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Validation of the Italian version of the mental health literacy scale (MHLS)

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ABSTRACT

Background and objectives: Mental health literacy (MHL) supports early recognition and management of mental disorders. The Mental Health Literacy Scale (MHLS) is the only validated tool covering all MHL domains. This study translated and validated the MHLS in Italian and evaluated its psychometric properties in a non-clinical adult sample.

Methods: Following international guidelines, the MHLS was translated and administered to 354 Italian-speaking adults. A subsample of 84 repeated the test twice at one-week interval. Participants also completed the HLS-EU-Q16 and DASS-21. Internal consistency, test-retest reliability, concurrent validity and exploratory factor analysis were performed.

Results: The Italian MHLS showed good internal consistency (Cronbach's $\alpha = 0.821$) and test-retest reliability ($r = 0.73$; $p < 0.001$). Scores were higher in women and in individuals with a psychiatric diagnosis, and correlated weakly with general health literacy and perceived stress. No associations emerged with anxiety or depression. Factor analysis suggested a four-factor structure explaining 42.1% of the variance, reflecting attitudes toward mental illness, symptom recognition, help-seeking and information-seeking.

Conclusions: The Italian MHLS is a valid and reliable instrument for assessing MHL in adults. It can be used in research and prevention to clarify public knowledge and attitudes toward mental health.

1. Introduction

Mental disorders represent a relevant and growing global concern, with major consequences on individual well-being and global functioning (Brännlund et al., 2017; Murphy et al., 2015). According to the World Health Organization, approximately 280 million people were affected by depression in 2019, with the onset of many psychiatric conditions occurring during adolescence and young adulthood, highlighting the widespread burden of mental illness (Solmi et al., 2022; World Health Organization, 2022). However, recent estimates indicate a substantial increase in the global mental health burden following the COVID-19 pandemic, with a 25% rise in the prevalence of anxiety and depression worldwide during the first year of the pandemic alone (World Health Organization, 2022). While the onset of many psychiatric conditions occurs during adolescence and young adulthood, the

long-term burden and the need for early recognition persist throughout the entire adult life span. This underscores the growing urgency for effective mental health literacy and early intervention strategies across all age groups.

In this context, Mental Health Literacy (MHL) has gained increasing attention as a pivotal factor in promoting early recognition and management of mental disorders. First conceptualized by Jorm et al., MHL refers to “knowledge and beliefs about mental disorders which aid their recognition, management, or prevention” (Jorm et al., 1997). The construct comprises six key domains: (1) recognition of mental disorders, (2) knowledge of risk factors and causes, (3) knowledge of self-treatment, (4) knowledge of professional help available, (5) knowledge about how to seek mental health information, and (6) attitudes that promote appropriate help-seeking (Jorm et al., 1997).

Despite its recognized importance, low levels of MHL continue to be

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a major barrier to timely and effective mental health care, contributing to poor symptom recognition, stigmatization, and delays in seeking professional support (Andrade et al., 2014; Gulliver et al., 2010). Conversely, improving MHL has shown to promote more positive attitudes toward mental illness and help-seeking, thereby contributing to narrowing the treatment gap and enhancing public mental health outcomes (Altweck et al., 2015; Givens et al., 2007; Jung et al., 2017; Smith & Shochet, 2011). This is particularly critical in university settings, where up to 50% of young adults (aged 18–24) are engaged in academic programs and may benefit from targeted MHL interventions (Kutcher et al., 2016; Reavley et al., 2012).

Research on MHL is still limited in Italy, but recent evidence suggests that this construct is highly relevant in the national context. A recent Italian validation study of the Mental Health Literacy Questionnaire for Young Adults (MHLq-YA) showed that mental health literacy can be reliably assessed in Italian young people and highlighted significant associations with gender, age, and personal familiarity with mental health problems (Pastore et al., 2025). It also underlined that stigma toward mental health problems and regional inequalities in access to mental health services may still represent important barriers to prevention, early recognition, and help-seeking. At the same time, educational and community-based settings may offer valuable opportunities for targeted mental health literacy interventions. Nevertheless, available Italian evidence remains scarce and mainly focused on younger populations. To date, Italian research on MHL has primarily focused on specific populations or used survey-based measures to assess public beliefs and attitudes toward mental disorders. For instance, a national survey by Munizza et al. (2013) (Munizza et al., 2013) explored knowledge and stigma related to depression using a structured 20-item questionnaire developed for that specific study. However, such instruments were disorder-specific and translated for individual studies without undergoing a formal and full psychometric validation process in the Italian context; thus, they often lack established psychometric validity and reliability. Furthermore, since the aforementioned MHLq-YA is specifically tailored for adolescents and young adults, a comprehensive instrument, like MHLS, formally validated in Italian and applicable to the general adult population across all age groups, is still missing.

To address the need for valid and comprehensive MHL assessment tools, O'Connor and Casey (2015) developed the Mental Health Literacy Scale (MHLS), a 35-item instrument designed to quantitatively assess all six domains of the MHL construct (O'Connor & Casey, 2015). The MHLS has since been validated in multiple languages and cultural contexts (Akhter et al., 2020; BinDhim et al., 2023; Chen et al., 2021; Dang et al., 2018; Fischer et al., 2024; Ghaedamini Harouni et al., 2022; Gobhathai et al., 2022; Heizomi et al., 2020; Korhonen et al., 2019; Krohne et al., 2022; Montagni & González Caballero, 2022; Nejatian et al., 2021; Neto et al., 2021; Nowicki et al., 2026; Tokur Kesgin et al., 2020). Recent examples include validations conducted in Germany (Fischer et al., 2024) and Poland (Nowicki et al., 2026), among others (Akhter et al., 2020; BinDhim et al., 2023; Chen et al., 2021; Dang et al., 2018; Ghaedamini Harouni et al., 2022; Gobhathai et al., 2022; Heizomi et al., 2020; Korhonen et al., 2019; Krohne et al., 2022; Montagni & González Caballero, 2022; Nejatian et al., 2021; Neto et al., 2021; Tokur Kesgin et al., 2020), demonstrating the instrument's broad international applicability. Although initially proposed as a unidimensional measure, subsequent validation studies have identified multi-factor structures that more closely align with the six theoretical domains of MHL (O'Connor & Casey, 2015). MHLS currently remains the only available instrument designed to capture the full width of the MHL construct within a single measure, making it a valuable resource for both research and clinical practice (Montagni & González Caballero, 2022; O'Connor & Casey, 2015). Nevertheless, additional validation studies are needed to ensure its psychometric strength across different populations and cultural settings (ElKhalil et al., 2024). In particular, there is no available validation of an Italian translation of the questionnaire, applied to an Italian population across a broad age range. This knowledge gap is

relevant, since psychometric properties of questionnaires may differ across languages, and when applied in different cultural contexts.

The present study aims to validate the translation of MHLS into Italian language, verifying its psychometric properties in adults in a broad age range, to warrant its potential use for research purposes in a wide population. This contribution seeks to expand literature on MHL and provide researchers and clinicians with a reliable and culturally appropriate tool to assess MHL in the Italian context.

2. Methods

2.1. Original questionnaire

The original version of the questionnaire (O'Connor & Casey, 2015), developed in English and validated in Australia, was designed to assess knowledge and attitudes regarding mental health that aid in recognition, management and prevention of mental health issues. MHLS includes a total of 35 items, exploring six different areas: knowledge of where to seek information, knowledge of risk factors and causes, knowledge of self-treatment, knowledge of professional help available, and attitudes that promote recognition or appropriate help-seeking behavior.

2.2. Translation

The original version of the questionnaire (O'Connor & Casey, 2015) was independently translated into Italian by two of the investigators (MS and DB), and the two versions were compared and homogenized by mutual agreement. A mother-tongue translator naïve to outcome measure performed a back-translation into English and then compared the meaning of this version with the original questionnaire. Discrepancies were resolved through discussion with all the investigators. The preliminary version of the questionnaire was provided to a group of 16 acquaintances of the investigators (two for each investigator) that did not have any specific health education, to obtain feedback on readability, clarity and unambiguity of questions. The Italian version of the scale is reported in Appendix.

2.3. Measures

The MHLS (*Mental Health Literacy Scale*) (O'Connor & Casey, 2015) is a 35-item scale developed to assess all attributes of mental health literacy. It covers six domains: (1) ability to recognize specific disorders; (2) knowledge of where to seek information; (3) knowledge of risk factors and causes; (4) knowledge of self-treatment; (5) knowledge of professional help available; and (6) attitudes that promote recognition and appropriate help-seeking. The response format varies across items, using both 4-point Likert scales (from 'Very unlikely' to 'Very likely' or 'Strongly disagree' to 'Strongly agree') and 5-point Likert scales (from 'Strongly disagree' to 'Strongly agree' or 'Definitely unwilling' to 'Definitely willing'). Scoring involves summing all items (after reverse-scoring items 10, 12, 15, 20, 28, 29, 30, 31, and 32) to produce a total score ranging from 35 to 160, where higher scores indicate greater MHL. In its original validation, the MHLS demonstrated good internal consistency ($\alpha = 0.873$) and high test-retest reliability ($r = 0.797$), effectively discriminating between mental health professionals and the general community.

The HLS-EU-Q16 (*European Health Literacy Survey Questionnaire – 16 item version*) (Lorini et al., 2019; Sørensen et al., 2013; Sørensen et al., 2015): it is a short form of the European Health Literacy Survey Questionnaire (HLS-EU-Q47) (Pelikan et al., 2019), designed to assess an individual's ability to access, understand, appraise, and apply health-related information. It is a self-reported tool with Likert-type responses ("very easy", "fairly easy", "fairly difficult", "very difficult") and an associated final score that measures interaction, comprehension, information seeking, application/ function, decision-making/critical

thinking, evaluation, responsibility, confidence, and navigation skills. To generate the score of the HLS-EU-Q16, the items are dichotomized into two categories with two scores, “easy” (“fairly” or “very” easy = 1) and “difficult” (“fairly” and “very” difficult = 0). The scale score is calculated as the sum of the scores of each item and varied between 0 and 16. A direct correlation between HL scores and MHLS scores was expected.

The DASS-21 (*Depression Anxiety Stress Scales – 21 item version*) (Bottesi et al., 2015; Coker et al., 2018; Henry & Crawford, 2005; Osman et al., 2012; Sinclair et al., 2012): it is a widely used self-report instrument that assesses psychological distress across three domains: depression, anxiety and stress. It consists of 21 items scored on a four-point Likert scale, with seven items allocated to each subscale. Participants rate the extent to which they have experienced each symptom over the past week on a four-point scale. The total score reflects overall emotional distress, with higher scores indicating greater symptom severity. Depression subscale evaluates symptoms such as low mood, hopelessness, lack of motivation, and anhedonia and higher scores indicate more severe depressive symptoms. Anxiety subscale measures physiological arousal, situational anxiety, and fear responses, and higher scores are indicative of greater levels of anxiety. Stress subscale assesses chronic non-specific arousal, including difficulty in relaxing, irritability, and impatience. Higher scores denote higher stress levels.

Since this questionnaire measures active symptoms at the time of completion, no specific correlation between DAS scores and MHLS scores was expected.

2.4. Validation: enrolment of the sample

Between October 7th 2024 and November 15th 2024, each investigator approached 50 of his/her acquaintances/relatives aged ≥ 18 years, explaining the aims and procedures of the study. Among those, 46 (11.5%) denied participation and/or did not complete the questionnaire. The final sample was therefore composed of 354 subjects.

2.5. Inclusion/Exclusion criteria

The questionnaire was provided to acquaintances/relatives of the investigators, excluding healthcare providers and patients referred to the psychiatrists, as they could be supposed to have a greater knowledge of the topics explored by the questionnaire.

Further exclusion criteria were:

- Age <18 years;
- Not fluent in Italian;
- Illiteracy and/or difficulty in reading for visual impairment.

2.6. Validation: procedure

Enrolled subjects were asked to provide their written informed consent.

All participants received a Google form link via text message or e-mail, for the collection of data. Collected data included social and demographic variables (age, sex, gender identity, years of formal education, occupation, relationship status) and some clinical information (previous psychiatric diagnoses, endocrine or metabolic diseases, cardiovascular diseases, autoimmune or rheumatologic diseases, neurological diseases, other medical conditions, self-reported use of tobacco, alcohol, cannabis, or other psychoactive substances), together with responses to the items of the questionnaires. At this stage, no feedback was asked to participants on readability, clarity, and relevance of the questions. Participants were asked to complete the forms in one session, without any indication of preferred devices (smartphone, tablet, or PC). A consecutive sub-sample of 84 subjects (all those enrolled between October 7th 2024 and October 22nd 2024) was asked to complete the MHLS questionnaire twice at a one-week interval, to assess test-retest

reliability.

In order to warrant the anonymization of data, each participant was identified through an unequivocal alphanumeric code, whereas the database did not contain any information which could lead to the identity of subjects.

Missing data were handled by including only questionnaires with >95% of items completed; any remaining missing values were imputed using the mean of the available responses.

The study was approved by the Local Ethical Board (Protocol n° 0101,831, approved on May 6th 2024).

2.7. Validation: test-retest reliability

For test-retest reliability, scores of each item were compared between the two tests performed, calculating the proportion of subjects with differences in scores > 1. In addition, IntraClass Correlation (ICC) was assessed between the total scores of the two tests and scores of individual items.

2.8. Validation: internal consistency

Internal consistency was verified in the whole sample by calculating Cronbach's alpha.

2.9. Validation: construct validity

Construct validity was assessed through three main approaches: factorial validity, convergent validity, and known-groups validity. Factorial validity was evaluated using Exploratory Factor Analysis (EFA) to verify the underlying dimensions of the scale. Convergent validity was examined by calculating the Spearman's correlation between MHLS scores and general health literacy, as measured by the HLS-EU-Q16, expecting a positive association. Known-groups validity was assessed by comparing MHLS scores across different demographic and clinical subgroups (e.g., gender, history of psychiatric diagnosis) using Mann-Whitney U or Kruskal-Wallis tests whenever appropriate. Finally, the relationship with psychological distress (DASS-21) was explored to evaluate the link between MHL and current emotional symptoms.

2.10. Factor structure

The factor structure of the questionnaire was assessed using an exploratory factor analysis with the principal component method. The number of relevant factors was identified through visual analysis of the scree plot, excluding further factors for which Eigenvalue had reached a substantial plateau. Relevant factors were extracted and rotated with a Varimax rotation, calculating the Kaiser-Meyer-Olkin measure and performing Bartlett's test of sphericity, to verify their correlation with individual item scores.

All analyses were performed using SPSS version 29.0.2.0.

3. Results

3.1. Sample characteristics

The final sample consisted of 354 participants, including 196 females (55.4%) and 158 males (44.6%). Detailed demographic and clinical characteristics are summarized in Table 1. Notably, 14.7% ($n = 52$) of the sample reported a current or lifetime psychiatric diagnosis, with depressive (7.6%) and anxiety disorders (3.7%) being the most prevalent conditions.

Internal consistency and factor structure. The distribution of MHLS scores in the Italian sample exhibited a slight negative asymmetry (-0.323) and a kurtosis of 0.896. As normal distribution could not be assumed, results are presented as median and interquartile range (IQR), with a median total score of 119 [111; 126]. The scale demonstrated

Table 1
Descriptive statistics of the sample.

Characteristics of the total sample (N = 354)	Number (%), mean $\pm$ standard deviation or median [quartiles]
Gender:	
Male	158 (44.6%)
Female	196 (55.4%)
Gender identity:	
Male	157 (44.4%)
Female	197 (55.6%)
Age:	
Male	47.9 $\pm$ 19.5
Female	44.6 $\pm$ 18.0
Total	46.1 $\pm$ 18.7
Educational level:	
Male	17.1 $\pm$ 3.8
Female	16.7 $\pm$ 3.6
Total	16.9 $\pm$ 3.7
Occupation:	
Student	60 (16.9%)
Full-time employment	189 (53.4%)
Part-time employment	26 (7.3%)
Retired	69 (19.5%)
Unemployed	10 (2.9%)
Relationship status:	
Cohabiting/married	188 (53.1%)
Single	82 (23.2%)
In a relationship	74 (20.9%)
Widowed	10 (2.8%)
History of psychiatric diagnosis:	52 (14.7%)
Anxiety	13 (3.7%)
Depression	27 (7.6%)
Other psychiatric diagnosis*	12 (3.4%)
No psychiatric diagnosis:	302 (85.3%)
Endocrine-metabolic disorders**	86 (24.3%)
Cardiovascular diseases***	62 (17.5%)
Autoimmune or rheumatologic diseases	8 (2.3%)
Neurological diseases	13 (3.7%)
Other chronic conditions****	37 (10.5%)
Smokers	143 (40.4%)
Alcohol use	64 (18.1%)
Drug use:	36 (10.1%)
Cannabis	32 (9%)
Other	4 (1.1%)
DASS:	
Total	15 [8; 23]
Depression	5 [2; 8]
Anxiety	3 [1; 6]
Stress	7 [4; 10]
HLS-EU-Q16:	
Total	11 [8; 14]

* ADHD (0.3%), Bipolar Disorder (1 [0.3%]), Borderline Personality Disorder (1 [0.3%]), Eating and Nutrition Disorders (4 [1.1%]), Obsessive-Compulsive Disorder (3 [0.8%]), Psychosis (1 [0.3%]), Unknown Diagnosis (1 [0.3%]).

** Seasonal allergy (1 [0.3%]), Celiac Disease (1 [0.3%]), Cushing's Syndrome (1 [0.3%]), Dyslipidemia (33 [9.3%]), Dyslipidemia + Erectile Dysfunction (1 [0.3%]), Dyslipidemia + Hyperuricemia (1 [0.3%]), Diabetes Mellitus (1 [0.3%]), Type 1 Diabetes + Hypothyroidism (1 [0.3%]), Type 2 Diabetes (8 [2.3%]), Type 2 Diabetes + Dyslipidemia (2 [0.6%]), Hyperuricemia (1 [0.3%]), Hypogonadism (1 [0.3%]), Hypothyroidism (19 [5.4%]), Hypothyroidism + Dyslipidemia (1 [0.3%]), Obesity + Dyslipidemia (1 [0.3%]), Polycystic Ovary Syndrome (PCOS) (2 [0.6%]).

*** Thalassemia (1 [0.3%]), Arrhythmia (1 [0.3%]), Arrhythmia + Hypertension (1 [0.3%]), Ischemic Heart Disease (1 [0.3%]), Ischemic Heart Disease + Hypertension (1 [0.3%]), Congenital Heart Disease (1 [0.3%]), Atrial Fibrillation (2 [0.6%]), Atrial Fibrillation + Hypertension (1 [0.3%]), Myocardial Infarction (1 [0.3%]), Hypertension (45 [12.7%]), Hypertension + Aortic Valve Disease (1 [0.3%]), Hypertension + Pacemaker (1 [0.3%]), Hypertension + Mitral Valve Prolapse (1 [0.3%]), Mitral Valve Prolapse (1 [0.3%]), Long QT Syndrome (1 [0.3%]), Paroxysmal Supraventricular Tachycardia (1 [0.3%]).

**** Hiatal Hernia (1 [0.3%]), Asthma (4 [1.1%]), COPD (1 [0.3%]), Diverticulosis (1 [0.3%]), Endometriosis (0.6%), Endometriosis + Asthma (0.3%), Pulmonary Fibrosis (0.3%), Monoclonal Gammopathy (0.3%), Monoclonal Gammopathy + BPH (1 [0.3%]), HIV (1 [0.3%]), BPH (4 [1.1%]), Low Vision (1

[0.3%]), Chronic Kidney Disease (2 [0.6%]), Breast Cancer (1 [0.3%]), Prostate Cancer (2 [0.6%]), Leukemia (1 [0.3%]), Chronic Myeloid Leukemia (1 [0.3%]), Chronic Lymphocytic Leukemia (1 [0.3%]), Mastocytosis (1 [0.3%]), IBD (1 [0.3%]), GERD (3 [0.8%]), OSAS (2 [0.6%]), Otosclerosis (1 [0.3%]), Psoriasis (1 [0.3%]).

robust internal consistency, as indicated by a Cronbach's alpha of 0.821.

The sampling adequacy for factor analysis was confirmed by the Kaiser-Meyer-Olkin (KMO) measure, which was 0.823, and Bartlett's test of sphericity, which was significant ($\chi^2(595) = 4303.422$, $p < 0.001$), indicating that the data were suitable for factor analysis.

Principal Component Analysis (PCA) supported a 4-factor structure, which collectively accounted for 42.0% of the total variance (see Table 1 in Supplementary Materials). As detailed in the rotated component matrix (Table 2), 33 out of the 35 items were clearly attributable to these four factors (Factor 1: 7 items; Factor 2: 11 items; Factor 3: 10 items; Factor 4: 5 items), enabling the calculation of specific subscale scores.

3.2. Test-retest reliability

Temporal stability was evaluated in a subsample of 84 participants. The Intraclass Correlation Coefficient (ICC) for the MHLS total score was 0.72 (95% CI: 0.61–0.81; $p < 0.001$), reflecting good reliability over a one-week interval. Detailed ICC values for individual items are provided in the Supplementary Materials (Table 2).

Table 2
Correlation between item scores and factors after Varimax rotation.

	Rotated component matrix			
	Component			
	1	2	3	4
MHLS 1	.072	.664	.021	-0.054
MHLS 2	.105	.728	.067	-0.030
MHLS 3	-0.024	.597	-0.023	.101
MHLS 4	.037	.707	.014	.038
MHLS 5	.057	.622	.079	.145
MHLS 6	.095	.648	.009	.083
MHLS 7	.044	.726	.076	.147
MHLS 8	-0.022	.706	-0.010	.164
MHLS 9	.128	.362	-0.163	-0.129
MHLS 10	-0.093	-0.210	.184	-0.040
MHLS 11	.015	.255	.049	.325
MHLS 12	.208	.115	.159	-0.203
MHLS 13	.193	.318	-0.003	.287
MHLS 14	.058	.359	.024	.300
MHLS 15	.130	.073	.301	-0.156
MHLS 16	.247	.122	-0.035	.594
MHLS 17	.172	.132	-0.140	.570
MHLS 18	.083	.042	-0.020	.689
MHLS 19	.009	.061	-0.011	.823
MHLS 20	-0.147	-0.022	.287	-0.170
MHLS 21	.061	.001	.614	-0.013
MHLS 22	.063	.129	.542	-0.028
MHLS 23	.221	-0.145	.545	-0.127
MHLS 24	.259	.003	.699	-0.100
MHLS 25	.054	-0.051	.535	-0.017
MHLS 26	.089	.006	.582	-0.022
MHLS 27	-0.154	-0.016	.591	.206
MHLS 28	.127	.073	.593	.192
MHLS 29	.719	.110	.087	.070
MHLS 30	.809	.066	.130	.143
MHLS 31	.859	.039	.091	.161
MHLS 32	.802	.065	.078	.164
MHLS 33	.785	.106	.084	.056
MHLS 34	.711	.088	.051	.030
MHLS 35	.825	.071	.109	.049

Note: KMO = 0.823; Bartlett's test of sphericity: $\chi^2(595) = 4303.422$, $p < 0.001$. Extraction Method: Principal Component Analysis (Analysis of main components). Rotation Method: Varimax with Kaiser normalization, convergence reached in 6 iterations. Bold values indicate correlations of items with factors to which item scores should be attributed for subscale score calculation.

3.3. Known-groups and concurrent validity

As illustrated in Table 3, several demographic and clinical factors significantly influenced mental health literacy levels. Females achieved significantly higher scores than males (median 120 vs. 117; $p = 0.021$), and participants with a history of psychiatric diagnosis showed higher MHL levels compared to those without (median 123 vs. 118; $p = 0.017$). Significant differences were also observed based on occupational status ($H = 42.797$, $p < 0.001$) and relationship status ($H = 17.264$, $p < 0.001$). Conversely, lifestyle factors such as smoking, alcohol consumption, or cannabis use did not significantly impact scores.

Concurrent validity was further supported by a significant positive correlation with general health literacy (HLS-EU-Q16: $\rho = 0.148$, $p = 0.005$) and a significant negative correlation with age ($\rho = -0.338$, $p < 0.001$), as reported in Table 4. Years of education did not show a significant association. Finally, while the DASS-21 total score was not significantly correlated with the MHLS ($\rho = 0.074$, $p = 0.167$), a weak positive correlation was observed specifically with the stress subscale ($\rho = 0.112$, $p = 0.036$).

4. Discussion

The translation of a self-reported questionnaire into a different language poses some methodological issues, which can theoretically alter its psychometric properties. The finding that the meaning of each question had not changed after translation into Italian and back-translation into English is a pre-requisite for the use of the Italian version. The reproducibility of answers when the questionnaire was administered twice at a one-week interval is a further indication that the translation of all the items was unambiguous.

The MHLS was originally developed and validated in Australia

Table 3
MHLS scores in different subgroups (median [interquartile range]).

Characteristics	Categories	MHLS scores	U*/H**	p
Sex	Male	117 [111–124]	13,284.0*	.021
	Female	120 [112–128]		
Psychiatric diagnosis	Yes	123 [115; 132]	9479.0*	.017
	No	118 [111; 126]		
Other chronic conditions	Yes	114 [108; 124]	11,981.5*	.032
	No	120 [113; 128]		
Occupation	Student	124 [117–131.7]	42.8**	<0.001
	Full-time employment	120 [114–127]		
	Part-time employment	111.50 [104.7–121.5]		
	Retired	112 [104.5–121]		
	Unemployed	124.5 [110.5–129.2]		
	Cohabiting/ married	118 [109–126]		
	Single	119.5 [113.7–126]		
Relationship status	In a relationship	122 [114.7–130.2]	17.3**	<0.001
	Widowed	107.5 [85–115.7]		
	Yes	119 [112; 126]		
	No	119 [111; 127]		
Alcohol use	Yes	117.5 [111.2; 126.7]	8887.0*	.596
	No	119.5 [111; 126]		
Cannabis use	Yes	118.5 [113; 127.5]	5480.5*	.552
	No	119 [111; 126]		
Use of other psychoactive substances	Yes	110 [103; 119.2]	399.0*	.139
	No	119 [111; 126]		

Table 4

Correlations of MHLS Scores (Spearman).

	R	Df	p
Age (years)	-0.338	350	<0.001
Education (years)	0.024	352	0.646
HLS-EU-Q16 TOT	0.148	352	0.005
DASS 21 tot	0.074	352	0.167
DASS depression	0.060	352	0.258
DASS anxiety	0.020	352	0.711
DASS stress	0.112	352	0.036

R = Spearman's rank-order correlation coefficient; p = two-tailed p-value; df = degrees of freedom; Age (years) = Age of participants in years; Education (years) = Years of formal education completed; HLS-EU-Q16 TOT = Total score on the European Health Literacy Survey Questionnaire, 16-item version; DASS 21 tot = Total score on the Depression Anxiety Stress Scales; DASS depression = Depression subscale score of the DASS-21; DASS anxiety = Anxiety subscale score of the DASS-21; DASS stress = Stress subscale score of the DASS-21.

(O'Connor & Casey, 2015). In comparison with the original validation study, which reported a mean score of 127.38 (SD = 12.63), our Italian sample showed a lower median score of 119 [111; 126]. This discrepancy likely reflects the different composition of the study populations. While the original study included mental health professionals, our study intentionally excluded healthcare providers to better represent the literacy levels of the general population. In addition, differences in general health literacy between the Australian (Choudhry et al., 2019 Mar, 28) and Italian (Program for the International Assessment of Adult Competencies (PIAAC) 2012; Program for the International Assessment of Adult Competencies (PIAAC) 2023) populations could have contributed to differences in mean scores.

The higher scores of MHLS in people with a prior psychiatric diagnosis is not surprising, since patients who are aware of having received a formal diagnosis have been in contact with health professionals, presumably providing them with information on their condition. Interestingly, psychopathological symptoms, as assessed with the DASS questionnaire, were not significantly correlated with MHLS scores, with the only exception of a weak correlation for DASS-Stress subscale. This finding suggests that MHLS is affected by care for mental disorders, rather than mental health per se: individuals with undiagnosed or sub-threshold psychiatric disorders, or unaware of their disorder, do not score any better on MHLS than the rest of the population.

Scores of MHLS did not appear to be affected by the educational status, supporting the validity of the questionnaire in a wide range of educational levels. Conversely, a positive correlation was found between general health literacy and MHLS scores, confirming that mental health literacy is part of general health literacy (Kutcher et al., 2016).

The interpretation of sex differences is not univocal. Women are more frequently affected by mental disorders (Baños & Miragall, 2024; Klose & Jacobi, 2004; Kuehner, 2017; Maestre-Miquel et al., 2021; McLean et al., 2011), which could drive toward a greater mental health literacy. On the other hand, women have been reported to be more health-conscious and to pay a greater attention to their health status (Olson et al., 2017; Vaidya et al., 2012), which could also lead to a higher literacy. The lower scores in older people could reflect a generational gap in the cultural approach to mental health issues (Baral et al., 2022; Robb et al., 2003).

The Italian validation of the Mental Health Literacy Scale (MHLS) demonstrated good internal consistency and reliability (Cronbach's alpha = 0.821), confirming that the total score measures a single construct across different population subgroups. MHLS was originally developed as a unidimensional instrument, with no subscales. Factor analysis of the original questionnaire suggested a 4-factor structure, but the use of the total score only was preferred by the authors, due to low factor loadings (O'Connor & Casey, 2015). Validation studies of translated versions of the questionnaire in different languages suggested a multifactorial structure, with the proposal of the development of

subscales. A four-factor structure was proposed in the Slovenian (Krohne et al., 2022), Saudi Arabian (BinDhim et al., 2023), Turkish (Tokur Kesgin et al., 2020), Vietnamese (Dang et al., 2018), and Chinese (Chen et al., 2021) validations, with minor differences in factor composition, whereas the Persian (Ghaedamini Harouni et al., 2022) and Thai (Gobhathai et al., 2022) versions proposed five-factor solutions, and the French validation identified a three-factor structure. In contrast, the South African (Korhonen et al., 2019) and Zambian (Korhonen et al., 2019) validations retained the original unidimensional structure. Our exploratory factor analysis suggested a possible multi-factor structure. Although the choice of the number of factors to include in final rotated analysis is questionable, a four-factor structure appeared to describe more accurately the distribution of scores, although explaining <45% of total variance. Supposing that each factor corresponds to a hypothetical subscale, factor 1 (items 29–35) could be recognized as “Attitudes or stigma that may promote or inhibit mental health-seeking”, and factor 2 (items 1–9; items 13–14) as “Ability to recognize mental health disorders”. Factor 3 (items 15; 20–28) seems to describe “General attitudes and behaviors toward mental disorders and help seeking”, whereas factor 4 (items 11; 16–19) is related to “Ability to seek health-related information on mental health”. Notably, some items (i.e.: 10 and 12) had a poor correlation with all rotated factors, and they could not be attributed to any specific scale.

Overall, the articulation of different subscales can add potentially interesting information. However, the reliability of the identified subscales is questionable: the relatively low proportion of variance explained by the main factors, the inconsistency of results across translations into different languages, and the fact that some of the items had only very weak correlations with the principal factors, warrant caution in the use of subscales without further investigations on their actual psychometric properties. Notably, although the initial Chinese validation explored a four-factor structure, it adopted a final unidimensional model (Chen et al., 2021). For these reasons we also suggest to use the MHLS as a unidimensional questionnaire and we decide not to exclude any item of the original version.

Some limitations of the present study should be recognized. In comparison with current guidelines for cross-cultural adaptation (Beaton et al., 2000), only one back-translation was performed, which may have theoretically limited the detection of minor conceptual discrepancies. The sample was not representative of the general population: convenience enrolment performed by health professionals led to the preferential recruitment of well-educated individuals with a permanent occupation, with a low proportion of elderly. It is possible that younger subjects, with limited experience of contact with health professionals, and elderly people, with a relatively lower level of scientific education, have mean lower levels of MHL; however, the size of the sample did not allow reliable separate analyses of MHLS scores in different age groups. Although health professionals and patients referred to psychiatrists were excluded, it is possible that being acquaintances and/or relatives of a health professional was associated with an average higher level of MHL than the general population. In addition, the enrolment was performed in a relatively small geographical area and in a predominantly urban context. The use of electronic databases for data collection may have limited access based on the digital competence of participants. Furthermore, the assessment of construct validity was partially constrained by the current lack of other validated Italian instruments specifically designed to measure mental health literacy, requiring the use of general health literacy and psychological distress scales as proxies. However, the combination of factorial analysis, known-groups comparisons, and correlation with general health literacy provides a robust framework to support the construct validity of the Italian MHLS.

On the other hand, the remote digital compilation of questionnaires warranted the absence of any interference of investigators, as needed for a self-report instrument. In addition, other relevant strengths of the present paper include the recruitment of a large sample with a broad age

range, which allowed for a more comprehensive validation than previous studies often limited to university students. Furthermore, the intentional exclusion of healthcare professionals and patients already in psychiatric care provided a more accurate and unbiased assessment of MHL within the general Italian population.

In conclusion, the results of the present study confirm the validity of the Italian version of the MHLS questionnaire, which can be used in epidemiological and medical research, preferably with a unidimensional model.

CRedit authorship contribution statement

Lara Allegrini: Writing – review & editing, Writing – original draft, Data curation. **Dario Bruognolo:** Writing – original draft, Conceptualization. **Marco Squillace:** Methodology, Conceptualization. **Andrea Gigliotti:** Writing – original draft, Investigation. **Giovanni Castellini:** Supervision. **Valdo Ricca:** Validation. **Edoardo Mannucci:** Validation, Supervision. **Francesco Rotella:** Writing – review & editing, Validation, Supervision, Project administration, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.mhp.2026.200507.

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