Original article

SAGE Open Medicine

SAGE Open Medicine
Volume 13: 1–11

DOI: 10.1177/20503121251341423
journals.sagepub.com/home/smo
Sage

Development and validation of Mental Health Literacy Assessment Scale among community health workers in Nepal

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Abstract

Objective: To develop and validate the Mental Health Literacy Assessment Scale for assessing mental health literacy among community health workers.

Method: A total of 24 items were initially generated and refined through cognitive interviews and expert evaluation. The final scale consisted of 20 items. Face validity was ensured through cognitive interviews conducted in two phases with community health workers and volunteers. Content validity was assured based on the ratings of six experts. Cross-sectional survey was performed among 233 community health workers. Exploratory factor analysis using Varimax rotation was performed to identify latent variables with factor loadings >0.4. Confirmatory factor analysis was employed to validate the model, using root mean square error of approximation <0.05, standardized root mean square residual <0.08, comparative fit index $\geqslant 0.90$, and Tucker–Lewis index $\geqslant 0.90$. Reliability was assessed through Cronbach's alpha where alpha coefficient >0.70 indicated internal consistency.

Results: Exploratory factor analysis identified four factors explaining 50.75% of variance explained by positive mental health behaviors (21.44%), misconceptions about mental health (14.24%), symptoms of mental distress (8.70%), and mental health stigma (6.37%). The confirmatory factor analysis demonstrated excellent model fit, with indices such as the normed Chi-square (1.31), comparative fit index (0.95), Tucker–Lewis index (0.94), and root mean square error of approximation (0.03). The scale displayed strong convergent and discriminant validity, with an average variance extracted >0.43 and composite reliability >0.70 for all factors. Internal consistency was confirmed, with a Cronbach's alpha value of 0.78 for the overall scale.

Conclusion: The Mental Health Literacy Assessment Scale has demonstrated robust psychometric properties and comprehensive coverage of mental health literacy components, making it a valuable tool for both research and practical applications among Community health workers in Nepal. While these findings support its utility in this context, further validation is needed to establish its applicability across other low- and middle-income countries to assess its effectiveness in diverse cultural and geographic settings.

Keywords

Community health workers, health literacy scale, health volunteers, mental health literacy

Received: 25 February 2025; accepted: 25 April 2025

Introduction

Health literacy is the cognitive and social skills of an individual that determine the motivation and ability to access, understand, and use information in ways that promote and maintain good health,[1,2] and plays a crucial role in overall well-being. Mental health literacy (MHL), a subdomain of health literacy, has evolved significantly since its introduction in 1997 as "knowledge and beliefs about mental disorders which aid their recognition, management or prevention."[3] With the evolving landscape of health literacy research, MHL has broadened to include multiple components, such as the ability to recognize specific disorders, knowledge, and beliefs about risk factors and causes, self-help interventions,

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the ability to seek mental health information, awareness of available professional help, and attitudes that facilitate recognition and health-seeing behavior.[4,5] It has been emphasized that MHL should not only focus on mental disorders but also reflect positive mental health.[6,7] This expanded perspective acknowledges the importance of promoting well-being and preventing mental health problems alongside the ability to identify and manage mental disorders.

Community health workers (CHWs) could include mid-level health service providers, health volunteers, school nurses, and other community-based healthcare personnel who serve as a bridge between communities and the healthcare system.[8–10] In Nepal, healthcare workers (HCWs) encompass a broad range of professionals, including physicians, nurses, paramedics, and community-based workers. Mid-level service providers, a subset of HCWs, include auxiliary nurse midwives (ANMs), health assistants (HAs), certified medical assistants, and auxiliary health workers (AHWs). These professionals are the major CHWs in Nepal, who primarily deliver primary healthcare services in rural and semi-urban areas, often working in health posts and primary healthcare centers. Unlike specialist physicians, mid-level service providers receive diploma-level training and play a crucial role in community health promotion, disease prevention, and basic clinical care. Given their frontline position in healthcare delivery, assessing their MHL is essential for strengthening community-based mental health services. However, these frontline workers often lack access to adequate mental health training and educational resources, which limits their ability to address mental health issues within their communities effectively. In Nepal, for instance, Female Community Health Volunteers (FCHVs), who are typically local women above 25 years of age, are provided with a basic 18 days of training in various primary healthcare topics. They play a crucial role in community health outreach, yet their training programs may not fully address MHL needs.[11–13] Similarly, mid-level health service providers from primary healthcare units also contribute significantly to primary healthcare delivery at the community level. However, not all of these crucial personnel are provided with formal education and/or training in mental health. To ensure that these health workforces can offer appropriate care and effectively connect individuals with mental health problems to the healthcare system, it is essential to assess their MHL and equip them with the necessary knowledge and skills to effectively identify, support, and refer individuals experiencing mental health challenges. Despite their critical role, there is a notable lack of tools in the literature specifically designed to assess MHL among these personnel.

Existing MHL scales are designed primarily for the general population and focus broadly on areas such as knowledge of mental disorders, risk factors, available professional help, positive mental health behaviors, and general awareness and understanding of mental health issues.[5,6,14,15] While these scales provide valuable insights, applying multiple scales to cover each MHL component addressed by these scales is time-consuming and inefficient. In addition, the existing tools fail to capture critical aspects relevant to CHWs, such as addressing myths and misconceptions, reducing stigma, and recognizing the need for interpersonal support in mental health care. They also lack the ability to assess essential competencies required for CHWs, including identifying individuals in distress, providing basic support, and facilitating access to appropriate care.

Given these limitations, there is a pressing need for a tailored assessment tool that comprehensively evaluates all essential components of MHL, particularly the ability to assist others in navigating mental health challenges. While existing tools offer a general understanding of mental health, they do not adequately assess MHL in health workers and volunteers, who require deeper knowledge beyond general awareness. Given their unique role, there is a need for a tailored MHL tool that assesses and equips CHWs with the specific knowledge and skills required to contribute effectively to mental health care within their communities. To address this gap, our study aims to develop and validate a new MHL tool tailored for CHWs also referred to as basic health care providers. This scale will be useful for assessing their knowledge, beliefs, and attitudes toward mental health, ultimately enhancing their ability to provide informed mental health support within their workplaces and communities.

Methods

Study design and participants

This cross-sectional, exploratory study was conducted among mid-level healthcare providers in Lalitpur Metropolitan City. The study population included HAs, ANMs, AHWs, FCHVs, and other community-based health volunteers.

Phase 1: Item generation and refinement

In the initial stage of scale development, an extensive literature review and expert consultation were conducted to develop a pool of potential items for the Mental Health Literacy Assessment Scale (MHLAS). The development and validation of the MHLAS followed a systematic process outlined by Boateng et al.[16] The initial stage involved an extensive literature review using PubMed, Scopus databases, and Google Scholar search engine employing keyword combinations such as "MHL," "health literacy," "CHWs," "health professionals," and "MHL assessment tool." Existing MHL scales, such as the Mental Health Literacy Questionnaire,[14] Mental Health Literacy Scale,[5] Mental Health Literacy Questionnaire in Young People,[15] and Mental Health-Promoting Knowledge Instrument,[6] were also explored as reference documents.

Considering the target population of CHWs (mid-level providers and health volunteers), the aim was to tailor the MHLAS to make it more relevant to this population.

Extensive literature reviews were performed to identify the core MHL components. The items covering knowledge of mental health conditions, help-seeking behavior, common stigma and misconceptions, and positive mental health practices were listed. Following expert consultation with public health and mental health professionals, along with experts experienced in tool development and validation, a total of 24 items were listed for refinement. The items were assessed on a 5-point Likert scale with response options ranging from "strongly disagree," "disagree, uncertain/neutral," "agree," to "strongly agree." To ensure that participants are attentive to the items and respond carefully to the items, some items were kept for reverse coding.

Phase 2: Content and face validity

Six experts specializing in Public Health, Education, Psychology, Implementation Research, and Health Promotion were involved in the generation of the initial item pool to capture MHL. Following this, they independently conducted the content validity assessment. Their selection was based on their extensive experience in mental health research, community-based interventions, social behavior change, health system strengthening, and scale validation, ensuring a rigorous and comprehensive evaluation of the tool.

Concurrently, face validity assessment was initiated through cognitive interviews with target participants to gather feedback on the comprehensibility, relevance, and clarity of the generated items. Face validity is the preliminary, subjective assessment of the tool's ability to appear relevant and appropriate for its intended purpose from the perspective of both the test participants and the experts in the field.[16] Thus, to gain insights into participants' understanding of each of the items, their subjective ideas, and potential response rates, cognitive interviews were conducted. Cognitive interviewing is a qualitative method that assesses how respondents interpret and respond to survey items, helping to identify ambiguities and improve item clarity.[17,18]

In the first phase of the cognitive interview, four mid-level health service providers and eight FCHVs were individually interviewed to assess their understanding of the items and identify unclear or difficult wording. Based on the feedback, necessary modifications were made to improve item clarity and ensure cultural appropriateness. For instance, the reverse-coded item "*Regular exercise does not affect mental health*" was rephrased as the positive statement "*Regular exercise has a positive impact on mental well-being*" to enhance clarity.

Simultaneously, content validity was assessed by the experts using a 4-point rating scale, where higher scores indicated greater relevance and clarity for assessing MHL, while lower scores reflected disapproval. Agreement among experts was quantified using content validity ratio (CVR) and content validity index (CVI). The CVR was calculated for each item using Lawshe's formula $CVR = ((n_e - N/2)/(N/2))$, where n_e is the number of experts rating the item as "quite relevant" or "highly relevant," and N is the total number of experts. The minimum acceptable CVR threshold was determined based on Lawshe's criteria for six experts.[19] The CVI was computed at both the item level (I-CVI) and the scale level (S-CVI). The I-CVI was calculated as I-CVI = (Number of experts rating the items as 3 or 4)/(Total number of experts). The scale-level CVI (S-CVI) was determined by averaging the I-CVI scores of all retained items.[19]

During the expert evaluation, three additional items were marked for removal due to concerns about their relevance, clarity, and potential for misinterpretation. The item "*People with mental illness cannot be trusted to make decisions about their own treatment*" was excluded because experts noted that while decision-making in mental health is an important topic, this item lacked precision and risked conflating concepts such as legal capacity, autonomy, and clinical recommendations. There was also a concern that respondents' answers could be influenced by personal beliefs rather than actual knowledge of MHL, potentially compromising the accuracy of the assessment. Similarly, the item "*Addiction is always a personal choice, not a real mental health condition*" was removed because it oversimplified the complexity of addiction, failing to acknowledge the biological, psychological, and social factors involved. Experts noted that its wording could lead to responses shaped by subjective opinions rather than established mental health knowledge. Another item, "*Taking psychiatric medication alters a person's real personality*," was also removed due to interpretation challenges. While concerns about medication and personality exist, experts highlighted that the phrase "real personality" is inherently subjective and lacks a universally agreed-upon meaning, increasing the likelihood of inconsistent responses among participants. After these removals, the remaining items demonstrated strong agreement among the experts. The CVR values for all retained items exceeded 0.67, surpassing the minimum threshold and indicating a strong endorsement of their essentiality. In addition, the I-CVI for all retained items ranged between 0.83 and 1, further reinforcing their relevance and clarity. The S-CVI, calculated as the average of the I-CVIs, was determined to be 0.93, demonstrating excellent overall content validity of the tool.

After the expert evaluation and discussion, the second phase of the cognitive interview was conducted with a different group of two mid-level health service providers and four FCHVs to confirm the effectiveness of these revisions. However, one item, "*People with mental health conditions behave differently from normal people*," was deemed too vague and was therefore removed from the scale. The term "differently" lacked specificity, leading to concerns about varied interpretations among respondents. No further concerns were raised regarding the remaining 20 items.

Phase 3: Sampling and data collection

The mid-level healthcare providers and health volunteers working in the Lalitpur Metropolitan City were eligible to

participate in this study and no specific exclusion criteria were applied. Lalitpur Metropolitan City was selected due to its proximity to the national capital and its high population density, making it a relevant setting for studying MHL in a diverse healthcare workforce. Furthermore, the metropolitan authority readily granted permission for the study and supported the research team in creating the sampling frame, facilitating smooth data collection. The public health section of Lalitpur Metropolitan City provided a comprehensive list of FCHVs in each ward, as well as other health volunteers and mid-level health service providers working across the community health units, including health posts, urban health centers, and basic healthcare centers within the metropolitan area.

The sample size was determined using Cochran's formula, assuming a 50% proportion of MHL due to the lack of prior studies. With a 5% margin of error and a 95% confidence interval, and adjusting for a finite population of 456, the required sample size was 209, which was further increased to 233 to account for a 10% nonresponse rate. Participants were selected using simple random sampling. A list of eligible participants was prepared, and random numbers were generated to select individuals. A total of 233 healthcare professionals (HAs, ANMs, AHWs, FCHVs, and other health volunteers) of Lalitpur Metropolitan City were approached in the survey. This sample size meets the minimum recommended sample size for confirmatory factor analysis (CFA; not less than 200 samples).[20,21] Face-to-face interviews were conducted using a Nepali-translated version of the MHLAS from June 8 to 28, 2024. To ensure translation validity, the instrument was translated into Nepali by a qualified translator and then back-translated into English by another translator. Before the initiation of data collection in the main study area, the Nepali version of the MHLAS was pretested with a small sample of CHWs from Godawari Municipality. Based on feedback from bilingual experts and pretesting, specific terms were adjusted, and complex phrases were simplified to enhance clarity and cultural relevance. The final version was reviewed and finalized before administration.

Phase 4: Statistical analysis

Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to illustrate the sociodemographic characteristics of the sample (age, sex, education, and past education in mental health). Exploratory Factor Analysis (EFA) and computation of Cronbach's alpha were performed using Statistical Package for the Social Sciences (SPSS) version 22.0, whereas CFA was performed using Analysis of Moment Structure software (AMOS) version 23.0.

Construct validity

After the data collection, factor analysis was performed to evaluate the construct validity of the MHLAS, as it helps to identify underlying factors or dimensions captured by the scale. In the context of construct validity, factor analysis can be used to assess whether the newly constructed scale measures what it is intended to measure.[22,23] The suitability of the data for EFA was assessed through Bartlett's test of sphericity, and the Kaiser–Meyer–Olkin (KMO) index was used to evaluate the adequacy of the sample for factor analysis ($p < 0.05$, KMO > 0.50).[24] EFA was intended to identify the underlying factors, compute commonalities, distinguish items, factor loading, and identify strong and weak factors of the MHLAS. Principal Axis Factoring with Varimax rotation was chosen as the extraction method, with the assumption that the factors of this new scale were uncorrelated. Varimax rotation is an orthogonal method that enhances interpretability by maximizing the variance explained by each factor while minimizing overlapping between factors. Guttman's rule and Cattell's scree plot were observed to confirm the number of factors that would be retained. Eigenvalues > 1 were used to determine the number of significant factors to retain, ensuring that they capture a meaningful amount of variance in the data.[25] The items with factor loadings > 0.40 were retained as the components.[25] Furthermore, CFA was performed to check and establish the factor structure obtained from EFA. CFA is a statistical technique that allows to test how well a predefined factor model fits the data. Multiple indices, such as normed Chi-square (CMIN/DF ≈ 2), Tucker–Lewis Index (TLI $\geqslant 0.90$), Standardized Root Mean Square Residual (SRMR < 0.08), and Root Mean Square Error of Approximation (RMSEA < 0.05 good; < 0.10 acceptable) with PCLOSE > 0.05 (reflecting model fits based on the RMSEA value) and Comparative Fit Index (CFI $\geqslant 0.90$), were used to evaluate the model fit.[26–28]

Convergent and discriminant validity

Convergent validity assesses the extent to which different measures capture the same underlying construct. The average variance extracted (AVE) was used to evaluate convergent validity, as it reflects the proportion of variance in an item explained by its underlying construct.[29,30] Generally, an AVE > 0.50 is considered desirable, whereas an AVE > 0.36 can also be considered to be acceptable.[31] Discriminant validity ensures that the measured constructs are distinct from each other and not highly correlated. The correlation between the constructs was assessed, where a correlation coefficient < 0.85 between the constructs suggested that discriminant validity exists.[30]

Reliability

The Cronbach's alpha coefficient was used to determine the reliability of the MHLAS. A value of Cronbach's alpha > 0.70 indicates that the scale meets the reliability standard.[32] In addition, a split-half test was conducted to further prove the scale's reliability.

Table 1. Characteristics of the participants.

Characteristics	*n* (%)
Age (mean ± SD)	44 ± 7.54
Gender	
Male	35 (15.00)
Female	198 (85.00)
Education level	
Informal education*	13 (5.60)
Primary level	12 (5.20)
Intermediate	85 (36.50)
Higher secondary	75 (32.20)
Bachelor and above	48 (20.60)
Job category	
Mid-level health service providers	62 (26.60)
FCHVs	134 (57.50)
Other health volunteers	37 (15.90)
Received mental health-related sessions during academic course	
Yes	67 (28.80)
No	166 (71.20)

*Individuals who have basic literacy and numeracy skills without attending any formal schooling.

Ethical consideration

This study adheres to the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Committee of CiST College (15/080/081) on June 7, 2024. Data collection commenced only after obtaining ethical approval, ensuring adherence to ethical guidelines and participant protections. Written informed consent was obtained from each participant before data collection.

Result

Among the 233 participants, nearly a fourth (26.60%) were mid-level health service providers (HA, ANMs, and AHWs), while more than half (57.5%) were FCHVs, and 15.90% were other community health volunteers appointed by Lalitpur Metropolitan City. The majority of the participants were females (85.00%). The age of the participants ranged from 20 to 60 years, with a mean of 44 ± 7.54 years. In terms of educational qualifications, only a fifth (20.60%) of the participants had acquired a graduate degree or higher, whereas nearly a third of them (32.20%) had completed high school. In regard to mental health education and training, the majority of the participants (71.20%) reported not having received mental health-related sessions during their academic courses (Table 1).

Factor analysis

Exploratory factor loading for 20 items of the MHLAS was performed, where the KMO measurement of the samples' adequacy was 0.77 (i.e., >0.60), suggesting sample adequacy. Bartlett's test of sphericity was significant <0.001 ($\chi^2 = 1152.13$, $df = 190$), suggesting that the data were suitable for factor analysis and that the variables were correlated. A total of four factors explained 50.75% of the total variance, with eigenvalues > 1 (Figure 1). Factor 1, referred to as *Positive mental health behaviors*, loaded seven items (explaining 21.44% of the observed variance) related to positive activities to promote mental well-being. Factor 2, *Misconceptions about mental health*, loaded six items (explaining 14.24% of the variance) and included items that reflect common misconceptions surrounding mental health. Factor 3, *Symptoms of mental distress*, loaded four items (explaining 8.70% of the variance), related to signs and symptoms to identify mental distress. Factor 4, *Mental health stigma* (explaining 6.37% of the variance), loaded three items, illustrating negative attitudes and beliefs that are unfairly associated with a group of people (Table 2).

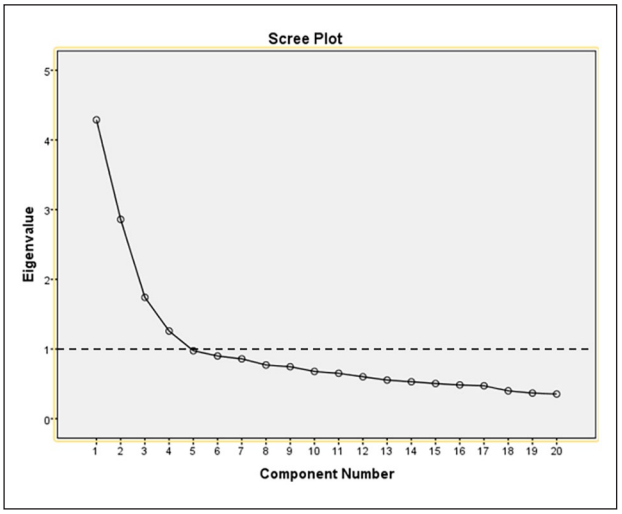

Figure 1. Scree plot for the exploratory component analysis of the MHLAS.

The factors identified in the EFA were subjected to CFA (Figure 2), where a CFI, normed Chi-square (CMIN/DF ≈ 2), TLI, SRMR, and RMSEA were observed, and all of them reflected that the model was a good fit (Table 3).

Convergent and discriminant validity

Convergent validity refers to the degree to which two measures of constructs that should theoretically be related are related. The high factor loadings of items (>0.50) on their respective constructs in CFA is one of the indicators of convergent validity. In this MHLAS, all the items have loadings >0.50 on their respective constructs, supporting convergent validity. Furthermore, the lowest AVE observed was 0.43, suggesting that the constructs capture a substantial portion of the variance, thus indicating acceptable convergent validity. Similarly, the composite reliability (CR) values were above 0.70 for all the factors, indicating good internal consistency for all the factors. Discriminant validity is the degree to which measures of different constructs are distinct. Comparing the AVE with the squared correlations, it was

Table 2. Exploratory factor analysis (EFA) (using Varimax rotation) applied to the 20-item MHLAS.

Items	Statements	MHLAS component loadings			
		I	II	III	IV
MHLAS-5	In the event that a friend of mine experiences mental distress, I can help him/her find professional help	0.76			
MHLAS-8	If I experience mental distress, I am able to consult with a mental health expert (psychologist or psychiatrist) for professional help	0.73			
MHLAS-7	Getting enough quality sleep is beneficial for mental well-being	0.69			
MHLAS-14	Spending time with close friends and family affects mental health	0.64			
MHLAS-11	Early detection of mental disorders increases the chances of effective treatment	0.63			
MHLAS-2	I am comfortable providing initial support to a friend who shows early signs of mental distress	0.60			
MHLAS-3	Regular exercise has a positive impact on mental well-being	0.58			
MHLAS-15	Mental illness is a lifelong condition with no chance of improvement*		0.72		
MHLAS-16	Talking openly about mental disorders can increase a person's risk of developing them*		0.69		
MHLAS-20	Isolating yourself from others at times when you are sad/depressed is a healthy way of dealing with mental problems*		0.67		
MHLAS-19	Talking to a therapist is a sign of being unable to handle the mental health problem or that their condition has worsened*		0.64		
MHLAS-17	Anxiety is simply a form of stress and just getting some relaxation (being relaxed) can help overcome it*		0.58		
MHLAS-18	Having conversations about suicide could lead to an increased risk of developing suicidal thoughts*		0.58		
MHLAS-4	A person with depression often experiences low mood			0.73	
MHLAS-6	People's behavior can be influenced by their mental health conditions			0.68	
MHLAS-10	People with mental disorders often hallucinate (see or hear things that are not there in reality)			0.67	
MHLAS-13	People experiencing depression often lose interest in things that they previously found enjoyable			0.66	
MHLAS-9	Mental disorders mostly affect people who belong to families experiencing economic crisis*				0.74
MHLAS-12	Mental problems do not affect children, teenagers, or young adults*				0.64
MHLAS-1	Emotional breakdown is a sign of personal weakness*				0.59

*Items that are reverse coded.

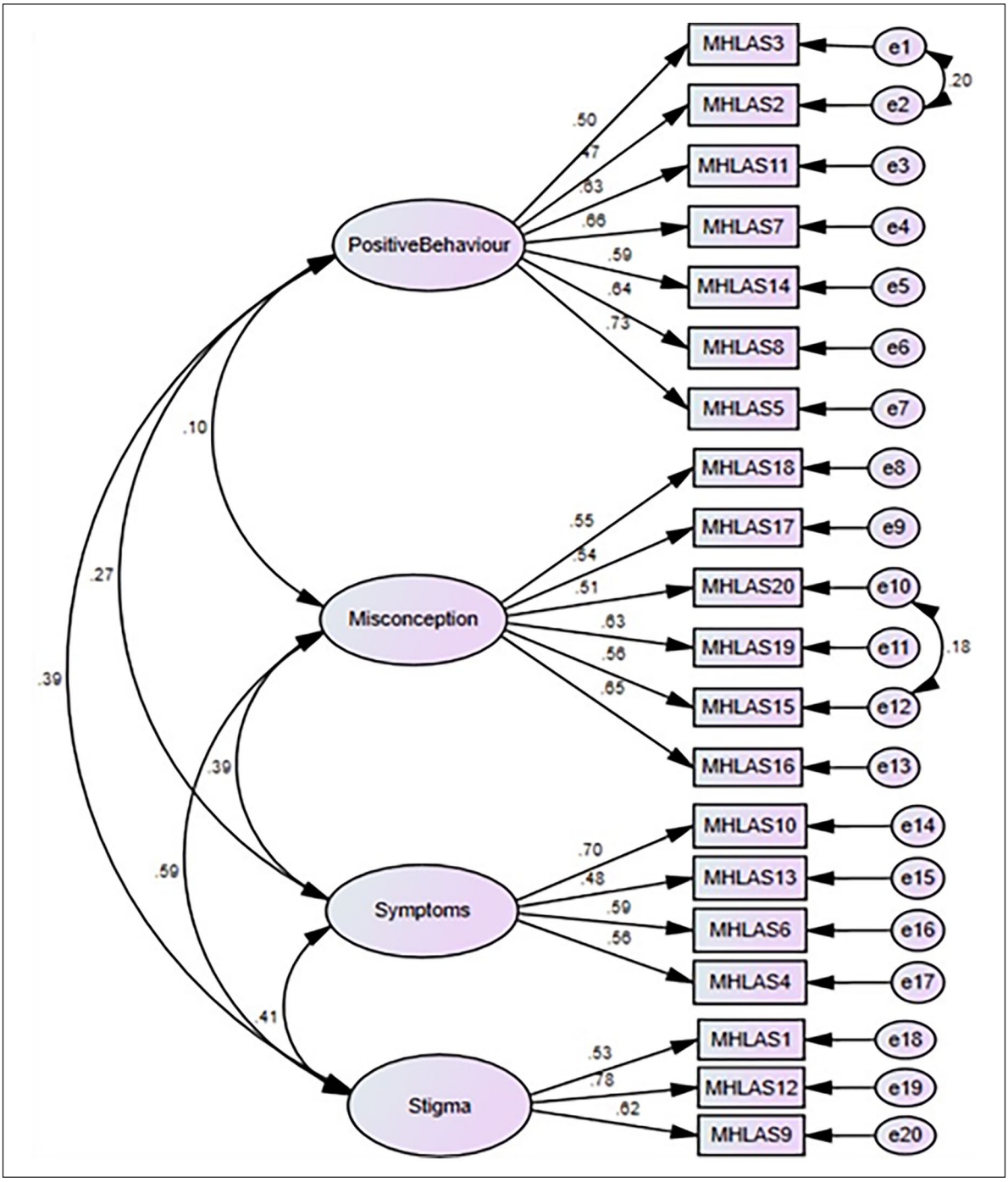

Figure 2. Confirmatory factor analysis of the MHLAS.

observed that the AVE was generally greater than the squared inter-factor correlations, indicating good discriminant validity (Table 4).

Reliability

The reliability assessment included the evaluation of the internal consistency of the scale through Cronbach's alpha, where the alpha value for the overall 20-item MHLAS was 0.79. The Cronbach's alpha coefficients for the four factors were 0.80 (Factor 1), 0.75 (Factor 2), 0.68 (Factor 3), and 0.67 (Factor 4). Furthermore, the Guttman split-half coefficient was 0.77.

Statistical differences in MHLAS scores across participants' characteristics

The MHLAS operates on the principle that higher scores reflect a higher level of MHL. All 20 items were assessed on

Table 3. Confirmatory factor analysis fit indices.

Indices	CFA standard cutoffs for model fit	Observed values
Normed Chi-square (CMIN/DF)	≈2	1.30
Tucker–Lewis Index (TLI)	⩾0.90	0.94
Adjusted goodness of fit (AGFI)	⩾0.90	0.90
Standardized root mean square residual (SRMR)	<0.08	0.054
Root mean square error of approximation (RMSEA)	<0.05 good; <0.10 acceptable	0.03
p of close fit (PCLOSE)	>0.05	0.95
Comparative Fit Index (CFI)	⩾0.90	0.95

Table 4. Convergent and discriminant validity indices for the MHLAS.

Factors	Average variance extracted	Composite reliability
I	0.45	0.85
II	0.43	0.81
III	0.47	0.78
IV	0.44	0.70

a 5-point Likert scale, with response options ranging from 1 = "strongly disagree," 2 = "disagree," 3 = "uncertain/neutral," 4 = "agree," to 5 = "strongly agree," with total score ranging from 20 to 100. Of these 20 items, 9 items are reverse-coded. In the sample of 233 participants, the total MHLAS score ranged between 45 and 98, with a mean score of 76 ± 9.27. The linear regression analysis revealed statistically significant differences in the scores across education, job category, and past academic exposure to mental health education. These findings further indicate that the tool can differentiate between groups with varying levels of MHL, further supporting construct validity (Table 5).

Discussion

The MHLAS has the ability to differentiate between various aspects of MHL, such as positive behaviors, misconceptions, symptoms of mental distress, and stigma, and provides a comprehensive tool for assessing knowledge, attitudes, and existing misconceptions among CHWs. The MHLAS aims to bridge the gap in MHL among these essential HCWs, who could play a vital role in providing mental health awareness and care in communities and linking those in need with the healthcare system. This is particularly crucial in the context of developing countries such as Nepal, where mental health issues are often stigmatized and misunderstood.[33,34] The tool emphasizes applied knowledge and practical skills necessary for recognizing mental health conditions, providing basic support, and making appropriate referrals. Unlike previous general MHL tools, the MHLAS incorporates items that assess professional preparedness, confidence in handling mental health cases, and perceived barriers to delivering mental health care in community settings. By addressing these critical components, the MHLAS enhances the ability to assess and strengthen the MHL of CHWs, ultimately contributing to improved mental health outcomes at the community level.

The MHLAS adheres to rigorous scale development and construction processes, which involve a series of steps to ensure the scale's content validity, construct validity, convergent validity, discriminant validity, and reliability. Through a combination of cognitive interviews with potential participants and expert consultations, the initial item pool was refined for clarity and relevance. The content validity analysis demonstrated a high level of agreement among the experts regarding the items' essentiality and clarity for assessing MHL. It has been suggested that CVI scores greater than 0.79 are considered acceptable and the scores between 0.70 and 0.79 should be re-evaluated, whereas scores less than 0.70 should be eliminated.[19,32–34] Consequently, two items with scores below 0.70 were eliminated, and the remaining items reflected an S-CVI greater than 0.97, indicating good content validity.[35,36] The I-CVI for all the items was above 0.83, which is an acceptable threshold for content validity where there are at least six experts involved.[37] Thus, the final version of the scale, with 20 items, was confirmed by the experts, which showed good psychometric properties.

The EFA revealed a four-factor structure for the MHLAS, accounting for a cumulative variance of 50.75%. The first factor, "Positive mental health behaviors," captured items related to activities promoting mental well-being. The second factor, "Misconceptions about mental health," grouped items reflecting common misunderstandings surrounding mental health. The third factor, "Symptoms of mental distress," identified items related to recognizing signs and symptoms of mental health problems. Finally, the fourth factor, "Mental health stigma," included items that assess negative attitudes and beliefs associated with mental illness. Past studies have suggested that MHL should cover mental disorder literacy, and positive MHL.[5,6,38] Reflecting on these works of literature, the MHLAS covers the components regarding literacy that could promote mental health, recognize the early signs and symptoms of mental disorders, and access needed information and services. Furthermore, it is well documented that misconceptions, myths, and stigma regarding mental health are prevalent, even among healthcare professionals.[34,39,40] Misconceptions can significantly

Table 5. Linear regression analysis of the MHLAS by participant characteristics.

Characteristics	Coefficient	Standard coefficient	*t*	*p*	95% CI
Gender					
Male	1.28	0.04	0.75	0.453	−2.07 to 4.63
Female	Ref				
Education level					
Primary or lower education	Ref				
Up to higher secondary	2.30	0.11	1.77	0.077	−0.24 to 4.85
Bachelor and above	4.40	0.19	2.97	0.003*	1.49–7.31
Job category					
Mid-level health service providers	5.39	0.25	4.05	<0.001*	2.76–8.01
Health volunteers (FCHVs and others)	Ref				
Attended mental sessions in an academic course					
Yes	4.30	0.21	3.26	0.001*	1.70–6.89
No	Ref				

*statistical significance at p<0.05.

impede effective mental health care and support. Therefore, this new tool also addresses common misconceptions about mental health, ensuring that CHWs are better prepared to provide accurate information and dispel harmful myths within their communities.

The KMO statistic examines the strength of the partial correlation (how the factors explain each other) between the variables, suggesting that KMO values < 0.50 are unacceptable, whereas values between 0.70 and 0.80 can be considered average and acceptable, and values between 0.80 and 0.90 can be considered excellent.[41,42] In this study, the KMO value was 0.76, suggesting sample adequacy, and the model was a good fit. CFA further supported the four-factor structure identified through EFA. This factor structure was confirmed by CFA, which validated the model's good fit, with indices such as a normed Chi-square (CMIN/DF) of 1.307, TLI of 0.94, RMSEA of 0.03, and SRMR of 0.05. All these CFA indices are in line with the recommended standard thresholds, such as TLI should be $\geqslant 0.90$, SRMR < 0.08, and RMSEA < 0.05, which suggests that the model is a good fit.[26–28]

These results indicate that the MHLAS effectively measures the underlying constructs it is intended to assess. The AVE, which reflects convergent validity and the proportion of variance in an item explained by its underlying construct, is >0.5 in the usual condition, but an AVE > 0.36 is considered acceptable for exploratory research.[29,30] The lowest AVE observed among the four factors of the MHLAS was 0.43, which is near the ideal level and above the acceptable threshold of 0.36, suggesting that the constructs captured a substantial portion of the variance.[31] This is further supported by the CR value, as the CR's lowest value was 0.70, indicating good internal consistency. The comparison of the AVE with the squared correlations showed that there is good discriminant validity, as it has been suggested that the AVE should generally be greater than the squared inter-factor correlations.[30] Furthermore, the Cronbach's alpha coefficient for the 20 items of the MHLAS was found to be 0.79, suggesting that it has good internal consistency, as it meets the standard reliability threshold of Cronbach's alpha > 0.70.[32]

The MHLAS can serve as a quick evaluation instrument to assess MHL, as it is relatively easy to administer in a short time (10–15 min) and addresses major stigma and misconceptions associated with mental health, along with general knowledge and attitude-related attributes. In MHLAS, higher scores reflect a higher level of MHL. Setting a cutoff score based on the nature of the data could facilitate the identification of individuals or groups who possess a higher or lower level of mental health understanding, enabling targeted interventions and educational efforts. However, interpreting individual scores may involve considerations beyond a single cutoff point, and future research could explore the best practices for score interpretation. By identifying gaps in knowledge and areas where misconceptions are prevalent, the MHLAS can inform targeted interventions and training programs. Such efforts are essential for enhancing the capacity of mid-level health service providers and community health volunteers to address mental health issues effectively within their communities.

While the MHLAS has strong psychometric properties, some limitations should be considered. Due to limited resources, we included the minimum required sample. While the sample size was adequate for the initial stages of scale development, a larger sample could provide more robust results. The study was conducted in a specific geographic area among health service providers from low-resource settings, which might limit its applicability to other population groups from high-resource settings. Thus, future research should explore the applicability of the MHLAS in different cultural and geographic contexts to assess its broader relevance. In addition, this study did not assess criterion validity or test-retest reliability. The absence of a universally accepted gold standard for MHL posed a challenge in evaluating criterion validity. Furthermore, resource constraints and the limited availability of health workers within the required

timeframe prevented the reapplication of the tool for test-retest reliability assessment. Future studies should aim to establish these psychometric properties to further validate the scale's reliability and applicability across different settings. Another limitation concerns the response options in the Likert scale used for this study. The scale included a "Neutral" (Neither Agree nor Disagree) option but did not explicitly provide an "I don't know" response. This could have led some participants, particularly those with lower MHL, to select the neutral option due to a lack of knowledge rather than true uncertainty. Given the assumed lower levels of MHL in LMICs, future studies should consider incorporating an "I don't know" response option to better differentiate between genuine neutrality and knowledge gaps.

The MHLAS has potential applications beyond healthcare professionals and community health volunteers. Considering the simplicity of the items, this tool could be used to assess MHL among other community members, such as community leaders, paramedics, and educators delivering mental health awareness programs in schools or community settings, and influencers who do not have formal education on mental health and psychology but could play a crucial role in bridging the community to the healthcare system. Evaluating the effectiveness of the MHLAS in these populations through targeted studies could help in understanding its broader applicability. Continued evaluation and refinement of the MHLAS will be essential to ensure its ongoing relevance and effectiveness in improving MHL and addressing mental health challenges in developing countries.

Conclusion

The MHLAS is a promising new tool for assessing MHL among mid-level healthcare providers and community health volunteers. The scale's robust psychometric properties and comprehensive coverage of MHL components make it a valuable tool for both research and practical applications. By assessing MHL among healthcare providers, the MHLAS can contribute to informing policy decisions on priority areas for better mental health awareness.

Acknowledgements

We would like to thank all our experts for their support in the tool development and validation process. We are grateful to all the CHWs and health volunteers who participated in the cognitive interviews and cross-sectional survey; without their time and response, this would not have been possible.

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Ethical considerations

Ethical approval was obtained from the Institutional Review Committee of CiST College (15/080/081).

Consent to participate

Written informed consent was obtained from each participant before data collection.

Consent for publication

Not applicable.

Author contributions

The substantive contribution of author SP has been the conception and development of the scale and design of the presented paper, the statistical analysis and interpretation of the findings, the writing of the article, and doing critical revision. AC has been involved in developing the scale, analysis, writing the manuscript, and final approval of the article. PS was involved in the literature review, data collection, and final approval of the article. TRB reviewed and edited the manuscript. All authors have reviewed the submitted manuscript and approved the manuscript for submission.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability statement

The data that support the findings of this study are available from the authors upon reasonable request.

Availability of preprint

A preprint version of this article is available on https://www.researchsquare.com/article/rs-4851154/v1

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