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Establishment and validation of a mental health literacy measurement in Canadian educators

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ABSTRACT

We aim to create the first mental health literacy measure addressing mental health knowledge of educators and assess its psychometric properties. We developed a 30-item multiple choice measure, Mental Health Literacy Tool for Educators (MHL-ED), with experts in both mental health and education. We administered it to educators (n = 909) from 6 Canadian provinces. We analysed the factor structure, internal consistency reliability, construct validity and responsiveness to change of MHL-ED. Factor analysis resulted in 4 factors of MHL-ED addressing: general mental illness and related treatment; assessment and diagnostic tools and treatments; causes and risk factors of mental illness; and epidemiology of mental health and mental illness. MHL-ED demonstrated strong internal consistency reliability. The construct validity was established because the hypothesis was supported that school based mental health professionals scored significantly higher than classroom teachers and school administrators/school support staff; and further MHL-ED scores were positively related with stigma measures. We did not identify floor or ceiling effects of MHL-ED. MHL-ED is reliable and valid to evaluate mental health literacy levels among educators working in junior high and secondary school settings, and may be considered for use in future research in this field.

1. Introduction

1.1. The concept of mental health literacy

Mental health literacy (MHL) was first defined as the "knowledge and beliefs about mental disorders which aid their recognition, management or prevention" (Jorm et al., 1997). Since then, the concept has evolved. For example, the Canadian Alliance on Mental Illness and Mental Health (2007), building on its advocacy approach, considered MHL to be "the range of cognitive and social skills and capacities that support mental health promotion." (p 36). Recently, others (Kutcher et al., 2016a; 2016b); in keeping with the World Health Organization's framework of health literacy have stressed the foundational nature of this construct for promotion, prevention and care and identified the importance of its impact on improvement of outcomes at both individual and population levels (WHO 2013; Institute of Medicine 2008, 2012; Kickbush, 2001). Further, consistent with the WHO (2013) health literacy framework, MHL is context dependent and needs to be applied within that appreciation.

According to Kutcher et al. (2016a, 2016b), mental health literacy comprises 4 distinct but related components: "understanding how to obtain and maintain positive mental health; understanding mental disorders and their treatments; decreasing stigma related to mental disorders; and, 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" (Kutcher et al., 2016a, P154, 2016b). A robust literature supporting this schema demonstrates the inter-relationship between improved mental health knowledge and stigma reduction (Kelly et al., 2007; Griffiths et al., 2008; Evans-Lacko et al., 2010; Hadlaczky et al., 2014) and the role of MHL in improving mental health outcomes and increasing the use of mental health services (Rusch et al., 2011; Corrigan and Watson, 2003; Henderson et al., 2013).

1.2. Current mental health literacy measurement tools

Wei and colleagues, in their series of systematic reviews and a scoping review (Wei et al., 2015), summarized and synthesized mental health literacy measures addressing knowledge, stigma against mental illness, and help-seeking. Their work identified 91 validated measures,

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including 16 knowledge measures, 65 stigma measures, and 10 help-seeking measures. Of these, the 16 knowledge measures demonstrated mixed levels of evidence of quality for related measurement properties. However, none had been validated for use in junior high or secondary school settings. Another review by O'Connor (2014) and colleagues identified 13 measures, failed to demonstrate related psychometric properties. Further, none were developed to address the context of junior high or secondary school settings. Since mental disorders contribute significantly to the global burden of disease with a high portion occurring in youth aged 12–25 (Whiteford et al., 2010), and educators are the frontline contacts of youth who spend most of their day time in schools, it is essential that MHL in educators be addressed in these settings. This work must be undertaken using valid tools that have been developed to respect the context in which they are applied. We here report on the psychometric properties of a MHL measure that focused on the second component of the MHL conceptual framework: understanding mental disorders and their treatments, and it was developed for and applied with educators in junior high and secondary school settings.

2. Methods

2.1. Recruitment and participants

We recruited participants from the Go-To Educator Training program (GTET) designed to help educators to improve their MHL, enhance early identification of potential mental illness among students and enhance links between schools and health care providers (Wei et al., 2011). The GTET was designed to be provided to a variety of educators, including but not limited to: classroom teachers; administrators; student services providers; human services providers working in schools; etc.). Educators In the current study were from the Canadian provinces of Nova Scotia, Ontario, Newfoundland, Manitoba, and Alberta and approval was obtained from each participating school board for data collection. All participants ($N = 909$) ($n = 492$ classroom teachers; $n = 308$ school mental health professionals; $n = 109$ school administrators and support staff) were involved in a one-day GTET training (8 h) delivered by a mental health professional between 2015–2016 at training sites in each participating province. All participants completed a mental health literacy questionnaire at baseline and immediately following the training.

2.2. Procedures

2.2.1. Development of the mental health literacy assessment tool for educators

The literature review noted above (Wei et al., 2015) identified that measures of mental health knowledge was measured in two different ways: a diagnostic vignette based approach addressing the respondents' ability to recognize a specific mental disorder (usually Major Depressive Disorder or an Anxiety Disorder) or a multiple-choice strategy addressing knowledge about numerous different components (e.g., various mental disorders, aspects of mental health promotion, treatments, etc.). Given that the diagnostic vignette method does not address the various different components of MHL, and in consultation with mental health experts (psychiatrists, social workers, youth care workers) and educators (classroom teachers, counsellors, school psychologists, education administrators), we chose to create a multiple-choice measurement tool that could be used to evaluate mental health knowledge amongst a variety of professionals working within the school setting.

It has been well documented that Canadian educators have identified a need to address student mental health, however, do not feel knowledgeable in this area due to inadequate professional learning (School-Based Mental Health and Substance Abuse Consortium, 2013; Canadian Teachers' Federation, 2012). Furthermore, mental health knowledge needs to be consistent across the various professionals working in school settings to facilitate collaboration, communication and co-ordination of efforts. The GTET program was designed to fill this need.

An initial item pool of 50 questions was developed by a mental health professional and an interdisciplinary researcher in education and mental health, based on the Kutcher MHL definition and dimensions (Kutcher et al., 2016a, 2016b). Face and content validity were established by using classroom teachers, administrators, school counsellors, social workers and youth care workers to review and refine the knowledge items. Items were refined through three rounds of independent review by mental health and education professionals (as listed above). Participants were instructed to not only review the items for appropriateness as a measure of necessary mental health knowledge, but also to read the GTET program to additionally make sure its content was covered in the new measure. Items were kept only if more than 4/5th of the experts agreed on its relevance for inclusion. As a result, a 30-item Mental Health Literacy tool for educators (MHL-ED) was created.

The tool addresses: epidemiology of mental health and mental illness; knowledge about common mental disorders often occurring during adolescent years, such as; Depression, Anxiety Disorders, Attention Deficit Hyperactivity Disorder, Schizophrenia, Eating Disorders, Substance Use Disorders (Polanczyk et al., 2015); aetiology of mental illness (e.g., causes and risk factors); treatments for mental illness and help-seeking resources. The tool also additionally covered content specific to the "Go-To" Educator Training, such as knowledge about specific assessment and screening tools used by school-based mental health professionals such as counsellors.

2.3. Measures

To examine the psychometric properties of MHL-ED, we extracted data from a research study on the effectiveness of "Go-To" Educator Training program across four provinces in Canada. MHL-ED was administered to 909 educators before and after the intervention. Participants filled in a questionnaire composed of 2 sections: the 30 item MHL-ED and an 8-item stigma against mental illness measure. For the knowledge measure, participants were asked to choose an answer out of 3 choices: "true", "false" or "I don't know". To help avoid guessing, they were instructed to use the "I don't know" choice if they did not know the answer. A correct answer was given one point and an incorrect answer or "I don't know" answer was given 0 points, with the potential highest score of 30. Therefore, higher scores reflect higher knowledge.

The 8-item stigma measure is a 7-point Likert scale designed specifically for educators and utilized in previous MHL literacy research (Milin et al, 2015). These 8 items examined participants' personal stigma, including perspectives about causes and treatment of mental illness, and intended behaviours towards people with mental illness. Scores range between 8 and 56 with higher scores indicating better attitudes/less stigma towards mental illness. These 8 items demonstrated acceptable internal consistency in previous studies ($\alpha = 0.65$; 0.68) (Milin et al., 2015) and in the current study ($\alpha = 0.70$). Exploratory factor analysis identified 2 factors that accounted for 50.41% of the variances in the current study. Details of the validation of the stigma measure will be discussed in a separate publication.

2.4. Evaluation of psychometrics

We first analysed baseline data to investigate the factor structure and reliability of MHL-ED. We further assessed the construct validity and responsiveness to change of MHL-ED using both the baseline and post-test data. We examined the construct validity of MHL-ED through testing two hypotheses: (1) school mental health professionals (e.g., counsellors; social workers; psychologists) should achieve significantly higher scores than general educators (e.g., classroom teachers and

school administrators and school support staff); and (2) higher knowledge scores should be related to higher attitudes scores (reduced stigma).

Responsiveness, also known as longitudinal validity, is defined as the ability of a questionnaire to detect important changes over time even if the changes are small (Terwee et al., 2007). Therefore, we tested the hypothesis that the change of mental health literacy level of participants between pre-test and post-test should be significant as a result of being exposed to the "Go-To" Educator Training program. We also checked the responsiveness by analysing whether MHL-ED was able to distinguish the smallest detectable changes from measurement error. We further checked floor (lowest possible scores) and ceiling (highest possible scores) effects of MHL-ED because present floor and ceiling effects will reduce the content validity and reliability, and further limit responsiveness to change.

2.5. Statistical analysis

For factor analysis and construct validity, we first examined sample adequacy using the Kaiser–Meyer–Olkin (KMO) measure with the value above 0.50 indicating acceptable sample size for reliable results (Hutcheson and Sofroniou, 1999). A principal component analysis was conducted on the 30 items with orthogonal rotation (varimax) for factor loadings using the baseline data, keep factors with eigenvalues >1. We followed the suggestion by Tabachnick and Fidell (2007) and Andrew et al. (1992) who use stringent cut-offs factor loading going from 0.32 (poor), 0.40 (fair), 0.55 (good), 0.63 (very good) or 0.71 (excellent). We kept items with loadings between 0.32 and 0.40 because: (1) We would like to capture the many facets of the measured concept that this mental health literacy scale has covered, (2) There is yet to be a consensus on acceptable cut off scores for factor loadings with extensive literature suggesting scores ranging from 0.20 to 0.70, and 3. Hair et al. (1998) suggested the acceptable factor loading of 0.30 if the sample size is or greater than 350. We also obtained the internal consistency of MHL-ED using Chronbach's alpha (α), with the value of 0.70 indicating acceptable reliability. We further applied McDonald's Omega (ω) (1999) to validate results obtained from the Chronbach's alpha approach. For construct validity (known group validity), we applied the analysis of variance (ANOVA) test to compare the mean difference among 3 groups of participants: classroom teachers, school mental health staff and school administrators/school support staff. Similarly, we applied paired samples *t* test to compare the mean difference between pre-test and post-test in general to examine responsiveness to change. These tests were conducted with a significance level of $\alpha = 0.05$. We further computed the standardized responsive mean (mean change score divided by standard deviation of the change score) (Terwee et al., 2007), with Cohen's criteria of the value of 0.5 as acceptable responsiveness to change and 0.8 as high level of responsiveness to change (Meyers et al., 2012; Terwee et al., 2007). We decided the floor and ceiling effects are present if more than 15% participants achieved lowest or highest possible scores respectively (Terwee et al., 2007). Statistical analyses were conducted with SPSS 24 and two other statistical software packages: R (https://www.r-project.org/) and JASP (https://jasp-stats.org/) to validate the results.

3. Results

The majority of the 909 participants were classroom/subject teachers ($n = 492$, 54.0%), followed by school-based mental health professionals ($n = 308$, 33.8%), and school administrators and support stuff ($n = 109$; 12%). School-based mental health professionals included school psychologists, social workers, and guidance counsellors. Administrators were principals and school support staff included curriculum consultants, program facilitators, school secretaries, learning support teachers, educational assistants, and student support workers. The majority of participants were females ($n = 719$, 78.9%), 20.2% ($n = 184$) were males, and 8 participants (0.9%) did not report their gender. Most participants were from the province of Nova Scotia ($n = 525$, 57.6%) and Ontario ($n = 242$, 26.6%), and the rest were from Alberta, Manitoba, New Brunswick, and Newfoundland. Details of participant baseline characteristics are presented in Table 1.

Table. 1
Baseline characteristics.

Baseline characteristics	*N*	Percentage
Gender		
Female	719	78.9%
Male	184	20.2%
Missing	8	0.9%
Profession		
Classroom teachers	492	54.0%
School based mental health professionals	308	33.8%
School administrators and support staff	109	12.0%
Missing	2	0.2%
Province		
Nova Scotia	525	57.6%
Ontario	242	26.6%
Alberta	50	5.5%
New Brunswick	33	3.6%
Manitoba	31	3.4%
Newfoundland	30	3.3%
Years of practice		
<10 years	340	37.3%
10–19 years	328	36.0%
≥20 years	216	23.7%
Missing	27	0.30%

3.1. Factor analysis (construct validity) and internal consistency

A principal component analysis was conducted on the 30 items with varimax rotation. The Kaiser–Meyer–Olkin (KMO) measure verified the sampling adequacy for the analysis, with KMO = 0.90 ('marvellous' according to Hutcheson and Sofroniou, 1999), which is well above the acceptable limit of 0.5. An initial analysis was run to obtain eigenvalues for each factor in the data. Four factors had eigenvalues over Kaiser's criterion (>1) and in combination accounted for 46.3% of the variance. However, the scree plot (Fig. 1) was ambiguous and showed inflexions that would justify retaining either 2 or 4 factors. We retained 4 factors because of the large sample size (Field, 2013), the convergence of the scree plot and Kaiser's criterion on this value. We kept items with factor loading between 0.32 and 0.40 because of the large sample size ($N = 909$) in support of their inclusion and factors described above. We noticed that item 3 about Canadian suicide rates did not load on any one of the 4 factors and although it may be related to the consequences of mental health problems or mental disorders, it did not directly address mental health. Further it only addressed Canadian rates, and therefore was removed from MHL-ED analysis. As a result, we obtained a 29-item survey addressing mental health literacy of educators. Table 2 shows the factor loadings after rotation. The items clustering on the same factor suggested that: factor 1 represents characteristics of mental illness and treatments of mental illness; factor 2 represents assessment and diagnostic tools and treatments; factor 3 represents causes and risk factors of mental illness; and factor 4 represents general epidemiology of and facts about mental health and mental illness.

Chronbach's alpha of the four factor MHL-ED was $\alpha = 0.85$, and McDonald's Omega was $\omega = 0.85$ in strong support of the internal consistency of MHL-ED. The internal consistency of each factor was $\alpha = 0.74$ (factor 1), $\omega = 0.75$; $\alpha = 0.63$ (factor 2), $\omega = 0.63$; $\alpha = 0.70$ (factor 3), $\omega = 0.71$; $\alpha = 0.60$ (factor 4), $\omega = 0.61$. Participants' responses ranged from 0 to 27 with a mean score of 11.61, with the standard deviation of 4.44.

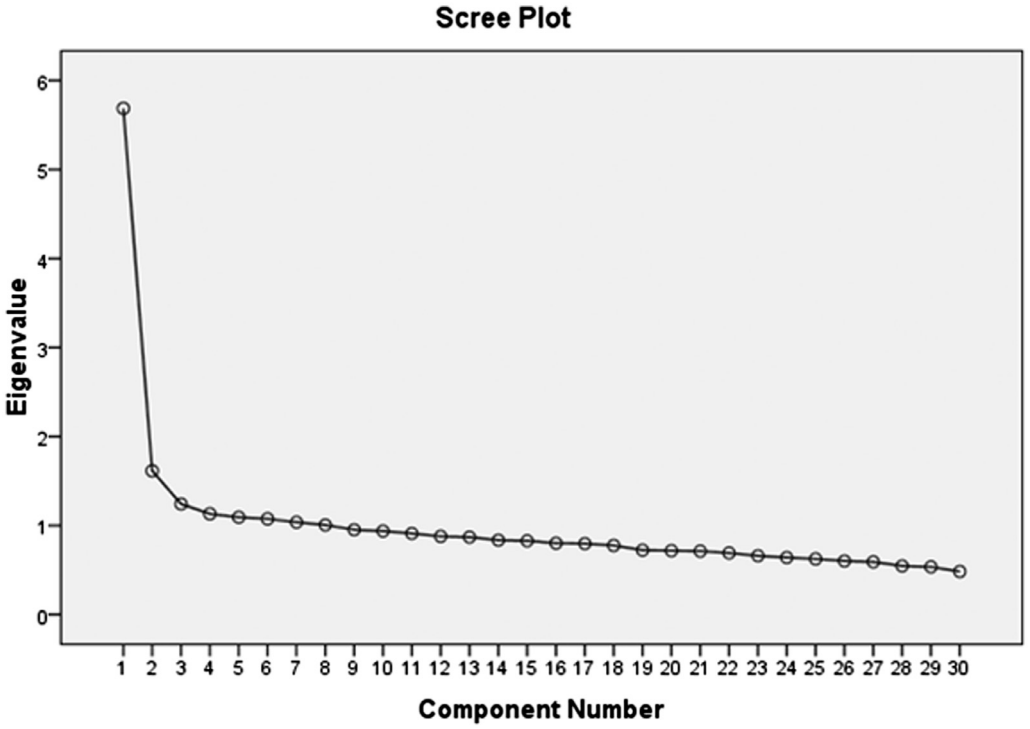

Fig. 1. The scree plot of MHL-ED.

3.2. Construct and known group validity

The analysis of variance (ANOVA) test showed that there was a significant effect of profession on mental health literacy level of participants ($F(2, 906) = 83.59$, $p = .000$). Post-hoc independent t test revealed that school based mental health professionals scored

Table. 2
Summary of exploratory factor analysis results for the SPSS MHL-ED ($N = 909$).

	Factor 1*	2*	3*	4*
The three domains of ADHD include inattention, hyperactivity, and oppositionality	−0.58			
Withdrawal from a drug is the defining feature of addiction	0.53			
Post-Traumatic Stress Disorder is one of the two most common types of anxiety disorders during adolescence	−0.53			
Adolescent depression can be effectively treated with some Selective Serotonin Reuptake Inhibitors (SSRI) medications	0.47			
A split personality is a sign of schizophrenia	−0.42			
Features of psychosis such as delusions and hallucinations are usually present during a manic episode	0.40			
A complementary treatment is one that is often applied instead of usual physician recommended interventions	−0.39			
Schizophrenia affects about 1% of the population, with males and females about equally represented	0.38			
The prodrome of a mental disorder refers to the premonition that something may be wrong with the mental health of a person	0.35			
It is useful to assist a young person struggling with psychosis by being a friend and keeping their confidence when necessary	−0.34			
The CLASPP mnemonic is a useful tool to help a student remember a variety of treatments for mental disorders		−0.69		
The CRAFFT is a useful tool for clinical screening of young people who may be at high risk of alcohol misuse or abuse		−0.67		
The Kutcher Adolescent Depression Scale (KADS) is a useful tool in the assessment and diagnosis of depression in adolescents		0.54		
Critical Incident Stress Debriefing is the preferred method for schools in dealing with a tragic event such as a suicide		−0.48		
The Tool for Assessment of Suicide Risk (TSR-A) can be used to help predict which teenagers will die by suicide		−0.43		
Initial treatment for Obsessive Compulsive Disorder usually lasts 12 weeks before substantial improvement can be expected		0.42		
The brain function of signaling is a method by which individuals learn to interpret the meaning of complex ideas		−0.35		
Poverty and other social determinants of health are well established causes of most mental disorders			−0.64	
The panic attacks of Panic Disorder usually occur at times when the person is in a situation that makes them anxious			−0.56	
Social isolation if combined with lack of motivation is usually a sign of academic difficulties and not a sign of a possible mental disorder			−0.55	
Social Anxiety Disorder usually occurs as a result of a stressful social event			−0.49	
A hallucination occurs when a person believes in something that is not real			−0.37	
Every person's mood will change over time, even in the absence of an external event			0.36	
Substance dependence is the most common type of substance problem found in teenagers			−0.36	
About 70% of all mental disorders can be diagnosed prior to age 25 years				0.59
Major Depressive Disorder or alcohol misuse can be a consequence of untreated Social Anxiety Disorder				0.55
School mental health has been a focus of agencies such as UNESCO since the 1950′s				0.54
Mental disorders arise as a result of perturbations of usual brain function				0.52
Because it is a chemical that decreases anxiety, nicotine abuse may be a consequence of an untreated anxiety disorder in young people				0.43
Eigenvalues	5.69	1.61	1.24	1.13

Note: Factor loadings below 0.30 were removed.

* Factor 1: Characteristics of mental illness and treatments; Factor 2: assessment and diagnosis tools and treatments; Factor 3: causes and risk factors of mental illness; and Factor 4: general epidemiology of and facts about mental health and mental illness.

significantly higher (M = 14.01, SD = 3.99) than classroom teachers (M = 10.29, SD = 4.18, p = .000) and school administrators/school support staff (M = 10.33, SD = 4.10, p = .000) respectively at baseline. However, there was no significant difference on baseline MHL-ED scores between classroom teachers and school administrators and support staff (p = .10), which supported our original hypothesis.

Furthermore, we found that MHL-ED scores were positively related with stigma measures (r = 0.28, p = .000), indicating higher mental health literacy levels were related with better attitudes towards mental illness. These findings were consistent with our pre-defined hypothesis.

3.3. Responsiveness to change and floor and ceiling effects

Floor or ceiling effects are considered to be present if more than 15% of respondents achieved the lowest or highest possible score, respectively. In the current study, only 5.4% participants' scores were lower than 7 (the bottom 15% of the score) out of 30 and 0.8% participants' scores were higher than 23 (the top 15% of the score) out of 30. Therefore, we did not identify floor or ceiling effects for MHL-ED measure with the current sample.

In the current study, the standardized responsive mean is 8.82/4.57 = 1.92, indicating the measurement tool had high responsiveness to change according to Cohen's criterion that a value greater than 0.8 is large. Further, the paired sample t test demonstrated participants' mean scores on MHL-ED significantly improved from pre-test (M = 11.61, SD = 4.44) to post-test (M = 20.43, SD = 3.80) (t = 57.38, p = .000), and the pre-test and post-test scores were positively correlated (r = 0.40, p = .000), further supporting the high responsiveness to change of the measure.

4. Discussion

This study provides strong evidence that this MHL-ED measure is reliable and valid in terms of its face validity, content validity, internal consistency reliability, construct validity, known group validity, and responsiveness to change. Further, it is evident that this MHL-ED measure didn't demonstrate floor or ceiling effects. Therefore, it may be appropriate to use this measure to evaluate mental health knowledge (items in factors 1, 3, 4) across a wide variety of educators, including but not limited to: classroom teachers, administrators, and student services providers. It may also be used to evaluate the impact of the GTET intervention applied in school settings. This is, to our knowledge, the first of its kind mental health literacy knowledge measure targeting educators in the junior high and secondary school setting.

As hypothesized, school based mental health professionals scored significantly higher than both classroom teachers and school administrators/school support staff. This construct validation confirms that this MHL-ED measure is able to make accurate inferences about an educator's mental health literacy level. Findings of the factor analysis that resulted in 4 factors that were consistent with the 4 original themes of the MHL-ED, which in turn further supported the content and construct validity of this MHL-ED measure. These findings support the application of this MHL-ED measure among educators in junior high and secondary school settings, not only to evaluate mental health literacy but also to guide the development and implementation of mental health literacy interventions for educators. The creation of this MHL-ED measure is a timely response to the recent national survey (Canadian Teachers Federation, 2012) of educators in Canada that called for more resources for educators to help them address youth mental health needs more effectively. It will allow for the testing of various resources to determine their impact on educator MHL.

It is important to note that this MHL-ED measure was found to be able to capture the change of scores overtime with high responsiveness to change and without evident floor or ceiling effects. This finding disaffirmed the hypothesis advanced by Moll et al. (2017), that a multiple choice approach may not be appropriate to test mental health literacy due to its potential for a high floor or ceiling effect. Perhaps the inclusion of the "don't know" option mitigated this possibility. However, further research is needed to determine the strengths and weaknesses of both vignette-based or multiple-choice approach for the evaluation of mental health literacy in different settings.

We noticed that this MHL-ED measure demonstrated strong internal consistency reliability as a whole (α = 0.85, ω = 0.85), however showed relatively lower level of internal consistency for factor 2 (α = 0.63, ω = 0.63) and factor 4 (α = 0.60, ω = 0.61). This is not surprising because factor 2 tested the understanding about different assessment and diagnosis tools and treatments, and factor 4 evaluated knowledge about different aspects of epidemiology of mental health and mental illness, both containing a multidimensional structure in nature, while internal consistency reliability intends to test the homogeneity of items. Despite this, both factors demonstrated acceptable internal consistency reliability.

In addition, knowledge and stigma were positively correlated (r = 0.28, p = .000), suggesting the improvement of knowledge could change participants attitudes towards mental illness in a positive manner and vise-versa. This finding is supported by recent research that knowledge is key to change people's attitudes towards mental illness, especially in young people (Milin et al., 2015; Kutcher et al., 2016a, 2016b). However, the correlation between knowledge and stigma of mental illness is not a one-to-one relationship, suggesting there may be other factors at play. This finding is consistent with previous research that in addition to knowledge, other factors at individual, community and system levels may play an important role in reducing the stigma of mental illness (Byrne, 2000). Strategies for stigma reduction may include contact with people with mental illness, public education, social media, community advocacy and policy changes. The relative impact of these different interventions has yet to be determined and is beyond the scope of this investigation.

5. Limitations

This study included participants from 6 provinces with the majority coming from the province of Nova Scotia, and thus may not be fully representative of all Canadian educators. However, the sample did contain participants from numerous Canadian provinces and there is no a-priori reason to suspect that teachers from any one province would be substantially different than those from any other in terms of their professional credentials, scope of practice or method of teaching. Participants were mainly female (78.9%) and thus the results may be biased against male participants. However, this gender profile is consistent with the female/male ratio in Canadian teachers with 72.6% identified as female (Canadian Teachers' Federation, 2012).

How to appropriately evaluate mental health knowledge has been an ongoing debate in the field. Although this MHL-ED measure covered knowledge addressing all four components of the MHL definition, some other aspects of import may have been missed. Application of this measure by other investigators in other education settings may help identify if such might be the case.

6. Conclusion

MHL-ED is the first of its kind mental health literacy knowledge measure designed specifically for junior high and secondary school educators psychometric properties. It can be used either as an independent measure or as part of the delivery of the GTET intervention. Therefore, it is reliable and valid for application in the junior high and secondary school setting. However, since the validation of a measure is an ongoing iterative process, more research is needed to confirm our findings in other geographic locations and in different cultural settings.

Conflict(s) of interest

The authors have no conflicts of interest to declare.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.03.009.

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