker discriminant validity holds (√AVE > all correlations). Maximum HTMT = .46 (threshold .85).

**Table 10** *Measurement Invariance of the MHLS-HI Across Gender*

| Model | $\chi^2$ | df | CFI | RMSEA | SRMR | ΔCFI | ΔRMSEA |
|---|---|---|---|---|---|---|---|
| Configural | 625.4 | 328 | .86 | .079 | .078 | — | — |
| Metric | 665.0 | 344 | .85 | .080 | .088 | −.011 | .001 |
| Scalar | 694.7 | 360 | .84 | .080 | .089 | −.007 | .000 |

*Note.* Multi-group CFA (male n = 195, female n = 95). Criteria: ΔCFI ≥ −.010 and ΔRMSEA ≤ .015 (Chen, 2007). Configural supported; metric borderline by ΔCFI but supported by ΔRMSEA; scalar supported — interpreted as approximate invariance given the female subsample.

# Figures

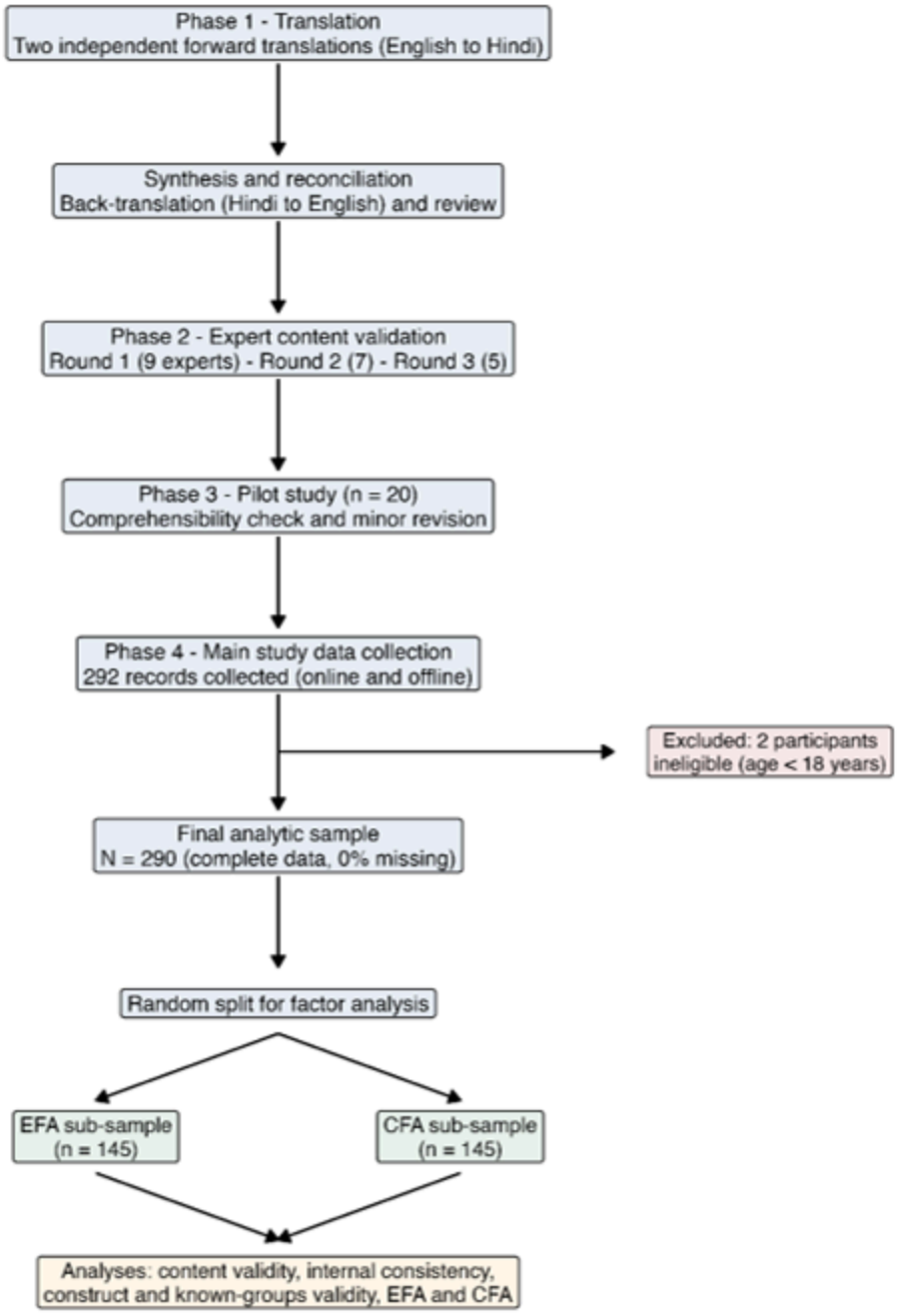



**Figure 1**

Study flow of the translation, cross-cultural adaptation, and psychometric validation of the MHLS-HI. The instrument underwent forward translation by two independent bilingual translators, synthesis, and back-translation, followed by three rounds of expert content validation (9, 7, and 5 experts) and a pilot study (n = 20). In the main study, 292 records were collected; two participants aged under 18 years were excluded as ineligible, yielding a final analytic sample of 290 with complete data. The sample was randomly split into independent exploratory (n = 145) and confirmatory (n = 145) factor-analysis sub-samples.

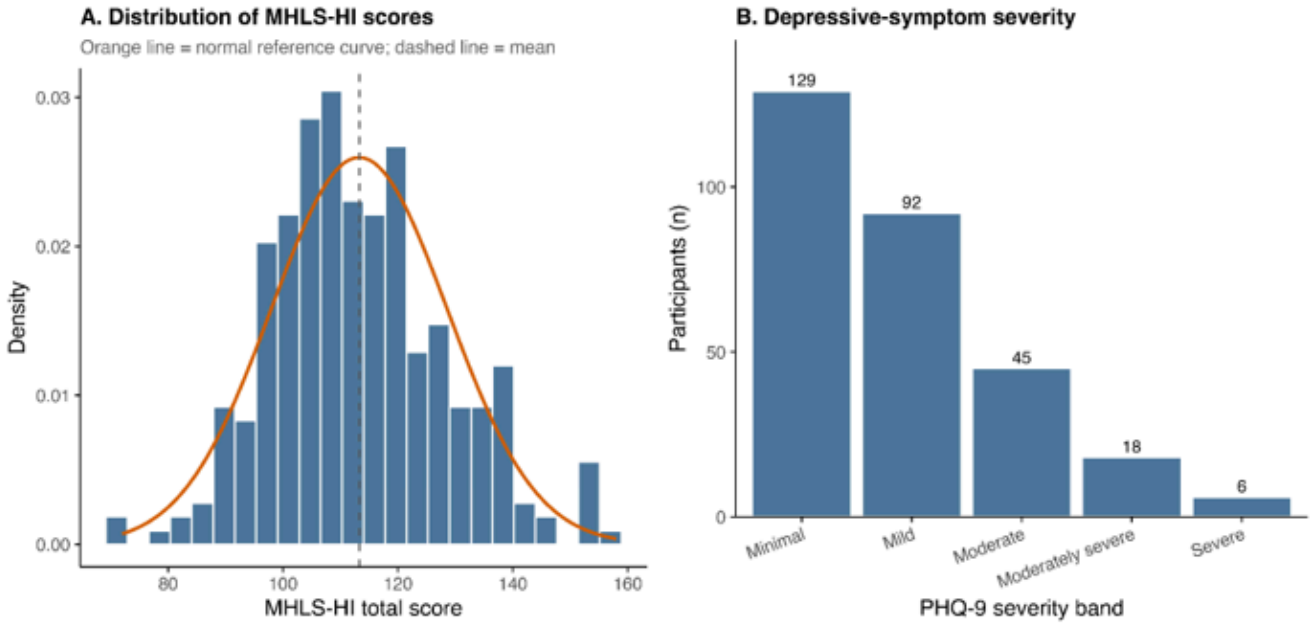



**Figure 2**

Distribution of study scores. Panel A shows MHLS-HI total scores (histogram) with a superimposed normal reference curve (orange) and the sample mean (dashed line); the distribution is approximately symmetric. Panel B shows the number of participants in each PHQ-9 depressive-symptom severity band.

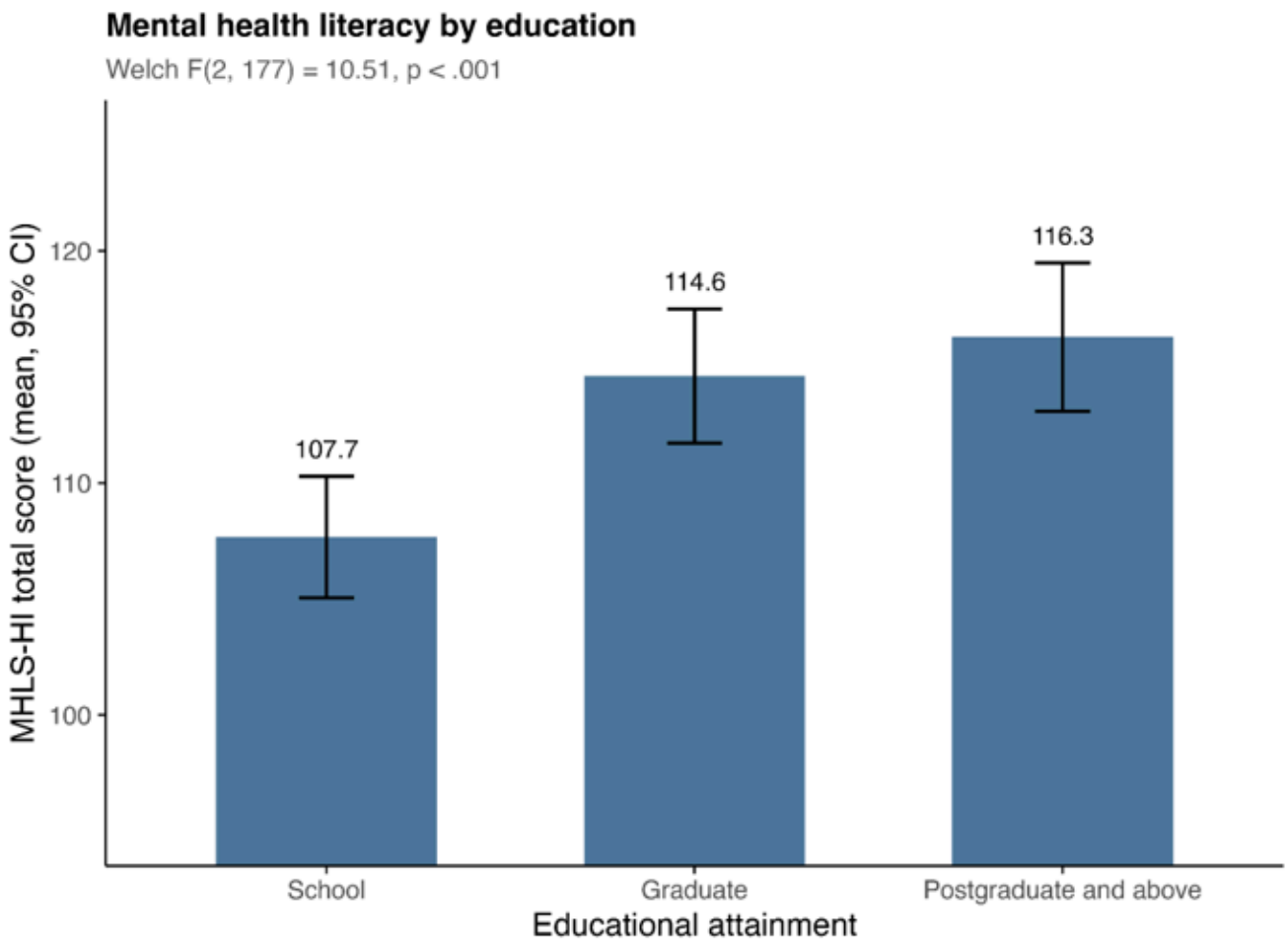



**Figure 3**

Construct validity of the MHLS-HI. Scatterplots with linear fit lines (95% confidence band) show the association of MHLS-HI total scores with (A) affiliate stigma, r = −.45 (95% CI [−.54, −.35]), and (B) depressive symptoms, r = −.20 (95% CI [−.31, −.09]); both negative and significant (p < .001), as hypothesised.

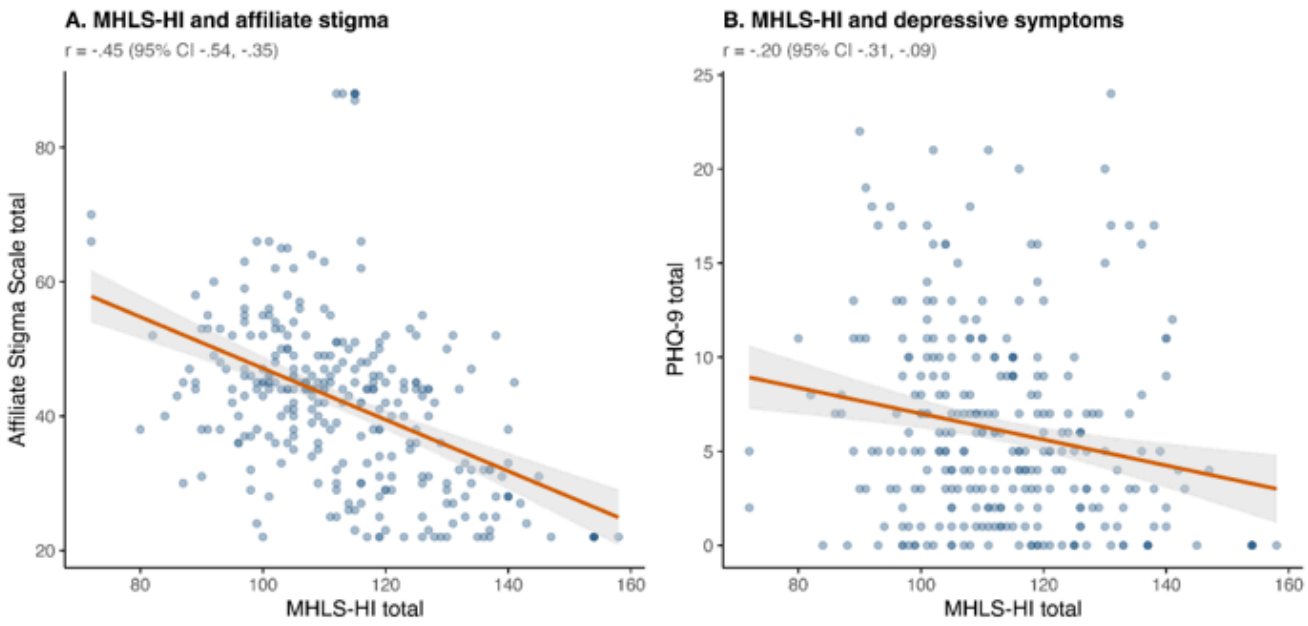



**Figure 4**

Mental health literacy by educational attainment. Bars show mean MHLS-HI total scores with 95% confidence intervals. Scores increased with education; Welch's ANOVA was significant, $F(2, 177) = 10.51$, $p < .001$, $\eta^2 = .05$ (95% CI [.01, .10]); Games–Howell comparisons showed graduates and postgraduates scored higher than the school-level group.

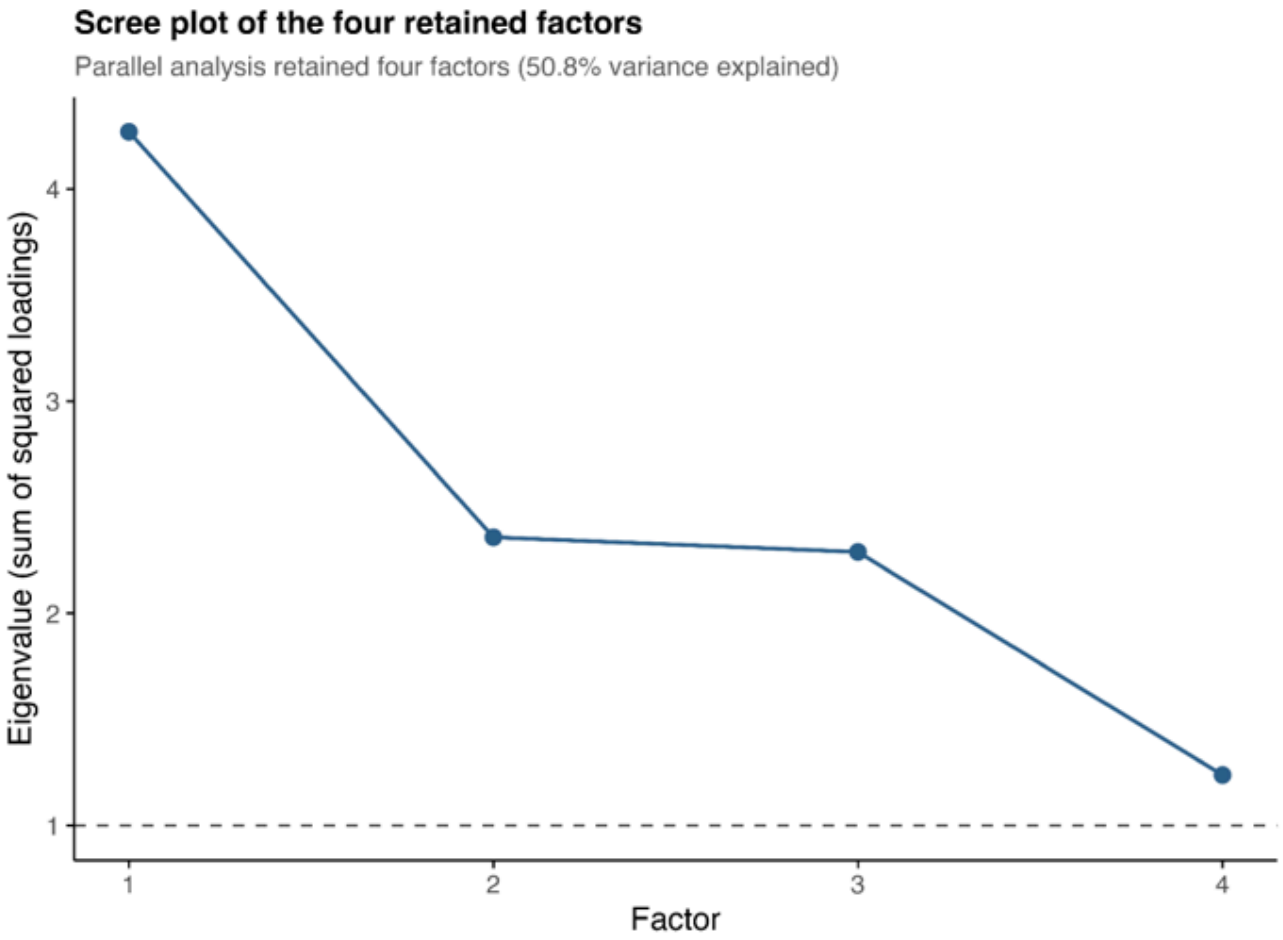



**Figure 5**

Scree plot of the four factors retained for the 20-item MHLS-HI. Eigenvalues are plotted by factor; parallel analysis retained four factors, together accounting for 50.8% of the variance in the exploratory sub-sample.

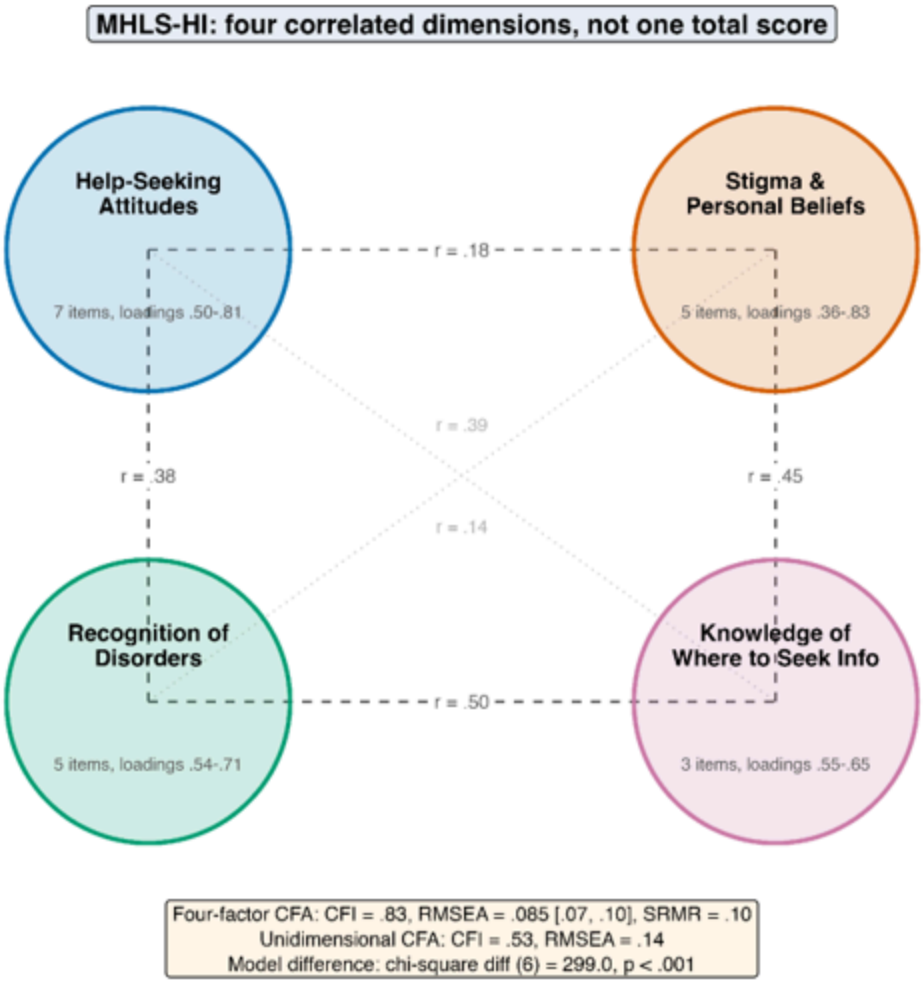



**Figure 6**

(headline). The validated four-factor structure of the MHLS-HI: four correlated dimensions — Help-Seeking Attitudes, Stigma and Personal Beliefs, Recognition of Disorders, and Knowledge of Where to Seek Information — with standardised-loading ranges in each node and inter-factor correlations on the connecting lines. On the holdout the four-factor model fitted far better than a unidimensional model (CFI = .83 vs .53; RMSEA = .085 vs .137; $\Delta\chi^2(6) = 299.0$, $p < .001$).

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- 04AppendixSupplementaryMHLSHI.docx