Mental health literacy: a focus on daily life context for population health measurement

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Abstract

A core purpose of mental health literacy is to enable everyone from all walks of life to manage and maintain wellbeing in daily life. In October 2019, a national campaign, Every Mind Matters, was launched in England to improve mental health literacy in the general population and empower action around daily life stress and anxiety, mood, and sleep. We developed three mental health literacy measures to assess knowledge, and attitudes that may evoke the use of this knowledge, of daily life signs and actions around depression, anxiety, and stress. As part of a larger campaign evaluation, baseline data were collected via an online survey of the general public ($n = 3262$ adults). For construct validation, we investigated dimensionality and hypotheses of logical associations with mental health literacy. The factor model results show that item responses on each measure have a single predominant source of influence. These responses show logical associations with knowledge about sleep hygiene, attitudes indicative of stigma towards mental health, and some indirect experience with mental health difficulties. Item response theory information plots showed that total scale scores are sensitive to a wide range of individual differences in mental health literacy. This means that the three measures can be used for early screening purposes or to evaluate the impact of public mental health interventions. Measurement of mental health literacy has been predominantly centred on knowledge about clinical symptoms of mental disorders. We show that daily life signs of depression, anxiety, and stress, before the onset of common mental disorders, can also serve as a tenable basis for measuring mental health literacy in the general population. Future comparisons of both types of measurement are needed, for debates on the objectives and benefits of mental health literacy interventions for public health in societies with high- and low-resource healthcare systems.

Introduction

There is growing interest in public health policy arena globally in the concept of mental health literacy. First introduced by Jorm et al. (1997), this concept refers to “knowledge and beliefs about mental disorders which aid their recognition, management or prevention”. A key premise in this concept is that everyone in a society can be empowered by knowledge and beliefs about mental disorders to protect and maintain personal mental health and wellbeing. This thinking is supported by changes observed across repeated population surveys where growing mental health literacy in the general public was accompanied by more positive attitudes about seeking help or treatment for mental health problems, and less negative attitudes towards individuals who experience problems with mental health (Shidhaye et al., 2017, Pescosolido et al., 2010, Goldney et al., 2009, Mojtabai, 2007, Jorm et al., 2006, Angermeyer and Matschinger, 2005).

In October 2019, a national campaign, Every Mind Matters, was launched in England to improve mental health literacy in the general population and empower action around personal mental health. This meant understanding what mental health is, how we can improve it and what we should do if we have mental health problem. More specifically, the campaign content prioritised sleep, anxiety, low mood, and stress as these are the most common mental health concerns where there is good evidence for self-help (The Mental Health Foundation, 2019, Jetten et al., 2022). Such an emphasis on daily life routine is also seen in more recent work of leading scholars (Table 1). Since the first definition of mental health literacy by Jorm et al. (1997), a large body of research has examined how knowledge may influence help seeking attitudes in the presence of mental disorders. Beyond knowledge and attitudes, Jorm (2020) called for more research on the link between knowledge and action. This focus is evident in his refined definition (Jorm, 2012) which now includes knowledge about actions that benefit one’s own mental health or that of others. Implicit in this refined definition is an emphasis on the context of daily life situations with / without the onset of mental disorders. Consistent with this emphasis, more recent definitions of mental health literacy by Kutcher et al. (2016) also include competencies for improving one’s mental health care and self-management capabilities in daily life routine.

Table 1. Leading theoretical definitions of mental health literacy

Jorm et al. (1997)	Jorm (2012)	Kutcher et al. (2016)
<ul style="list-style-type: none"> ability to recognise specific disorders 	<ul style="list-style-type: none"> recognition of when a disorder is developing 	<ul style="list-style-type: none"> understanding mental disorders and their treatments
<ul style="list-style-type: none"> knowledge of risk factors and causes 	<ul style="list-style-type: none"> knowledge of how to prevent mental disorders 	<ul style="list-style-type: none"> understanding how to obtain and maintain positive mental health
<ul style="list-style-type: none"> attitudes that promote recognition and appropriate help-seeking 	<ul style="list-style-type: none"> knowledge of help-seeking options and treatments available 	<ul style="list-style-type: none"> enhancing help-seeking efficacy (knowing when and where to seek help and developing competencies designed to improve one’s mental health care and self-management capabilities)
<ul style="list-style-type: none"> knowledge of self-treatments, and of professional help available 	<ul style="list-style-type: none"> knowledge of effective self-help strategies for milder problems 	
<ul style="list-style-type: none"> knowing how to seek mental health information 	<ul style="list-style-type: none"> first aid skills to support others who are developing a mental disorder or are in a mental health crisis 	<ul style="list-style-type: none"> decreasing stigma related to mental disorders

Depression, anxiety, and stress are common daily life issues that individuals experience from time to time. Without vigilance, recognition, and management, these experiences can escalate in severity and duration, giving rise to depressive and anxiety disorders. These disorders are termed as common mental disorders because they are highly prevalent in populations globally (World Health Organization, 2017). As they are very common in the general population (Steel et al., 2014), everyone would in principle benefit from an understanding of signs in daily life, before the onset of common mental disorders. The COVID-19 pandemic has heightened urgency to address public health impact of common mental disorders (Holmes et al., 2020), where in the UK, prevalence was already rising steadily over the past decades (Mind, 2020, McManus et al., 2016). Meta-analysis of observational studies of the pandemic (Arora et al., 2022, Salari et al., 2020) reported prevalence estimates of 22 – 34% for depression, 28 – 32% for anxiety, and 27 – 30% for stress. Slightly higher estimates have been reported in UK-only studies (Pierce et al., 2020, Niedzwiedz et al., 2021, Daly et al., 2020). With growing concerns across the society, signs of depression, anxiety, and stress are highly relevant daily life issues when targeting mental health literacy in the general population.

An understanding what mental health is, how we can improve it and what we should do if we have mental health problem, entails knowledge for recognising signs and taking actions when mental health in daily life is affected by depression, anxiety, and stress. This knowledge would also carry broad relevance across psychiatric illnesses (Bohnke et al., 2014, McLaughlin and Nolen-Hoeksema, 2011, Steel et al., 2014). However, knowledge alone is not likely to be enough for mental health literacy because knowledge and attitudes may have distinct consequences on behaviour (O'Connor et al., 2014). Specifically, one may have knowledge for recognising signs and taking actions, but active use of this knowledge may also depend on one's attitudes about mental health and the perceived need to be vigilant.

To evaluate the impact of campaign on these areas of knowledge and attitudes, we searched for mental health literacy measures, using seminal work and recent reviews (Mansfield et al., 2020, Kutcher et al., 2016, Wei et al., 2015, O'Connor et al., 2014, Jorm, 2012), their bibliography and citation record. We encountered pervasive references to psychiatric illnesses across available measures (Table S1 in online supplement). With mental disorders (e.g., major depressive disorder, generalised anxiety disorder, panic disorder, obsessive compulsive disorder) as the 'core frame of reference' (Kusan, 2013), these measures capture 'mental disorder literacy' (Mansfield et al., 2020) which centres around the 'recognition and knowledge of mental illness'. This frame of reference presents a measurement challenge in the context of Every Mind Matters, where mental health literacy in the general population is centred on knowledge and attitudes about how mental health is linked to sleep, anxiety, low mood, and stress in daily life. We thus investigated if the latter focus is a tenable basis for reframing measurement practice in mental health literacy research.

Method

Study participants

Members in the general population who were recruited for an existing market research panel maintained by YouGov (<https://account.yougov.com/gb-en/join/main>) were invited to respond to a cross-sectional survey prior to the launch of Every Mind Matters. They are paid a small sum once they have taken part in several YouGov surveys. This work represents secondary analysis of data anonymised by YouGov before receipt and as such is exempt from approval by the King's College London Psychiatry Nursing and Midwifery Research Ethics Subcommittee.

The evaluation of Every Mind Matters includes multiple waves of public surveys following a pre-campaign wave in September 2019. Baseline data from the pre-campaign wave were

collected from 3262 adult respondents. Quota sampling is used by YouGov to ensure representativeness of the adult population (age 18 and above) of England with respect to demographic variables including age, gender, ethnicity, socioeconomic status and geographical region. We reported these sample characteristics in the online supplement (Table S7).

Measures

We developed three measures of mental health literacy knowledge and attitudes. Content development involving formative assessment of field test versions is reported in the online supplement. Here, we describe the versions used to collect data at the psychometric validation stage. The first measure, Mental Health Literacy – Recognition (MHL-REC), has three identical sets of nine items measuring the extent one recognises signs in everyday life when mental health is affected by stress, anxiety, and depression, respectively. These knowledge items focus on changes in daily behavioural patterns when mental health is affected (e.g., enjoyment, energy level, social contact). Respondents were asked to pick any of the nine items in each of three adjacent columns for stress, anxiety, and depression. Responses to the 27 items are treated as binary data (0 = No, 1 = Yes) based on the following instructions: *“Please note that you can tick more than one condition for each experience (row). If you think one or more of the experiences is not a sign of stress, anxiety or depression, please tick ‘none of these’ for those experiences (row).”* The second measure, Mental Health Literacy – Action (MHL-ACT), has the same format in MHL-REC. It has three identical sets of nine items describing actions that one can take when mental health is affected by depression, anxiety, and stress. These knowledge items focus on actions in routine daily life that maintain or improve mental health (e.g., sleep, diet, exercise). The third measure, Mental Health Literacy – Vigilance (MHL-VIG), has 12 items that tap into personal views about mental health. These attitudes frame a lay understanding that fosters vigilance and evoke use of relevant knowledge for maintaining mental health in daily life (e.g., There is always something you can do to look after your mental health and wellbeing). Based on 5-point Likert response scale (strongly disagree – strongly agree), higher scores indicate more vigilance about mental health.

We used another three measures for two external validation purposes. First, convergent validation was performed using Sleep Beliefs Scale (SBS) for measuring sleep hygiene knowledge (Adan et al., 2006), a key campaign focus of Every Mind Matters. We also used a 4-item subscale in the Reported and Intended Behaviour Scale (RIBS) for measuring desire for social distance from people with mental health conditions (Evans-Lacko et al., 2011). This measure assesses stigma about mental health, a construct that has been closely examined in relation to mental health literacy by observational and intervention studies, as well as systematic reviews (Morgan et al., 2018, Holman, 2015, Pinto-Foltz et al., 2011). Second, we anticipated group differences in mental health literacy due to personal experience (Pinto-Foltz et al., 2011, Hansson et al., 2016). Specifically, we performed known-group validation to see if respondents have more mental health literacy if they: (1) have personal experience of having mental health problems, or (2) ever visited a doctor for mental health concerns, or (3) known someone close with a mental health condition, or (4) ever worked as a mental healthcare professional.

After validation, we conducted exploratory analyses to examine the associations between mental health literacy and five additional outcome measures focusing on confidence and wellbeing. There are apparent interests in these outcomes, as exemplified by the definition of health literacy from the World Health Organization (2022) and the conduct of randomised trials (Lam et al., 2019). However, mental health literacy research has focused mainly on stigma and help seeking (Mansfield et al., 2020), rather than confidence and wellbeing. We thus explored these latter associations using (1) a 7-item subscale in Self-Rated Abilities for Health Practices (SRAHP-c7) for measuring confidence in self-care actions for maintaining psychological wellbeing (Becker et al., 1993); (2) a 4-item subscale in Mental Health Literacy

Scale (MHLS-c4) for measuring confidence in knowing how / where to seek information for mental health needs (O'Connor and Casey, 2015); (3) a 7-item scale developed locally by PHE (PHE-c7) for measuring confidence in ability to maintain one's mental health; (4) the 7-item short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS) for measuring wellbeing in past 14 days (Ng Fat et al., 2017), and (5) the 6-item K6 scale for measuring distress in past 30 days (Prochaska et al., 2012). Details of their content, item response format, and psychometric properties are provided in the online supplement.

Analysis

Structural validation

If individual differences in item responses on MHL-REC, MHL-ACT, and MHL-VIG, are mainly due to mental health literacy, their respective measurement model would be strictly or essentially unidimensional. We investigated the tenability of one-factor measurement models by examining their eigenvalues, model fit, item correlation residuals and modification indices. Eigenvalues were obtained using exploratory factor analysis (EFA) procedures in Mplus, whereas all other results were based on confirmatory factor analysis (CFA) procedures. For one-factor models, the model specifications and results are identical regardless of CFA or EFA procedures. Item and test information curves were used to add item response theory insights on item-level relevance and sensitivity, and scale-level reliability (Reise and Haviland, 2005, Petrillo et al., 2015) as estimated by $\text{reliability} = 1 - (1 / \text{information})$. Based on the correspondence between factor analytic models and IRT graded response models (Kamata and Bauer, 2008, Reise, 2012), we leveraged Mplus capabilities to generate the IRT information curves after CFA procedures. We conducted identical sets of structural validation analyses for other seven measures.

External validation

If individual differences in item responses on MHL-REC, MHL-ACT, and MHL-VIG are mainly due to mental health literacy, higher scores would be associated with more knowledge about sleep hygiene (SBS) and less desire for social distance indicative of stigma about mental health (RIBS-d4). For these convergent validation purposes, correlations between the five measurement models were estimated using a correlated-factor model framework (Model 1).

We hypothesised that respondents with some personal experience of mental health issues should have more mental health literacy in terms of knowledge (MHL-REC, MHL-ACT) and attitudes (MHL-VIG) as well as sleep hygiene (SBS), and less desire for social distance indicative of stigma (RIBS-d4). For these known-group validation purposes, group differences were estimated by adding four binary covariates to Model 1, each indicating whether respondents had any of four types of personal experience with mental health issues.

Exploratory analyses

After construct validation, we explored cross-sectional associations that constructs of mental health literacy knowledge and attitudes might have with three measures of confidence in keeping well (SRAHP-c7, MHLS-c4, PHE-c7) and two measures of recent wellbeing (SWEMWBS, K6). We estimated these correlations by adding the five measurement models to Model 1.

Modelling

We treated Likert scale responses to the 10 measures as order categorical data and estimated model parameters using the recommended diagonally weighted least squares (DWLS) estimator with robust standard errors (Rhemtulla et al., 2012), denoted 'weighted least squares means and variance adjusted' (WLSMV) in Mplus 7. Overall model fit was

evaluated in two ways. An exact fit between model predictions and observed data, within bounds of sampling error, would result in model Chi-square (χ^2) values that fail to reach statistical significance (Kline, 2010). As this statistic is highly sensitive to sample size, we also considered approximate model fit. Approximate model fit is deemed tenable if: (a) root mean square error of approximation (RMSEA) values are low (Browne and Cudeck, 1993, Reininghaus et al., 2011), where <0.10 is considered as acceptable and <0.05 as very good fit; (b) comparative fit index (CFI) values are high (Muthén, 1989, Bentler, 1990), where >0.90 is considered as acceptable and >0.95 as very good fit. Model misspecifications were examined using: (a) residual correlations between items that were 0.10 or larger; and (b) modification indices, measured as improvement in exact model fit (or reduction in model χ^2 values) if constrained parameters are released (Kline, 2010).

Results

Structural validation

Unidimensionality was tenable for each of the 10 measures. Details are provided in online supplement. Here, we focused on measures of mental health literacy knowledge (MHL-REC and MHL-ACT) and attitudes (MHL-VIG).

A strictly unidimensional model for 27 MHL-REC items did not have an exact fit with sample data ($\chi^2 = 5714.413$, $df = 324$, $p < .0001$), but attained acceptable approximate model fit (RMSEA = 0.071, 90% CI: 0.070 – 0.073; CFI = 0.908). Model fit could be improved, if residual correlations suggested by modification indices were added, mainly between items in adjacent columns for each series (e.g., item 1 for depression, anxiety, or stress). This proximity could have inflated similarity in item responses. However, as proximity is not a construct-relevant influence, we opted not to add residual correlations for explaining the inflated common variance. Model fit could also be improved if more factors were extracted, one for each series in depression, anxiety, and stress. Without them, a strictly unidimensional model tends to under-predict inter-item correlations within each series but over-predict those between series. However, after extraction of the first factor, additional factors show a much weaker impact on item responses, as indicated by a large ratio between the first two eigenvalues (13.090, 2.180, 1.494, 1.171, 0.837). This means that MHL-REC is essentially unidimensional (Reise and Haviland, 2005, Reise et al., 2010). Coupled with an acceptable approximate model fit, we thus retain a strictly unidimensional model for MHL-REC. All 27 items show sizable factor loadings in a consistent direction (Table S8). Test information curve (Figure S1) shows that MHL-REC total scores have a reliability of at least 0.8 for discriminating a wide range of individual differences (about 2.0 SD below sample average to 1.5 SD above). Item information curves (Figure S2 – S4) show that respondents in general recognise the nine daily life changes more easily as signs of depression than as signs of anxiety and stress. The latter are more ‘difficult’ items and as such tend to be more informative about individuals with more mental health literacy in terms knowledge about daily life signs of mental health.

A strictly unidimensional model for 27 MHL-ACT items did not attain an acceptable fit with the sample data ($\chi^2 = 16818.772$, $df = 324$, $p < .0001$, RMSEA = 0.125; CFI = 0.793). The tenability of this model was undermined by two reverse-keyed items (“*try not to think about it*” and “*avoid all difficult situations*”). They refer to unhealthy actions in contrast to the other seven. Ticking these actions would constitute an incorrect response. In all three series (depression, anxiety, and stress), both items showed weak and negative factor loadings in a strictly unidimensional model. We double-checked and confirmed that reverse-coding has been properly applied. Similar issues with reverse-keyed items have been documented across fields of psychological assessment (Zickar, 2020, Menold, 2019, van Sonderen et al., 2013, Lindwall et al., 2012). Given the anomalous impact of this methodological artefact, we excluded both items from each series and re-estimated a unidimensional model with the remaining 21 items.

This model also did not have an exact fit but attained acceptable approximate fit ($\chi^2 = 3816.924$, $df = 324$, $p < .0001$, $RMSEA = 0.077$, 90%CI: 0.075 – 0.079; CFI = 0.951). As MHL-ACT has the same format as MHL-REC, modification indices flagged similar issues with item proximity. Inspection of correlation residuals did not surface an apparent need for extracting more factors. The large ratio of first two eigenvalues strongly supports that MHL-ACT data was essentially unidimensional (13.048, 1.088, 0.889). Coupled with acceptable approximate model fit, we thus retain a strictly unidimensional model for MHL-ACT. All 21 items show sizable factor loadings in a consistent direction (Table S9). Test information curve (Figure S5) shows that MHL-ACT total scores have a reliability of at least 0.8 for discriminating a similarly wide range of individual differences as MHL-REC. Item information curves (Figure S6 – S8) show that knowledge about the seven actions, irrespective of depression, anxiety, or stress, tend to be most informative about respondents with slightly below average mental health literacy in terms of knowledge about maintaining mental health in daily life.

A strictly unidimensional model for 12 MHL-VIG items did not have an exact fit with the sample data but attained acceptable approximate model fit ($\chi^2 = 1513.792$, $df = 54$, $p < .0001$, $RMSEA = 0.092$, 90% CI: 0.088 – 0.096; CFI = 0.966). Inspection of modification indices and correlation residuals did not surface major issues. The large ratio of first two eigenvalues supports that MHL-VIG data was essentially unidimensional (6.188, 1.054, 0.839). Coupled with good approximate model fit, we thus retain a strictly unidimensional model. All 12 items show sizable factor loadings in a consistent direction (Table S10). Test information curve (Figure S9) shows that MHL-VIG total scores have a reliability of at least 0.8 for discriminating a similarly wide range of individual differences as MHL-REC. Item information curves (Figure S10) show that the 12 items show very similar item relevance in that they are most informative about respondents with slightly below average mental health literacy in terms of vigilance about mental health.

External validation

The correlated factors model (Model 1) did not have an exact fit but attained acceptable approximate fit ($\chi^2 = 15984.967$, $df = 3708$, $RMSEA = 0.032$, 90% CI: 0.032 – 0.033; CFI = 0.928). Table 2 shows the associations between various types of knowledge and attitudes. The coefficients were estimated simultaneously from a multivariate model (Hidalgo and Goodman, 2013) with five latent constructs of knowledge and attitudes. As such, they denote the associations between constructs, adjusted for measurement error that is unique to each item in the latent variable models.

Table 2 Associations between latent factors of mental health literacy-related knowledge and attitudes (n = 3157)

		MHL-REC	MHL-ACT	SBS	MHL-VIG
Knowledge	MHL-REC				
	MHL-ACT	.69 (.66 – .71)			
	SBS	.45 (.42 – .49)	.55 (.52 – .59)		
Attitudes	MHL-VIG	.36 (.32 – .39)	.47 (.44 – .51)	.54 (.51 – .57)	
	RIBS-d4 *	-.34 (-.38 – -.30)	-.37 (-.41 – -.34)	-.37 (-.41 – -.33)	-.48 (-.52 – -.45)

* Higher RIBS-d4 latent scores reflect more stigma about mental health
95% confidence intervals in parentheses

There was a strong association between both types of mental health literacy knowledge ($r = 0.69$), much stronger than the moderate associations they have with the other types of knowledge and attitudes. This is indicative of discriminant validity in MHL-REC and MHL-ACT data where mental health literacy knowledge (signs or actions) is related but distinct from mental health literacy attitudes (MHL-VIG), sleep hygiene knowledge (SBS) and attitudes indicative of stigma about mental health (RIBS-d4).

Among the moderate associations indicative of convergent validity in MHL-REC and MHL-ACT data, more knowledge of daily life actions was associated with more vigilance about mental health. Knowledge of daily life signs showed a similar but weaker association (0.45 vs 0.55). With sleep hygiene knowledge, knowledge of daily life actions also showed a stronger association than knowledge of daily life signs (0.55 vs 0.45). Both types of mental literacy knowledge were associated, to a similar extent, with less negative attitudes indicative of stigma (-0.34 and -0.37).

Mental health literacy attitudes that reflect vigilance about mental health had a moderately strong association with less desire for social distance indicative of stigma (-0.48), more so than mental health literacy knowledge. This vigilance also had a moderately strong association with more sleep hygiene knowledge (0.54).

Table 3 shows group differences in mental health literacy knowledge and attitudes, sleep hygiene knowledge and stigma about mental health. The coefficients were estimated simultaneously from a multivariate model (Hidalgo and Goodman, 2013) with five dependent variables (latent factors of knowledge and attitudes) regressed on four independent variables (manifest binary variables denoting types of group differences). As such, they denote the mean group differences in latent scores, adjusted for multiple factors (structural model) and measurement error (latent variable models) in a full structural equation model.

Table 3 Group differences in mental health literacy-related knowledge and attitudes

Reference group 1 (No) vs group 2 (Yes)	Knowledge			Attitudes	
	MHL-REC	MHL-ACT	SBS	MHL-VIG	RIBS-d4*
have a mental health condition	.37 (.29 – .46)	.04 (- .05 – .13)	.06 (- .04 – .17)	.09 (- .00 – .18)	- .25 (- .35 – -.15)
visited a doctor for mental health concerns	.30 (.21 – .38)	.23 (.14 – .31)	.18 (.08 – .27)	.36 (.27 – .44)	- .26 (- .35 – -.17)
someone close has a mental health condition	.51 (.42 – .60)	.55 (.45 – .64)	.35 (.24 – .45)	.35 (.25 – .44)	- .47 (- .57 – -.37)
worked as a mental healthcare professional	.33 (.14 – .51)	.21 (.02 – .39)	- .04 (- .26 – .18)	.26 (.08 – .43)	- .13 (- .31 – .05)

* Higher RIBS-d4 latent scores reflect more stigma about mental health

Point estimates in **grey** if mean group differences in latent scores did not attain statistical significance

Point estimates in **bold** if magnitude of mean group differences ≥ 0.3 (at least 9% explained variance)
95% confidence intervals in parentheses

Respondents showed slightly more literacy in recognising daily life signs when mental health is affected (MHL-REC: 0.37) if they reported having a mental health condition. While not as apparent, they also showed slightly less negative attitudes indicative of stigma about mental health (RIBS-d4). Such group differences were not found for knowledge in daily life actions for maintaining mental health (MHL-ACT), sleep hygiene (SBS), and vigilance about mental health (MHL-VIG).

Respondents showed slightly more literacy in recognising daily life signs when mental health is affected (MHL-REC: 0.30) if they reported having visited a doctor for mental health

concerns. They were also slightly more vigilant about mental health (MHL-VIG: 0.36). While not as apparent, they also showed slightly more knowledge in daily life actions for maintaining mental health (MHL-ACT), sleep hygiene (SBS), and less negative attitudes indicative of stigma about mental health (RIBS-d4).

Respondents showed more knowledge in recognising daily life signs when mental health is affected (MHL-REC: 0.51) and in daily life actions for maintaining mental health (MHL-ACT: 0.55) as well as less negative attitudes indicative of stigma about mental health (RIBS: - 0.47) if they reported knowing someone close with a mental health condition. They also had slightly more vigilance about mental health (MHL-VIG: 0.35) and sleep hygiene knowledge (SBS: 0.35).

Respondents showed slightly more literacy in recognising daily life signs (MHL-REC: 0.33) if they reported having worked as a mental healthcare professional. Though not as apparent, they also showed slightly more knowledge in daily life actions for maintaining mental health (MHL-ACT) and vigilance about mental health (MHL-VIG). Such group differences were not found for sleep hygiene knowledge (SBS) or negative attitudes indicative of stigma about mental health (RIBS).

Exploratory analyses

The model that estimated associations between 10 latent constructs did not have an exact fit but attained acceptable approximate fit ($\chi^2 = 30282.227$, $df = 6395$, $p < 0.001$, $RMSEA = 0.034$, $90\%CI: 0.033 - 0.034$; $CFI = 0.922$). Table 4 shows the associations that knowledge and attitudes have with confidence in various ways of keeping well and recent wellbeing. The coefficients were estimated simultaneously from a multivariate model (Hidalgo and Goodman, 2013) with 10 latent constructs of knowledge, attitudes, confidence and wellbeing. As such, they denote the associations between constructs, adjusted for measurement error that is unique to each item in the latent variable models.

Table 4 Associations between mental health literacy-related constructs, confidence in keeping well and wellbeing

	Confidence in self-care actions SRAHP-c7	Confidence in information seeking MHLS-c4	Confidence in maintaining mental health PHE-c7	Wellbeing: positive emotions SWEMWBS	Wellbeing: negative emotions K6 **
Knowledge					
MHL-REC	- .15 (- .19 – - .11)	.08 (.04 – .12)	.00 (- .04 – .04)	- .21 (- .24 – - .17)	- .27 (- .31 – - .23)
MHL-ACT	.06 (.02 – .10)	.23 (.19 – .27)	.16 (.12 – .20)	.01 (- .03 – .04)	- .02 (- .06 – .04)
SBS	.08 (.04 – .13)	.26 (.22 – .29)	.12 (.08 – .16)	.03 (- .01 – .07)	.07 (.03 – .12)
Attitudes					
MHL-VIG	.26 (.23 – .29)	.45 (.42 – .48)	.46 (.43 – .49)	.12 (.08 – .16)	.04 (.00 – .07)
RIBS-d4*	- .05 (- .09 – - .01)	- .32 (- .36 – - .29)	- .24 (- .28 – - .20)	.01 (- .03 – .05)	.09 (.05 – .13)

* Higher RIBS-d4 latent scores reflect more stigma about mental health

** Higher K6 latent scores reflect more wellbeing (i.e., less distress)

Note: estimates in grey did not attain statistical significance, estimates in **bold** if magnitude ≥ 0.3 (at least 9% explained variance). 95% confidence intervals in parentheses.

Mental health literacy knowledge showed little association with confidence in keeping well and recent wellbeing. Less wellbeing (positive/negative emotions) was weakly associated with more knowledge about daily life signs of when mental health is affected. Knowledge of daily life actions for maintaining mental health showed no association with recent wellbeing. Attitudes, rather than knowledge, in mental health literacy had stronger associations with confidence in self-care actions, information seeking and maintaining mental health. But they also showed little association with recent wellbeing. Knowledge about sleep hygiene and desire for social distance indicative of attitudinal stigma about mental health showed comparably weak associations with confidence in keeping well and recent wellbeing. While knowledge and attitudes lack strong association with recent wellbeing and confidence in keeping well, wellbeing and confidence had moderate to strong associations (Table S18).

Discussion

We developed measures for assessing mental health literacy in terms of knowledge, and attitudes that may evoke the use of this knowledge, of signs and actions in daily life when mental health is affected by depression, anxiety, and stress. Our factor model results showed that item responses on MHL-REC, MHL-ACT and MHL-VIG are essentially unidimensional. This means that each has a single predominant source of influence. We postulated that mental health literacy is this influence. Further investigations show that MHL-REC, MHL-ACT and MHL-VIG data display logical relationships with knowledge of sleep hygiene, desire for social distance indicative of stigma about mental health, and some personal experience, particularly if someone close has a mental health condition. Mental healthcare professionals show slightly more mental health literacy in terms of knowledge in daily life signs, knowledge in daily life actions, and vigilant attitudes about mental health. But it is unclear why differences were not larger given that respondents have work experience in mental health settings. Survey studies with more targeted occupational data would be needed to replicate and explain this. Based on a general population survey, our findings taken together show that a focus on knowledge and attitudes around depression, anxiety, and stress in daily life, can also serve as a tenable basis measuring mental health literacy in the general population.

The MHL-REC measures a lay person's knowledge about daily life impact of depression, anxiety, or stress in terms of changes in daily behavioural patterns when mental health is affected. The MHL-ACT measures a lay person's knowledge about daily life actions for maintaining mental health. The MHL-VIG measures attitudes that may aid one's attention to signs and actions in everyday life for maintaining mental health. In general, the items are most informative about individuals with slightly below average mental health literacy. When summed for each measure, the total scale scores are sensitive to a wide range of individual differences in mental health literacy. This means MHL-REC, MHL-ACT and MHL-VIG can be used for early screening purposes to help identify people with below average mental health literacy levels. Alternatively, they can also be used for evaluating interventions to help identify people who achieve above average mental health literacy levels.

A few other findings are worth noting. First, we found that mental health literacy knowledge and attitudes are related but distinct. Higher levels of mental health literacy, both in knowledge and attitudes, are related to having indirect personal experience of knowing someone close with a mental health condition. Mental health literacy interventions have documented similar benefits about social contact (Pinto-Foltz et al., 2011, Hansson et al., 2016). Those with direct personal experience of having a mental health condition have more knowledge of daily life signs but not of daily life actions. This is also the case among those who sought professional help, but they also have slightly more vigilant attitudes about mental health. The lack of association between direct experience and knowledge in managing mental health may seem counterintuitive. However, this may explain the need for targeting self-management in emerging treatment approaches of cognitive behavioural and

behavioural activation therapy (Uphoff et al., 2020, Cunningham and Shapiro, 2018), as well as in new service models like the recovery college (Theriault et al., 2020). Interventions should consider both knowledge and attitudes, as either alone may not be enough to have an impact on behaviour.

Second, confidence in information seeking, self-care actions, and maintaining mental health, had stronger associations with attitudes than with knowledge in mental health literacy. Confidence may be related more to attitudes than knowledge. But our cross-sectional data do not allow us to be certain about this. Confidence and knowledge may be more closely related in a society with more mental health literacy. Thus, we will need to re-examine this as more observational data are collected in subsequent public surveys. Randomised trials are also needed to see if improving knowledge in daily life signs and actions actually help build confidence in various ways of keeping well. Our data suggest that confidence and wellbeing have mutual benefits.

Third, knowledge and attitudes lack strong association with recent wellbeing. This raises an important question because mental health literacy is fundamentally about empowering people to maintain wellbeing in everyday life. A crucial factor for understanding this conundrum is the context of mental health adversity. It is possible that as people respond differently to the adversity brought on by the pandemic, more individual differences in recent wellbeing may unfold over this period (Mansfield et al., 2022). The variation observed over the course of the pandemic may in turn be increasingly explained by individual differences in mental health literacy. Consequently, more apparent associations between the two constructs may emerge if our study data had been collected after the onset of the pandemic. Contextually informed data are needed (Kutcher et al., 2016), to examine whether mental health literacy matters for wellbeing under low, average, or high levels of adversity. This field of research must also account for diverse concepts and measures of wellbeing (Skevington and Bohnke, 2018, Bohnke and Croudace, 2016).

Study limitations

At least three issues may constrain the generalisability of our study findings. First our study sample may not be representative of the general population even though quota sampling was done with respect to age, gender, ethnicity, socioeconomic status, and geographical region. As part of an online panel recruited by YouGov for market research purposes, it is possible that our respondents are adept in accessing the internet. A study in the UK reported a strong association between internet access and health literacy (Estacio et al., 2019). This suggests that our study sample may be more likely to use the internet for health-related purposes. Consequently, our findings may be affected by the digital divide between those who do and do not have online access habits in the general population.

Another major limitation of our study is the data we have on stigma about mental health. The 4-item subscale in RIBS (Evans-Lacko et al., 2011) measures desire for social distance indicative of stigma about mental health. This is but only one measure and does not represent all types of stigma about mental health (Skeem and Cooke, 2010). Understanding the links between mental health literacy and different types of stigma (e.g., internalised stigma) will help clarify the importance and purpose of mental health literacy interventions. Given the large number of stigma measures (Wei et al., 2015), our study results showing a moderate association between mental health literacy and stigma must be interpreted with caution. Of note, our data show that mental health professionals did not differ from the general public in their desire for social distance that is indicative of stigma about mental health. This may seem counterintuitive, but a review showed that the contact mental health professionals have with people with mental illness is associated with positive attitudes about civil rights but does not reduce stigma as does social contact such as with friends or family members with mental illness (Henderson et al., 2014). More recent research also considers mental health professionals to be one of the main sources of stigmatisation (Valery and Prouteau, 2020), and stigma reduction interventions are as needed in healthcare settings

(Potts et al., 2022, Kohrt et al., 2020, Nyblade et al., 2019, Heim et al., 2019), as in the general population (Henderson and Thornicroft, 2013, Henderson and Thornicroft, 2009).

The process of construct validation calls for more psychometric investigations with empirical data from different populations and contexts (Zickar, 2020, Clark and Watson, 2019, Flake et al., 2017). The present study focused on an adult population (age 18 and above). As most mental health difficulties begin during youth (Patel et al., 2007, Kessler et al., 2005), an important target population for construct validation is adolescents (Mansfield et al., 2020). Another priority for construct validation is establishing responsiveness to change (Hays and Hadorn, 1992) in the context of interventions that are known to be effective.

Conclusion

A core purpose of mental health literacy is to enable everyone from all walks of life to manage and maintain wellbeing in daily life. Measurement of mental health literacy has been predominantly centred on knowledge about clinical symptoms of mental disorders. We show that daily life signs of depression, anxiety, and stress, before the onset of common mental disorders, can also serve as a tenable basis for measuring mental health literacy in the general population. The use of everyday life language will also assure an accurate assessment of lay knowledge and attitudes about mental health. Future comparisons of both types of measurement are needed for debates on the objectives and benefits of public health interventions for mental health literacy. Depending on context, the impact of mental health literacy on stigma, help seeking, and healthcare service use may also vary between societies due to differences in availability or accessibility of services in high- and low-resource healthcare systems (Andersen, 1995, Babitsch et al., 2012).

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