Psychometric Properties of The Mental Health Continuum-Short Form (MHC- SF) In Iranian Adolescents

Majid Yousefi Afrashteh (yousefi@znu.ac.ir)
University of Zanjan

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Abstract

Background: Psychological tests are necessary to assess and assess the mental state of individuals. Mental health is one of the important psychological indicators and is increasingly considered as having various aspects of well-being. The Mental Health Continuum-Short Form (MHC-SF) is a 14-item instrument that assesses mental health, focusing on emotional, psychological, and social well-being. The present study examined the psychometric properties of the Persian version of the MHC-SF among adolescents, focusing on its factor structure, internal consistency, construct validity, and gender measurement invariance.

Methods: The population of this study was Iranian adolescents between 11 and 18 years old who were enrolled in the seventh to twelfth grades. A convenience sample of 822 Adolescents from four large cities in the Iran (Tehran, Zanjan, Hamedan and Ghazvin) participated in the present study. Questionnaires were completed online. Statistical analyses to evaluate the factor structure, internal consistency, construct validity, gender and age factorial invariance were performed in SPSS and LISREL.

Results: The results of confirmatory factor analysis supported the 3-factor structure of MHC-SF (emotional, psychological, and social well-being). Reliability was confirmed by Cronbach's alpha method and composite reliability (>.7). Measurement invariance were confirmed among girls and boys. Convergent and divergent validity were also evaluated and confirmed by correlating the test score with similar and different tests.

Conclusion: This study examined and confirmed the psychometric properties of GHQ in the Iranian adolescent community. This instrument can be used in psychological research and diagnostic evaluations.

Introduction

Adolescence is a critical period for increasing vulnerability and the onset of mental illness (1-2). Mental health problems during adolescence impose psychological, social and economic challenges on any society (2-4). Epidemiological studies have shown the prevalence of adolescent mental illness from 10 to 20% worldwide (3). About 15% of Iran's population is between 10 and 20 years old and adolescents (5). Based on epistemological data in Iran, behavioral and mental health problems are common in this group (6-8). Research reports show that unmet needs in children and adolescents are even greater than in adults (9).

The relationship between mental health and mental illness has evolved in recent decades, and this has influenced the conceptualization of mental health. For example, The World Health Organization defined mental health as being free from mental illness (10-11). However, focusing solely on the prevention and treatment of mental illness was not successful in reducing the prevalence of mental illness (12).In particular, Weisz et al (13) showed that in the last fifty years, psychological interventions in children and adolescents have not led to much improvement. On the other hand, the pathological view of mental health did not help to distinguish adolescents with educational and behavioral problems (14).

With the development of positive psychology, a new approach to mental health was formed. In the latest definition of the World Health Organization (15) mental health is defined as “A state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community”. This approaches emphasize the role of positive functioning, worthwhile goals, meaningful activity and optimistic growth in mental well-being. Thus, elements of positive mental health and symptoms of mental illness can coexist. In this view, the strengths and weaknesses of the individual are seen together and must be combined to fully assess the mental state.

Various models have been proposed for conceptualizing and evaluating mental health. In Keyes's theory (16), human beings are embedded in social structures, face various social challenges, and have numerous interpersonal interactions, thus addressing the social aspect of mental health. Keyes (16-17) developed two distinct but related continuum model, Instead of a single continuum with mental well-being and illness at both ends. This mental health continuum distinguishes three levels of positive mental health: flourishing, moderate, and languishing mental health (18).People with flourishing mental health have enjoyable and positive performance. In contrast, people with languishing mental health experience low pleasure and positive performance. Individuals who are neither flourishing nor languishing are known as moderate mental health. Given the importance of measuring the mental health of the population, epidemiological studies focusing on flourishing - such as MHC-SF - have been shown to be associated with superior physical, mental, and psychosocial functions (19).

Most instruments designed to measure adolescent mental well-being either have many questions or measure limited dimensions of mental health (20). Due to the many countries have adopted MHC-SF, considering evidence supporting the utility, validity and reliability of its. The 14 item Continuum-short form of mental health (MHC-SF) (25) is a short questionnaire that corresponds to the 40 item Continuum mental health form (26). Psychometric properties of the MHC-SF were confirmed in adolescents and adults of different cultures, including Argentina (21), Canada (22), China (23), Egypt (24), India (25), Ireland (26), Italy (27), Korea (28), Poland (29), South Africa (30), USA (31, 32), Dutch(20). In Iran, too, Joshanloo reported the psychometric properties of this tool well. But his research sample was university students (33).

As mentioned, adolescents are a special group and the structure obtained from adults about them may not be valid. Given that the field of planning and exercise is increasingly focused on mental health among adolescents, an appropriate instrument to this age group is needed to considering the variance in well-being. The aim of this study was to adapt MHC-SF to a sample of adolescents in Iranian society. For this purpose, the factor structure and psychometric properties such as its Reliability and validity have been evaluated. Most previous research has confirmed the three-factor structure for MHC-SF. In order to investigate the psychometric properties of MHC-SF, first, its reliability is evaluated based on internal consistency and test-retest, second, determining the factor structure by assuming three underlying factors, and third, evaluating convergent validity of the MHC-SF-A, correlating the PANAS-C, and Kidscreen-2 and RCADS-25. As well as, this study aimed to obtain evidence for the two-continuum model.

Method

Participants

The population of this study was Iranian adolescents between 11 and 18 years old who were enrolled in the seventh to twelfth grades. A convenience sample of 822 Adolescents from four large cities in the Iran (Tehran, Zanjan, Hamedan and Ghazvin) participated in the present study. They were relatively proportional distributed by sex: 430 girls (52%) and 392 boys (48%). The mean age was 16.33 years old (*SD* = 8.80). The highest percentage of the participants (38.6%; *n* = 317) lived in Tehran province, 20% (*n* = 165) lived in Zanjan province, 22% (*n* = 179) lived in Hamedan province 18.7% (*n* = 154) lived in Ghazvin province and only 7 cases did not report their residence. Concerning their socioeconomic status, the majority (68.1%, *n* = 560) described itself as belonging to the middle class, 19.9% (*n* = 164) to middle-low or lower class, 9.2% (*n* = 76) to high or middle-high class, and 2.6% (*n* = 22) did not report their class. In the Iranian educational system, the first and second secondary education are included from the seventh to the eleventh grade. Most of the participants (58%, n=479) were enrolled in the second secondary, compared to 42% (n=345) who were enrolled in the first secondary education. In terms of educational grade the sample consisted 95 7th graders (11.5%), 115 8th graders (13.9%), 135 9th graders (36.5%), 164 10th graders (36.5%), 195 11th graders (36.5%), and 120 12th graders (36.5%).

Procedure

The executive process of this research has been approved by the Ethics Committee of Kermanshah University of Medical Sciences under No. IR.KUMS.REC.1400.608 All procedures were carried out an adequate understanding and each participant provided their informed consent prior to the study. Data was collected through non-random and voluntary sampling. Iranian adolescents were asked to complete online questionnaires. Questionnaires were provided for online implementation and administered from November 28th 2020 to February 16th 2021. Before completing the questionnaires, the participants were explained the purposes and significance of research and their informed consent was obtained. For participants under 16 years, parental consent was also obtained

MHC-SF-A

The original 14-item Mental Health Continuum–Short Form (MHC-SF) (30) is a self-report questionnaire, measuring three basic subjective well-being domains: emotional (3 items), psychological (6 items) and social (5 items) of well-being. Respondents rated the frequency of every feeling in the past month on a 6-point Likert scale. Respondents thought about their past month and rated the frequency of each feeling on a 6-point Likert-type scale from never (0) to every day (5). The Iranian version of this questionnaire has already been used and validate by Rafiey et al. (34) in the adult population. The original English MHC-SF (30) for adolescent is just like the adult version, with only one helpful change to better fit the adolescent population. Specially, Examples of the community in the item “How often did you feel that you belonged to a community?” which in the adult version was “(like a social group, your

neighborhood, or your city)" were given in the adolescent version as "(like a group of friends, at school, or in the neighborhood)".

PANAS-C

The positive affect (PA) dimension of the 10-item PANAS-C (35) was selected to evaluate emotional well-being, as referred to the degree to which people feel is vitality and enthusiastic. The PA dimension was evaluated five adjective by five items: happy, lively, happy, energetic, and proud. The items have a 5-point Likert response format with answers ranging from 1 („very little) to 5 („a lot'). The sum of the item scores gives the total health score. The PA dimension has been shown to measure PA markers well among 6–18-year-olds. Ebesutani et al. (35) showed that PANAS-C is valid and reliable for the age group of 18-18 years. Lotfi (36) reported the psychometric properties of this questionnaire very well in Iran. In the present study, the Cronbach's alpha of the PANAS-C was 0.76.

Kidscreen-27

Kidscreen-27 (37) is a brief screening measure to evaluate the behavioral and emotional problems of children and adolescents by 27 items measuring five scales, physical well-being, psychological well-being, autonomy and parents, peers and social support, and school environment. Items are scored on a 5-point Likert scale. The higher the total score indicates greater quality of life.Nik-Azin, Naeinian and Shairi (38) reported the psychometric properties of this questionnaire in Iran suitable for the age group of 11 to 19 years. The results of this study supported the five-factor structure of the original version. In the present study, the Cronbach's alpha of the Kidscreen-27 was 0.73.

DASS-21

The DASS-21 (39) is a short form of DASS-42, well-established instrument for measuring depression, anxiety, and stress with good reliability and validity reported in different cultural context (40). DASS-21 is a set of three self-report 7-item scales for assessing negative mental states in anxiety, depression, and stress. All 21 items are scored on a 4-point Likert scale from 0) did not apply to me at all) to 3 (applied to me very much, or most of the time). Asghari (41), examining the psychometric properties of this questionnaire in Iran, reported it as valid and reliable. A high score indicates psychological distress on each scale. In the present study, the Cronbach's alpha of the DASS-21 was 0.75.

Results

The results of the analysis are reported separately for different areas of psychometrics.

Reliability

Table 1 shows the descriptive statistics (means, standard deviations, skewness, and kurtosis), Cronbach alphas and composite reliabilities for latent MHC-SF-A subscales. The results support the reliability of the scales in both Cronbach's alpha methods and the composite reliability (>0.70)that indicates the MHC-SF is a reliable measure, therefore it can be accepted.

Table 1. Descriptive Statistics for MHC-SF dimensions and reliability indices

Dimension	M	SD	Skewness	Kurtosis	CR	α
Emotional	10.31	3.17	.38	.70	0.87	0.84
Social	14.82	3.94	.74	.67	0.85	0.85
Psychological	18.13	4.26	.43	.69	0.86	0.82
MHC-SF Total	43.27	12.48	.51	.33	0.88	0.87

Factorial Validity

Confirmatory factor analysis was used to determine the factor structure of the questionnaire. LISREL10.2 was used to evaluate the factor structure. The method of estimating the weighted least squares with data from polychoric matrix and asymptotic covariance matrix was used in data analysis. The least squares method was preferred because the Likert response options were five-choice and

the polychoric matrix had to be calculated instead of the Pearson correlation (42). Confirmatory factor analysis was performed by comparing four models of one-factor, two-factor, three-factor first-order and three-factor second-order. According to the information in Table 2, the first-order three-factor model has the best fit. Table 3 reports the standard estimates and the t-value based on the best fit of the factor model.

Table 2. Results of the Confirmatory Factor Analyses

model	X^2	df	IFI	CFI	NFI	RMSEA	90% CI RMSEA
Single factor	727.22	77	0.823	0.818	0.813	0.131	0.126-0.136
Two factor	498.09	75	0.872	0.868	0.867	0.111	0.106-0.116
Three factor	222.35	73	0.938	0.943	0.941	0.061	0.055-0.066
Second order (three factor)	315.74	68	0.910	0.901	0.903	0.082	0.074-0.087

Notes. χ^2: Chi Squared test, df: degrees of freedom, IFI: Incremental Fit Index, CFI: comparative fit index, NFI: Normed-of-Fit Index, RMSEA: root mean square error of approximation, CI: confidence interval. Criteria for interpreting model fit are: RSMEA < .08, IFI, CFI and NFI > .90.

Table 3. Standard estimate and t-value for the relationship between the item and the factor in the three-factor model

Factor	item	Factor loading	t-value
Emotional Wellbeing	1. Happy	.65	7.31
	1. Interested in life	.58	6.25
	1. Satisfied	.55	6.04
Social Wellbeing	1. That you had something important to contribute to society	.61	7.09
	1. That you belonged to a community (like a group of friends, at school or in the neighborhood)	.51	5.87
	1. That our society is becoming a better place for people	.57	6.16
	1. That people are basically good	.58	6.20
	1. That the way our society works makes sense to you	.59	6.29
Psychological Wellbeing	1. That you liked most parts of your personality	.63	7.24
	1. Good at managing the responsibilities of your daily life	.57	6.18
	1. That you had warm and trusting relationships with others	.60	6.34
	1. That you have experiences that challenge you to grow and become a better person	.64	7.28
	1. Confident to think or express your own ideas and opinions	.49	5.53
	1. That your life has a sense of direction or meaning to it	.63	7.20

Cross-Validation

Cross-validation was used to assess whether the three-factor model determined in the two groups of boys (n = 366) and girls (n = 366) had a similar fit. The model fit indices for the two groups are reported in Table 4. The results show that the three-factor measurement model fits well in both girls and boys.

Table 4. Results of cross-validation analysis in two groups of girls and boys

group	X^2	df	IFI	CFI	NFI	RMSEA	90% CI RMSEA
Males	219.38	73	0.942	0.941	0.933	0.065	0.060-0.071
Females	224.84	72	0.945	0.941	0.925	0.065	0.060-0.071

Measurement Invariance

Table 5 shows the values for comparing models and measurement variability. Chi-square difference, CFI difference and RMSEA difference are the comparison criteria. According to the results of the Table, none of the indicators are significant (p>0.05). Therefore, Strong invariance was supported between males and females.

Table 5. Measurement Invariance across Gender

model	X^2	df	CFI	RMSEA	Model comparison	ΔX^2	Δdf	p	ΔCFI	ΔRMSEA
Model 1 No constraints	339.33	149	0.942	0.062	-	-	-		-	-
Model 2 Factor loadings constrained	352.85	160	0.940	0.061	2 vs 1	13.52	11	0.260	0.002	0.001
Model 3 Factor loadings and covariances constrained	362.19	164	0.942	0.060	3 vs 1	22.86	15	0.087	0.000	0.002

Construct validity

To evaluate the construct validity, the relationship between the score obtained from MHC-SF-A and several other measures was examined. According to Keyes' (17) conceptualization, MHC-SF-A is expected to be negatively related to anxiety and depression (convergent validity), Also has a positive relationship with Kidscreen-27 positive affect tests (divergent validity). The results of Pearson correlation coefficient for convergent and divergent validity are reported in Table 6. This table also shows the relationship between MHC-SF-A subscales to evaluate the internal homogeneity of the test. According to these results, there is both convergent validity, divergent validity and internal validity between MHC-SF-A subscales.

Table 6. Pearson Correlation Coefficients for Construct Validity

measure		MHC-SF subscale			MHC-SF total
		Emotional	Psychological	Social	
convergent validity					
anxiety		-0.40***	-0.33***	-0.29***	-0.37***
depression		-0.43***	-0.37***	-0.36***	-0.40***
divergent validity					
Kidscreen-27		0.48***	0.47***	0.40***	0.45***
Positive affect		0.50***	0.43	0.38***	0.44***
Internal Consistency					
MHC-SF subscale	Emotional	-			
	Psychological	0.62***	-		
	Social	0.50***	0.55***	-	
***$p < .001$					

Reliability

Table 7 shows the descriptive statistics (means, standard deviations, skewness, and kurtosis), Cronbach alphas and composite reliabilities for latent MHC-SF-A subscales. The results support the reliability of the scales in both Cronbach's alpha methods and the composite reliability (>0.70) that indicates that the MHC-SF is a reliable measure, therefore it can be accepted.

Descriptive statistics, composite reliabilities and Cronbach alpha coefficients for MHC-SF-A subscales

scale	M	SD	Skewness	Kurtosis	CR	α
Emotional	3.41	0.92	0.69	0.78	0.87	0.84
Psychological	3.32	1.04	0.46	0.31	0.85	0.85
Social	3.01	1.13	0.70	0.89	0.86	0.82
MHC-SF total	3.20	0.95	0.44	0.40	0.88	0.87

Discussion

The purpose of the present study was to analyze the structure and the psychometric properties of data gathered with the Mental Health Continuum-Short Form version for adolescents (30) in Iranian adolescences, its internal consistency and reliability, its invariance across gender, and plausibility of the two continua model proposing that mental health and illness are distinct yet related constructs. The Mental Health Continuum, or MHC, represents a clinical approach to the continuous assessment and categorical diagnosis of states of positive mental health (30,17). The short form of the MHC scale, consisting of 14 items, is one of the instruments to assess well-being most widely used internationally (21). For this reason, the main objective of this study was to validate the MHC–SF within an Iranian adolescences population. The current findings confirm that the MHC–SF is a valid and reliable instrument that can be used for assessing well-being within the Iranian adolescences.

The findings of our study confirm that the multidimensional structure of well-being (emotional, social and psychological). The three-factor model displayed acceptable goodness-of-fit indexes, and comparatively better than those of single-factor and two-factor models. These results are consistent with a growing number of studies that suggest that MHC-SF measures a predominant general well-being factor and three specific factors that correspond to the emotional, social, and psychological well-being subscales (27, 29, 33, 43-45).

The emotional and psychological subscales of MHC-SF in this population showed high internal consistency and reliability, as assessed with Cronbach's alpha. Internal consistency and reliability coefficients of the social well-being subscale, although satisfactory, were low relative to the other subscales. Similar findings have been observed in previous studies (27,29,30,46). All Cronbach's alphas were above those observed in South African and Dutch and Italian studies (29,30,46).

Confirmatory Factor Analysis (CFA) were computed to ascertain the factor structure of the MHC-SF. To examine whether these three factors tapped the same dimension, a second-order CFA was conducted. CFA has provided a fairly good level of support for the tripartite structure of the MHC-SF (29,47) 12. The only cross-cultural study on the factor structure of the MHC-SF is Joshanloo et al.'s (47) study using CFA, showing that the three-dimensional model of the MHC-SF fitted the data well in Iran, South Africa, and the Netherlands. The overall Iranian MHC-SF and the three sub-dimensions had a better internal consistency than did other studies. Additionally, our findings supported strong invariance of the three subscales of the MHC-SF by gender. These findings suggest that MHC-SF is measured similarly across males and females using the 3-factor model, allowing comparison across gender.

The convergent validity of the MHC-SF is good in the current study, suggesting that the MHC-SF is a valid instrument. The results of Pearson correlation coefficient for convergent and divergent validity indicated the relationship between MHC-SF-A subscales to evaluate the internal homogeneity of the test. Between anxiety and depression, depression covered a broader conceptualization of well-being. It means the well-being validation measure depression, for example, correlated strongest with total MHC-SF score, an assessment of overall well-being. According to Keyes' conceptualization (16), MHC-SF-A is expected to be negatively related to anxiety and depression. Prior studies also have provided evidence of convergent validity of emotional, social, and psychological dimensions of mental well-being (18,46).

In addition to convergent validity, the present study also confirmed divergent and discriminant validity of the MHC–SF. The two-continua model holds that mental illness and mental health are related, but distinct, dimensions. The present study makes clear that measures of mental health are correlated with, but distinct from, measures of mental illness. This means that the absence of mental illness does not necessarily imply the presence of mental health, justifying the need for a measure to assess mental health.

In general, the MHC-SF is a useful, brief self-report questionnaire for assessment of positive mental health. As a result, the study contributes in filling the knowledge gap on the validation and usefulness of MHC-SF in national cultures world-wide to measure positive mental health.

There are a number of limitations to this study that need to be considered. Due to the large sample size, even weak correlations are statistically significant. To account for this, we applied an alpha of .001 instead of the common .05 as a margin of significance in the validation analyses. Because of the overly restrictive assumptions of the CFA approach and the resulting inflation of factor intercorrelations, the future studies are will be able to use Exploratory Structural Equation Modeling (ESEM) to represent the factor structure of multidimensional constructs such as mental well-being. In addition, future research should explore the validity of the Iranian MHC–SF, and the three classifications for positive mental health, for people in different categories.

The findings have important implications for mental health policy and care. Currently, mental health care focuses mainly on psychopathology in diagnostics as well as in treatment. However, with mental health and mental illness being two distinct indicators of mental health, it may be beneficial to focus also on promotion of positive mental health. It is hoped that this study will pave the way for more informed and comprehensive conceptualization and assessment of mental well-being in a variety of age groups.

Conclusion

In this study, we administered the Mental Health Continuum–Short Form (30) to a broad Iranian sample (aged from 11 to 18 years) to investigate its factor structure, psychometrics, and utility in distinguishing the level of functioning among Keyes' (16) model (i.e., languishing, moderate mental health, and flourishing), in terms of the level of mental health. Therefore, to the best of our knowledge, this research is among the first to validate a measure of Iranian adolescences' positive mental health and provides initial evidence that the MHC-SF can be used with younger participants. These findings reinforce the results of previous studies with adolescents (31,48) suggesting that this conceptualization of mental health may be applicable from childhood to adulthood. In conclusion, we consider the MHC-SF to be a psychometrically sound instrument for overall mental well-being in Iranian adolescents.

Declarations

Ethics approval and consent to participate

All participants gave informed written consent with the right to withdraw at any time. In the first part of the questionnaire, there was a paragraph introducing the study aim and assuring confidentiality of data by anonymous questionnaires. Participants did not experience any harm and they were allowed to stop their participation during the data collection process. The executive process of this research has been approved by the Ethics Committee of Kermanshah University of Medical Sciences under No. IR.KUMS.REC.1400.608.

Consent for publication

Not applicable

Availability of data and materials

The datasets during and/or analyzed during the current study available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' Contributions

MYA conceived and designed the research; MYA collected, organized and analyzed the dada; MYA wrote the paper. MYA read and approved the final manuscript.

References

1. WHO. Health for the world’s adolescents: a second chance in the second decade; 2014.
2. Heizomi H, Allahverdipour H, Jafarabadi MA, Bhalla D, Nadrian H. Effects of a mental health promotion intervention on mental health of Iranian female adolescents: a school-based study. Child and Adolescent Psychiatry and Mental Health. 2020 Dec;14(1):1-0.
3. Kieling C, Baker-Henningham H, Belfer M, Conti G, Ertem I, Omigbodun O, Rohde LA, Srinath S, Ulkuer N, Rahman A. Child and adolescent mental health worldwide: evidence for action. The Lancet. 2011 Oct 22;378(9801):1515-25.
4. Sharifi V, Mojtabai R, Shahrivar Z, Alaghband-Rad J, Zarafshan H, Wissow L. Child and adolescent mental health care in Iran: Current status and future directions. Archives of Iranian medicine. 2016 Nov 1;19(11):0-.
5. Statistical Center of Iran. Population and housing census. 2018; Available from: http://www.amar.org.ir/Default.aspx?1. Statistical Center of Iran. Population and housing census [Internet]. Iran: Statistical Center of Iran: 2018. Available from: http://www.amar.org.ir/Default.aspx?tabid=1190.
6. R, Hefazi M, et al. Twelve–month prevalence and correlates of psychiatric disorders in Iran: The iranian mental health survey, 2011. Arch Iran Med. 2015; 18(2): 76 – 84.
7. Radgoodarzi R, Hefazi M, et al. Iranian Mental Health Survey: Design and Field Procedures. Iran J Psychiatry. 2014; 9(2): 96 – 109.

8. Mohammadi MR, Salmanian M, Ghanizadeh A, Alavi A, Malek A, Fathzadeh H, et al. Psychological problems of Iranian children questionnaire. J Ment Health. 2014; 23(6): 287 – 291.
9. World Health Organization. The World Health Report 2001: Mental health: new understanding, new hope.
10. Fen CM, Isa I, Chu CW, Ling C, Ling SY. Development and validation of a mental wellbeing scale in Singapore. Psychology. 2013 Jun 24;4(07):592.
11. Snyder CR, Lopez SJ. Handbook of positive psychology. Eds. New York: Oxford University Press; 2002.
12. Insel T, Scolnick E. Cure therapeutics and strategic prevention: raising the bar for mental health research. Mol Psychiatry. 2006;11:11–7.Return
13. Weisz JR, Kuppens S, Ng MY, Eckshtain D, Ugueto AM, Vaughn-Coaxum R, et al. What five decades of research tells us about the effects of youth psychological therapy: a multilevel meta-analysis and implications for science and practice. Am Psychol. 2017;72:79–117.
14. Antaramian SP, Scott Huebner E, Hills KJ, Valois RF. A dual-factor model of mental health: toward a more comprehensive understanding of youth functioning. Am J Orthopsychiatry. 2010;80:462–72.
15. World Health Organisation. Promoting mental health: concepts, emerging evidence, practice (summary report). Geneva, Switzerland: WHO Press; 2004. p. 69.
16. Keyes CL. The mental health continuum: From languishing to flourishing in life. Journal of health and social behavior. 2002 Jun 1:207-22.
17. Keyes CL. Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. American psychologist. 2007 Feb;62(2):95.
18. Keyes CL, editor. Mental well-being: International contributions to the study of positive mental health. Springer Science & Business Media; 2012 Nov 8.
19. Keyes CL. Mental illness and/or mental health? Investigating axioms of the complete state model of health. Journal of consulting and clinical psychology. 2005 Jun;73(3):539.
20. Luijten CC, Kuppens S, van de Bongardt D, Nieboer AP. Evaluating the psychometric properties of the mental health continuum-short form (MHC-SF) in Dutch adolescents. Health and quality of life outcomes. 2019 Dec;17(1):1-0.
21. Perugini MLL, de la Iglesia G, Solano AC, Keyes CL. The mental health continuum–short form (MHC–SF) in the Argentinean context: confirmatory factor analysis and measurement invariance. Eur J Psychol. 2017;13:93–108.Return
22. Doré I, O'Loughlin JL, Sabiston CM, Fournier L. Psychometric evaluation of the mental health continuum–short form in French Canadian Young adults. Can J Psychiatry. 2017;62:286–94.
23. Guo C, Tomson G, Guo J, Li X, Keller C, Söderqvist F. Psychometric evaluation of the mental health continuum-short form (MHC-SF) in Chinese adolescents–a methodological study. Health Qual Life Outcomes. 2015;13:198–206.
24. Salama-Younes M. Validation of the mental health continuum short form and subjective vitality scale with Egyptian adolescent athletes. In: Brdar I, editor. The human pursuit of well-being. Dordrecht: Springer; 2011. p. 221–34.
25. Singh K, Bassi M, Junnarkar M, Negri L. Mental health and psychosocial functioning in adolescence: an investigation among Indian students from Delhi. J Adolesc. 2015;39:59–69.
26. Donnelly A, O'Reilly A, Dolphin L, O'Keeffe L, Moore J. Measuring the performance of the mental health continuum-short form (MHC-SF) in a primary care youth mental health service. Ir J Psychol Med. 2019:1–5.
27. Petrillo G, Capone V, Caso D, Keyes CL. The mental health continuum–short form (MHC–SF) as a measure of well-being in the Italian context. Soc Indic Res. 2015;121:291–312.
28. Lim YJ. Psychometric characteristics of the Korean mental health continuum–short form in an adolescent sample. J Psychoeduc Assess. 2014;32:356–64.
29. Karaś D, Cieciuch J, Keyes CL. The polish adaptation of the mental health continuum-short form (MHC-SF). Personal Individ Differ. 2014;69:104–9.
30. Keyes CL, Wissing M, Potgieter JP, Temane M, Kruger A, Van Rooy S. Evaluation of the mental health continuum–short form (MHC–SF) in setswana-speaking south Africans. Clin Psychol Psychother. 2008;15:181–92.

31. Keyes CL. The subjective well-being of America's youth: toward a comprehensive assessment. Adolescent Family Health. 2006;4:3–11.
32. Keyes CL, Eisenberg D, Perry GS, Dube SR, Kroenke K, Dhingra SS. The relationship of level of positive mental health with current mental disorders in predicting suicidal behavior and academic impairment in college students. J Am Coll Heal. 2012;60:126–33.
33. Joshanloo M. A new look at the factor structure of the MHC-SF in Iran and the United States using exploratory structural equation modeling. Journal of clinical psychology. 2016 Jul;72(7):701-13.
34. Rafiey H, Alipour F, LeBeau R, Amini Rarani M, Salimi Y, Ahmadi S. Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHC-SF) in Iranian earthquake survivors. International Journal of Mental Health. 2017 Jul 3;46(3):243-51.
35. Ebesutani C, Regan J, Smith A, Reise S, Higa-McMillan C, Chorpita BF. The 10-item positive and negative affect schedule for children, child and parent shortened versions: application of item response theory for more efficient assessment. J Psychopathol Behav Assess. 2012;34:191–203.Return to ref 40 in article
36. Lotfi M, Bahrampoori L, Amini M, Fatemitabar R, Birashk B, Shiasi Y. Developing the Persian version of positive and negative affect scale for children (Original and short form) and assessing its psychometric properties. Iranian Journal of Psychiatry and Clinical Psychology. 2020;25(4):440-53.
37. Ravens-Sieberer U, Auquier P, Erhart M, Gosch A, Rajmil L, Bruil J, Power M, Duer W, Cloetta B, Czemy L, Mazur J. The KIDSCREEN-27 quality of life measure for children and adolescents: psychometric results from a cross-cultural survey in 13 European countries. Quality of Life Research. 2007 Oct;16(8):1347-56.
38. Nik-Azin A, Naeinian M R, Shairi M R. Validity and Reliability of Health Related Quality of Life Questionnaire “KIDSCREEN-27” in a Sample of Iranian Students . IJPCP. 2013; 18 (4) :310-321.
39. Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. Psychological assessment. 1998 Jun;10(2):176.
40. Oei TP, Sawang S, Goh YW, Mukhtar F. Using the depression anxiety stress scale 21 (DASS-21) across cultures. International Journal of Psychology. 2013 Dec; 48(6):1018-29.
41. Asghari A, Saed F, Dibajnia P. Psychometric properties of the Depression Anxiety Stress Scales-21 (DASS-21) in a non-clinical Iranian sample. Int J psychol. 2008;2(2):82-102.
42. Keyes, C. L. M. (1998). Social well-being. Social Psychology Quarterly, 61(2), 121-140. doi:10.2307/2787065
43. Echeverría, G., Torres, M., Pedrals, N., Padilla, O., Rigotti, A., and Bitran, M. (2017). Validation of a Spanish version of the mental health continuum-short form questionnaire. Psicothema 29, 96–102. doi: 10.7334/psicothema2016.3
44. Rogoza, R., Truong Thi, K. H., Rózycka-Tran, J., Piotrowski, J., and ZemojtelPiotrowska, M. (2018). Psychometric properties of the MHC-SF: an integration of the existing measurement approaches. J. Clin. Psychol. 74, 1742–1758. doi: 10.1002/jclp.22626
45. Longo, Y., Jovanovic, V., Sampaio de Carvalho, J., and Kara ´ ´s, D. (2020). The general factor of well-being: multinational evidence using bifactor ESEM on the Mental Health Continuum–Short Form. Assessment 27, 596–606. doi: 10.1177/1073191117748394
46. Lamers S, Westerhof GJ, Bohlmeijer ET, ten Klooster PM, Keyes CL. Evaluating the psychometric properties of the Mental Health Continuum–Short Form (MHC-SF). J Clin Psychol. 2011;67(1):99-110.
47. Joshanloo M, Wissing MP, Khumalo IP, Lamers SM. Measurement invariance of the Mental Health Continuum–Short Form (MHC-SF) across three cultural groups. Pers Individual Differences. 2013;55(7):755-75
48. Matos, A. P., Andre´, R. S., Cherpe, S., Rodrigues, D., Figueira, C., & Pinto, A. M. (2010). Preliminary psychometric study of the Mental Health Continuum—Short Form—for youth, in a sample of Portuguese adolescents. Psychologica, 53, 131–156. doi:10. 14195/1647-8606_53_7.