Psychometric of Iranian version of Mental Health Literacy Scale (MHLS)

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Abstract
Background: The risk rate for the incidence of any mental disorder is 50%, and the prevalence of mental disorders is increasing. This study aimed to evaluate the psychometric of the Iranian Version of Mental Health Literacy Scale (MHLS).

Methods: This cross-sectional study was conducted with a multi-stage sampling method with the participation of 1363 individuals in the general population. The formal, content and construct validity were used for validation of MHLS. Cronbach’s alpha coefficient was used for the reliability of MHLS. Confirmatory factor analysis (CFA) was performed using AMOS software Version 24.

Results: After performing the CFA, the final version of the MHLS included a total of 29 items, which consisted knowledge of where to seek information (4 item), Ability to recognize disorders (8 item), knowledge of self-treatment (2 item), knowledge of risk factors and causes (2 item), Attitudes that promote recognition or appropriate help-seeking behavior (10 item), and knowledge of professional help available (3 item). In the CFA test, the six items were deleted.

Conclusion: Due to the lack of appropriate tools for measuring health literacy in the Iranian population, the 29-item MHLS with six subscales is a valid and reliable tool for measuring mental health literacy in the population.

Background
Mental health literacy (MHL), is an important predictor of positive health outcomes[1]. MHL is defined as the ability of access to understand and application of the information in ways that promote and maintain good mental health[1]. MHL is also defined as the knowledge, beliefs, and abilities to recognize, manage, or prevent mental health problems, the term MHL was used in 1997 to describe knowledge and beliefs related to mental disorders that help diagnose, manage, and prevent them. The concept of mental health requires increasing general knowledge about mental health and disorders since it is a prerequisite for early diagnosis and intervention in mental disorders[2-4]. Studies show that the risk rate for the incidence of any mental disorder is 50% and the prevalence of mental disorders is increasing, while based on reports of World Health Organization more than half a billion of the world’s population suffer from mild to severe mental disorders at various times of their
lifespan[5]. Therefore, individuals will confront directly to anybody with mental disorders throughout their lifespan, and understanding mental disorders are essential because it affects one’s attitude and behavior toward the individual affected[6]. Also, MHL is an important factor in obtaining supportive behaviors[7].

Mental disorders due to the significant economic and emotional burden as well as the suffering and limitations they cause for an individual would result in discrimination in the social and professional activities of the individual due to mental disease labels. The impact of mental disorders of the population is crucial due to their care and physical support and the reduction in their productivity. The intense burden of the costs for treatment and care and the physical and emotional support borne by the patient’s families, and also their economic burden should not be disregarded[8]. The World Health Organization estimates that by 2020 major depression will be the second leading cause of disease[9]. Base on the results of a meta-analysis in Iran, the prevalence of depression and anxiety were 18.6% and 28.7%, respectively[10]. In a study conducted in Iran, after performing psychological tests and evaluations on individuals who reported themselves as having no psychological problems (70.8%), about 17.3% of them were diagnosed with various psychological problems[11]. Also, the results of various studies in Iran reported that the prevalence of mental disorders in adolescents ranging from 28.1 to 73% [12, 13].

The commonness of mental disorders in the general population means that most people are directly faced with a mental health problem, but most of them do not have the knowledge and skills required to assist them[3]. Generally, mental disorders of the individuals lead to their shorter lifespan[14]. recent studies showed that health literacy(HL) and MHL of individuals are very poor[3]. The results of a study in Australia showed that the HL of more than 60% is poor [15]. The results of a national study in American adults showed that the level of HL and self-care behavior of individuals is not good[16]. The results of a national survey on the Iranian population aged 18-65 showed that about 44% of the Iranian population did not have a good level of HL[17]. The results of a study on healthy volunteers in Iran showed that only 23.1% of them had a good level of HL[18].

Mental health researches to date showed that many people have poor HL because they do not know
psychological problems, or have negative attitudes about their treatment or effectiveness of the treatments. Whereas high HL has several advantages such as prevention, early diagnosis and intervention and attenuation of symptoms related to mental disorders, MHL is recognized as a prerequisite for early diagnosis, and intervention in mental disorders[3]. Given the increasing prevalence of mental disorders and the necessity of appropriate MHL in society, there is a need for an appropriate tool to evaluate the level of MHL. Therefore, this study aimed to evaluate the psychometric aspect of the Iranian version of MHLS in the general population of Gonabad.

**Methods**

This cross-sectional study conducted to evaluate the validity and reliability of the Iranian version of the MHLS with the participation of 1363 individuals of the general population in Gonabad, Iran in 2018.

**Sample size**

Based on the previous studies sample size of 1000 or more is estimated to be very good for factor analysis. In this study, the sample size of 1363 individuals was considered for assessment of the validity and reliability of the instrument[19-21].

**Sampling method**

The sampling in this study was conducted by multistage. Initially, the number of community health centers and the population of each center were determined. In the next step, each center was considered as one class and the sample size was determined according to the population of each class. Samples were then randomly selected from each center. It should be noted that the questionnaire for illiterate participants was completed by the interviewer. Inclusion criteria were age over 18 years old and informed consent of the individual to participate in the study.

**Instruments**

1) Demographic questionnaire: This questionnaire includes questions on gender, age, occupation, level of education, marital status, etc.

2) MHLS: This questionnaire was designed and evaluated by Connor et al. In 2015[22]. The questionnaire has 35 questions and 6 subscales of the Ability to recognize disorders, Knowledge of
self-treatment, Knowledge of risk factors and causes, Knowledge of where to seek information, Knowledge of the professional help available, Attitudes that promote the recognition or appropriate help-seeking behavior.

A. Ability to diagnose disorders: This construct has 8 questions that are assessed by a 4-point Likert scale (highly rare, rarely, likely, very likely).

B. Knowledge of risk factors and causes: This construct is assessed with 2 questions and a four-option scale (highly rare, rarely, likely, very likely).

C. Awareness of self-treatment: This construct is measured by two questions and a four-option scale (not very useful, not useful, useful, very useful).

D. Awareness of the available professional assistance: This construct consists of 3 questions that are measured on a four-option scale (highly rare, rarely, likely, very likely).

E. Awareness of the place for searching information: This construct consists of 4 questions that measure with a 5-option Likert scale (strongly disagree, disagree, no opinion, agree, strongly agree).

F. Attitudes that promote cognition or appropriate behavior: This construct is with 16 questions and a 5-option Likert scale [(strongly disagree, disagree, no opinion, agree, strongly agree) or (definitely willing, probably willing, no opinion, probably unwilling, definitely unwilling).

In this questionnaire, the lowest score is 35 and the highest score is 160, and higher scores indicate better MHL. The validity and reliability of this questionnaire were evaluated in the Connor study. The internal consistency of this scale was measured by Cronbach’s alpha (Cronbach's alpha= 0.873)[22].

**Validation: Face and content validities (qualitative and quantitative)**

Firstly, the English version of the questionnaire was forward-translated into the Persian language by three faculty members and then reconciled. Then one skilled English expert who was not familiar with
the specialized English text of psychology translated the text backward into English. The English text of the backward-translation was re-translated into the Persian language by three psychology professors fluent in the English language. Then, the final Persian version was prepared by adjusting the first Persian translated version of the questionnaire and making the necessary corrections. The validity and reliability of the questionnaire were then evaluated.

**Qualitative formal validity**

For this purpose, the Persian questionnaire was given to two faculty members fluent in English language and specialized vocabulary to evaluate the final Persian version of the questionnaire in terms of clarity (use of simple and comprehensible words), common language application (avoidance of the specialized and technical words). If required, changes were made to the used metrics to make it simpler and more comprehensible. Also, for knowing the comments of audiences, a face-to-face interview was conducted with some of the individuals in the target group to find out any difficulty in understanding of the words and phrases, the appropriateness and relevance of the items, the likelihood of ambiguity and misunderstandings, or any failure in conceptualization. In case of problems, their comments were applied to the questionnaire.

**Qualitative content validity**

To evaluate the validity, the questionnaire was provided to 20 experts and specialists to assess grammar, use of appropriate words, the importance of items, the correct placement of items, and the time for completion of the designed instrument. After collecting the expert evaluation results, necessary changes were made in consultation with the members of the research team. Given that the standard questionnaire has been used and translated, quantitative content validity and formal validity were not required to be measured[23].

**Construct validity assessment (exploratory factor analysis)**

Firstly, the Kaiser-Meyer-Olkin (KMO>0.8) and Bartlett’s test of sphericity (<0.05) were used to make sure of the reliability of sampling[24]. CFA was used to evaluate the Construct validity assessment. Before to CFA, data were analyzed using Mahalobis statistics for the outliers. The normality of data was also evaluated using skewness and kurtosis. CFA was performed using AMOS version 24 software.
To obtain an acceptable model, questions with poor internal consistency were removed from the questionnaire.

The assessment of the model was conducted using the following fit indices: Chi-square ratio to degree of freedom ($x^2/df$); root mean square residual (RMR); root mean square error of approximation (RMSEA); goodness of fit index (GFI); adjusted goodness of fit index (AGFI); parsimonious normed fit index (PNFI); parsimony comparative fit index (PCFI); incremental fit index (IFI); parsimony goodness-of-fit index (PGFI); comparative fit index (CFI); and parsimonious normed fit index (PNFI)[25-27]. The model was acceptable if the ($x^2/df$) < 5, RMSEA and RMR ≤ 0.08, PCFI, PNFI and PGFI > 0.5, AGFI > 0.8, and other indices (IFI, GFI, CFI) > 0.9[25-28].

**Reliability assessment**

Finally, to establish the reliability, a pilot study was performed; the minimum sample size required for reliability assessment is between 25 and 30[29]. In this phase, the questionnaire was completed by 60 individuals who did not participate in the main study, and the internal consistency of the questions in each dimension was assessed by Cronbach’s alpha coefficient.

**Ethical Considerations**

In this study, written informed consent was obtained from all the participants before the study and they were assured that their information remained confidential with the research team.

**Results**

The mean (standard deviation) age of the participants in this study was 31.32 (10.28), and 56.8% (769) of participants were women and 69.4% (983) were married. Most of them had an associate/bachelor’s degree (56%) and a high school diploma (31.8%). In this study, 79% (994 people) of the participants were residents in the city and most of them were self-employed (37.3%) (Table 1). The mean (standard deviation) of the total MHL was 92.33 (8.72). Details on each subscale of MHLS are available in table 2.

**Formal validity**

After completing the translation process of the questionnaire, the qualitative formal validity of the instrument was evaluated and the intended corrections were made. Also, the important factor was
used for quantitative formal validation, and the IF value was above 1.5 obtained for all questions and none of the questions of the questionnaire were omitted at this stage.

**Content validity**

In this stage, firstly, the validity of qualitative content was evaluated and expert reforms were applied. Content validity index (CVI) and content validity ratio (CVR) were used for quantitative content validation. CVI and CVR values were 0.84 and 0.86, respectively. At this stage also none of the questions were omitted.

**Construct validity assessment (CFA)**

Before performing CFA, KMO and Bartlett’s test of sphericity were evaluated and the results indicated an adequate sample (KMO=0.843 and Bartlett’s test: $\chi^2 = 10344.809$, df=406, $P=0.001$). Since the amount of distance is more than 0.8 and the zero hypotheses of Bartlett’s test of sphericity in the 5% error level was confirmed, the reliability acceptable if the sample size could be verified[24]. After performing the CFA test, the final version of the MHLS included a total of 29 items, which consisted knowledge of where to seek information (4 item), knowledge of self-treatment (2 item), Ability to recognize disorders (8 item), Attitudes that promote recognition or appropriate help-seeking behavior (10 item), knowledge of risk factors and causes (2 item), and knowledge of professional help available (3 item).

In CFA test 6 items deleted. The deleted questions are visible in Table 1. All psychometric testing was conducted using these items in the MHLS. The factor lodging value of each of the questions is visible in Table 3 and Fig 1. The results also showed that the CR value of each question was above 1.96 and the significance level of all questions was less than 0.001. The goodness of fit for these six Subscale model was acceptable ($X^2/df=4.110$, RMR=0.049, RMSEA=0.048, PCFI=0.780, PGFI=0.758, PNFI=0.754, AGFI=0.910, GFI=0.927, GFI=0.901, IFI=0.901) (Table 4).

**Reliability**

Before starting the study, 40 subjects were asked to complete the questionnaire and Cronbach’s alpha of 0.88 was obtained. Cronbach’s alpha of MHLS and its subscales can be seen in Table 2 after performing CFA and deleting some of the questions.
Discussion
This study aimed to evaluate the psychometric aspect of the Iranian version of MHLS in general. There is no specified tool for evaluating MHL in Iran, and no study on psychometrically evaluation of the MHLS.

The results of the Noroozi et al study showed that the Cronbach’s alpha for total questions and CVR were 0.74 and 0.90, respectively[30]. In a study conducted by O’Connor, the MHLS was designed based on other questionnaires in this field, and the 55-item questionnaire was evaluated, which after psychometric evaluation of the questionnaire, finally the 35-item version of the MHLS with six substructures were confirmed and Cronbach’s alpha of 0.879 and test-retest reliability of 0.797 were reported[22]. In the present study, this 35-item questionnaire was evaluated and after performing the stages of psychometric evaluation of the questionnaire, 6 questions were finally omitted and the 29-item version of the MHLS with 6 subscales was approved.

In a study conducted by Jung et al with the aim of development and reliability assessment of an instrument for evaluating MHL, the results of the exploratory factor analysis discovered three factors for the 26-item questionnaire. The results of CFA showed that the proposed model has a good fit in the stage of CFA. Also, Cronbach’s alpha for the first factor (knowledge-oriented MHL), the second factor (Beliefs-oriented MHL) and the third factor (resource-oriented MHL) were reported as 0.76, 0.77 and 0.84, respectively[31].

The results of a systematic review examined the tools available in the field of evaluation of MHL showed that the MHLS used in the present study is an acceptable tool for evaluating MHL in individuals[32]. One of the strengths of this study is its conduction in the general population, with different age groups and social classes. The large sample size is another power of this study. Given the confirmation of the validity of the MHLS in this study and the applicability of this questionnaire to assess the level of MHL in different groups of society, it is recommended to use this questionnaire to assess the MHL of different target groups for educational, clinical and research purposes. Also, due to being new in this questionnaire, it is recommended that the psychometric of this questionnaire be evaluated in other studies and with various target populations.
Conclusions
According to the results of this study, due to a lack of appropriate tools for evaluating HL in the Iranian population, the 29-item MHLS with six substructures is a suitable instrument for assessing MHL in individuals. Due to the shortness and ease of use, this tool can be used to evaluate the level of community HL, which in case of requirement increases the level of MHL in the population by implementing appropriate intervention programs and prevent mental disorders in society.

Abbreviations
MHLS: Mental Health Literacy scale; MHL: Mental Health Literacy; HL: Health Literacy; CFA: Confirmatory factor analysis; CVR: Content Validity Ratio; CVI: Content Validity index; KMO: Kaiser-Meyer-Olkin

Declarations

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Authors’ contributions
Authors MN, HT and AJ designed the study. MN, HT and AJ participated in the conception of the study. MN and AJ managed and conducted the statistical analyses and interpreted the data. AJ and HT wrote the first draft and MN, HT and AJ revised it to make the final manuscript. All authors have approved the final manuscript.

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Availability of data and materials
The data sets used and/or analyzed during the current study were available from the corresponding author on reasonable request.

Ethics approval and consent to participate
This study is based on a research project approved by Ethics Committee of Mashhad University of Medical Sciences with the code of ethics IR.MUMS.REC.1398.095. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable.
Consent for publication
Not applicable

Conflicts of interest
The authors have no conflicts of interest

ethical standards. Informed consent was obtained from all individual participants included in the study.

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**Tables**

Due to technical limitations, Table 1, 2, 3 and 4 are only available as a download in the supplemental files section.

**Figures**
Figure 1

Standardized parameter estimates for the factor structure of the MHLS with item 6 deleted.

All factor loadings are significant at p<0.001. (AR: Ability to recognize disorders, SI: Knowledge of how to seek information, RF: Knowledge of risk factors, ST: Knowledge of self-treatment, PH: Knowledge of professional help available, A: Attitudes that promote recognition or appropriate help seeking behavior)
Supplementary Files

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