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Development and Initial Validation of Primary Care Provider Mental Illness Management and Team-based Care Self-efficacy Scales

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Declarations

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Abstract

Objective—Develop and validate self-efficacy scales for Primary Care Provider (PCP) mental illness management and team-based care participation.

Study Design and Setting—We developed three self-efficacy scales: Team-Based Care (TBC), Mental Illness Management (MIM), and Chronic Medical Illness (CMI). We developed the scales using Bandura's social cognitive theory as a guide. The survey instrument included items from previously validated scales on team-based care and mental illness management. We administered a mail survey to 900 randomly selected Colorado Physicians. We conducted exploratory principal factor analysis with oblique rotation. We constructed self-efficacy scales and calculated standardized Cronbach's alpha coefficients to test internal consistency. We calculated correlation coefficients between the MIM and TBC scales and previously validated measures related to each scale to evaluate convergent validity. We tested correlations between the TBC and the measures expected to correlate with the MIM scale and vice versa to evaluate discriminant validity.

Results—PCPs (n = 402, response rate = 49%) from diverse practice settings completed surveys. Items grouped into factors as expected. Chronbach's alphas were 0.94, 0.88, and 0.83 for TBC, MIM, and CMI scales respectively. In convergent validity testing, the TBC scale was correlated as predicted with scales assessing communications strategies, attitudes towards teams, and other teamwork indicators ($r=.25$ to $.40$, all statistically significant). Likewise, the MIM scale was significantly correlated with several items about knowledge and experience managing mental illness ($r=.24$ to $.41$, all statistically significant). As expected in discriminant validity testing, the TBC scale had only very weak correlations with the mental illness knowledge and experience managing mental illness items ($r=.03$ to $.12$). Likewise, the MIM scale was only weakly correlated with measures of team-based care ($r=.09$ to $.17$).

Conclusion—This validation study of MIM and TBC self-efficacy scales showed high internal validity and good construct validity.

Keywords

Chronic Disease; Self Efficacy; Mental Health; Primary Health Care; Primary Care Physicians; Surveys and Questionnaires; Validation Studies

Background

Patients commonly receive treatment for mental illnesses in the primary care setting, with over half of patients with mental illness treated in primary care.^{1,2} However, Primary Care Providers (PCPs) report high levels of uncertainty in their clinical skills to diagnose and treat mental illness.^{3–5} Team-based interventions⁶ based on the Chronic Care Model⁷ (CCM), such as the Collaborative Care Model⁸, and other integrated care models⁹ improve outcomes for mental illness. Transitioning from one-on-one doctor-patient relationships to team

models of care for patients with mental illness requires a significant change in the PCP role from the traditional patient-physician relationship. Thus, to provide optimal care for patients with mental illness, PCPs need to take primary responsibility for the treatment of mental illness and participate in a team to care for patients.

Self-efficacy, the belief that one can perform a behavior or attain specific outcomes, represents an important factor in PCP adoption of these roles.¹⁰ Rather than a global personality trait, self-efficacy varies with specific behaviors and is modifiable.¹¹ The association between self-efficacy and behavior has been found in a wide range of behaviors, including patient self-care for chronic illness.^{12,13} According to Bandura's Social Cognitive Theory, perceptions of efficacy influence people's behavior choices, level of effort of engagement in an activity, and emotional reaction.¹⁴ Therefore, PCP self-efficacy likely influences the degree to which PCPs engage in the activities necessary to 1) treat patient with mental illness and 2) participate meaningfully in team-based care. Measuring PCP self-efficacy would help assess the success of interventions aimed at increasing physician engagement in both treatment of mental illness and in team-based care. Further, they may prove useful in assessing PCPs readiness to treat patients with mental illness and to adopt new models of care in their clinical setting. We know of no self-efficacy measures for PCP treatment of mental illness or participation in team-based care.

Implementing effective team-based care for patients with mental illness requires that PCPs have the skills and confidence to manage this population. In this study, we developed and validated measures to assess PCP self-efficacy with Mental Illness Management and participation in Team-Base Care.

Methods

We conducted a cross-sectional mail survey of currently practicing family medicine (FM) and internal medicine (IM) physicians in the state of Colorado.

Survey Development

Self-efficacy Scales—Three scales were developed: Management of Chronic Medical Illness (CMI), Mental Illness Management (MIM), and Participation in Team-based Care (TBC). We developed the scales using Bandura's theory as a guide¹⁵ and following the approach Ozer used for assessing provider self-efficacy in screening adolescents for risky health behaviors.¹⁶

Domains: The TBC scale addressed the following content areas based on the National Committee for Quality Assurance (NCQA) Patient Centered Medical Home 2011 standard: communication within the team, care coordination, population management, self-management support, and continuity of care.²⁰ This scale consisted of seven items. Three items involved increasing levels of reliance on a care manager in providing patient care within a team-based model. These items also included activities that fall within the NCQA domains of population management and self-management support. Two items involved collaboration with a care manager, thus addressing care coordination and communication within the team. Two item involved communication with the team as a whole. We did not

include items related to continuity of care as that was considered a clinic-level activity rather than individual.

All items were scored to on an 11-point scale with higher scores indicating increased self-efficacy: 0 (not at all confident) to 10 (extremely confident).

The MIM scale consisted of ten items. It addressed self-efficacy related to the diagnosis and treatment of mental illnesses treated in primary care. We chose depression, generalized anxiety disorder, and bipolar depression as they are commonly treated in primary care and signify increasing complexity in management. In the United States (US), major depressive disorder has a lifetime prevalence of 16.6 percent with 32.9 percent of patients treated by a mental health specialist, 32.5 percent treated in primary care, and 43.2 percent with no treatment. Generalized anxiety has a lifetime prevalence of 5.7 percent with 25.5 percent of patients treated by a mental health specialist, 31.7 percent treated in primary care, and 47.7 percent with no treatment. Bipolar disorder has a lifetime prevalence of 3.9 percent with 33.8 percent of patients treated by a mental health specialist, 33.1 percent treated in primary care, and 44.5 percent with no treatment.¹⁷ In many countries, patients with mental illness are treated in primary care even more commonly than the US.¹⁸ Patients with these disorders also often experience a delay in receiving treatment with a range of six to eight year delays for mood disorders and nine to 23 years for anxiety disorders.¹⁹ Since bipolar is often managed by psychiatrists, the scale included coordination of care with psychiatry. This scale also included management of suicidal patients and the management of concomitant psychiatric and medical illness. Since these conditions are common in primary care practice but frequently overlooked, we expected PCPs to rate their self-efficacy high for CMI, but to report lower and more variable self-efficacy for MIM.

The CMI scale was developed to provide a benchmark against which self-efficacy for MIM could be contrasted. It consisted of six items addressing self-efficacy related to the diagnosis and treatment of two chronic medical illnesses with increasing complexity (hypertension and chronic obstructive pulmonary disease), managing multiple chronic illnesses, and communicating with specialists in the care of chronic medical illness.

After initial development, the survey was cognitively tested with PCPs and health services researchers. Cognitive testing has been commonly used in survey development to evaluate respondents' understanding of questions, their thinking processes about the questions, and decision-making processes in choosing answers.^{21,22} We administered the survey with an evaluation form that addressed understandability and clarity of individual items, time to complete the survey, overall impression of the item bank, guidelines and directions, flow of questions, and layout. Five PCP's gave detailed feedback through written answers and 10 health services researchers gave feedback through a verbal feedback session, after which the research team revised the survey. Major changes based on the feedback from cognitive testing included: the addition of the separate CMI scale as an anchor scale, rewording multiple items in the TBC scale for clarity, and changing the scale from a 10-point to an 11-point scale for scoring purposes.

We then piloted the survey with 30 randomly selected PCPs and made further revisions. The primary change after piloting the survey was a modification to the introduction to the TBC scale to clarify that these questions could be answered even if the participant did not have specific aspects of a team functioning in their clinic.

Other Measures—To test construct validity of the TBC and MIM scales, we adapted several previously validated instruments and tested their correlation with the self-efficacy scales. We used a combination of factor loadings and content domains to choose a limited number of items from each instrument. We selected five items from the 26 item Attitudes toward Health Teams Scale, which assesses general attitudes toward working in a team.²³ From the 61 item The Team Climate Inventory^{24,25} which measures the cultural climate in healthcare teams, we used six items.

We used the Mental Health Knowledge and Management Instrument,²⁶ which includes questions on the effectiveness of different psychotropic medications for different mental illnesses, to evaluate participant knowledge. We modified this measure by changing the specific mental illnesses assessed to mirror those in the MIM self-efficacy scales. We added the diagnosis of bipolar disorder and removed panic disorder. After cognitive testing, we also changed the answer choices regarding effectiveness of medications for each illness from yes/no to “effective”, “somewhat effective”, “not effective”, and “don’t know” to allow more flexibility in choices.

To assess experience in managing mental illness, we asked respondents how common each of the following conditions is in their patient panel; how frequently they manage each condition, and how prepared they felt in managing each condition after the completion of their residency: major depression, generalized anxiety disorder, and bipolar disorder.

For the construct of communication self-efficacy, we adapted the Asbury’s Physician Confidence with Communication Strategies survey.²⁷ The original survey had 13 items and each item was rated on a four-point scale. Factor analysis results were not available for this scale. We removed 3 items that we determined were redundant and we rescaled the answer choices to match the 11-point self-efficacy scale used in our survey. To assess the level of implementation of team-based care in participants’ practices, we used the Team Approach Subscale of the Practice Monitor in its originally published format.²⁸

Study Population

We randomly selected 450 FM and 450 IM physicians from a comprehensive statewide survey of practicing physicians in Colorado, provided by Peregrine Management Corporation, which included 2955 PCPs.²⁹

Survey Procedures

The self-administered survey was sent via first-class mail. We used the Dillman Tailored Method to maximize the response rate.³⁰ We administered the survey from November 2014 to April 2015 with up to five mailings for non-respondents. The study was introduced in a pre-notice letter in the first mailing. The second mailing included the survey with a \$2 incentive, as even small monetary incentives have been shown to increase the odds of

response by up to 50%.^{31,32} Reminder post-cards were sent approximately one week after the first survey. We timed repeat survey mailings based on rates of returned surveys from the previous mailing. If a survey was returned because of an incorrect address, study personnel conducted Internet searches for a more current practice address. If no address was found, the participant was considered a “noncontact”. If an updated address was found, the mailing survey process was repeated with the new address. The tracking system was maintained in a separate database, so all surveys remained de-identified. All returned surveys were double entered into the research database. Two members of the research team performed 100% double data entry. The two data entries were compared, and the error rate was found to be 0.45%. All the discrepancies were corrected prior to final statistical analysis. All study activities were approved by the Colorado Multiple Institutional Review Board (COMIRB).

Statistical Analysis

We conducted an exploratory factor analysis on all 23 self-efficacy items from the chronic illness, mental illness, and team based care sub-sections. This analysis utilized a principal factor analysis with squared multiple correlation prior communality estimates. To allow factors to be correlated with one another, we used an oblique promax rotation to estimate the factor pattern. Items were assigned to the factor with which they had the highest standardized regression coefficient 0.4. Cronbach’s alpha was used to test internal validity for each scale. Next, we constructed factor scores by calculating means of the items in each factor, for participants who had responded to at least half the items in that section of the scale. Lastly, Pearson correlation coefficients were calculated between factor scores and validated scales to evaluate construct validity. All analyses were performed using SAS version 9.4 (SAS Institute, Inc., Cary, NC), or R version 3.1.2.

Results

We calculated a response rate of 49% (n=402) after excluding those for whom no current address could be found (n= 50), those who moved out of state (n= 13), and those not working as a primary care provider (n= 8). See Figure 1 for a flow diagram of participant responses. The survey captured diverse practice sites, practice settings, practice sizes (i.e., number of providers), professional roles, and specialties of participants. However, the PCPs were predominantly white and non-Hispanic (Table 1).

Factor loadings and eigenvalues from the factor analysis are shown in Table 2. Items grouped as expected in the factor analysis. Cronbach’s alpha coefficients for the three scales showed either good or excellent reliability: TBC $\alpha = 0.94$; MIM $\alpha = 0.88$; and CMI $\alpha = 0.83$.

Figures 1 and 2 show the distribution of the MIM and TBC self-efficacy scales by question. The mean scores for the three scales were: MIM scale [N = 401, Mean 7.1, SD 1.4, Range = (0,10)]; TBC scale [N = 379, Mean 7.7, SD 1.7, Range = (0,10)]; and CMI scale [N = 402, Mean 9.1, SD 0.8, Range = (6.3,10)].

Table 3 shows results of construct validation with convergent and discriminant validity testing. With respect to convergent validity, Pearson correlation coefficients indicated

statistically significant positive correlations ($r=.25$ to $.48$) between the self-efficacy scales and the previously validated measures tested for convergent validity. Conversely, in discriminant construct validation, the correlations between self-efficacy scales and measures expected to be unrelated were notably weaker, although some of these correlations were also statistically significant. Specifically, the TBC scales and commonness of mental illness in practice and experience managing mental illness were weakly but significantly correlated. The MIM scale and the Practice Monitor and the Team Climate Inventory were also weakly but significantly correlated.

Discussion

We developed and validated reliable scales based on Social Cognitive Theory to measure PCP self-efficacy in the management of mental illness, participation in team-based care, and management of Medical illness. We identified three factors comprised of 23 questionnaire items, which map to the three self-efficacy scales of MIM, TBC, and CMI. Our two primary scales, MIM and TBC, show good construct validity with other measures in the survey. These scales represent promising tools for assessment of provider self-efficacy. Further testing of the association of the scales with practice patterns is needed.

To our knowledge, no self-efficacy scales have been developed for treatment of mental illness or participation in team-based care. Our work parallels prior research in self-efficacy scales for physicians in addressing other health concerns. Ozer found that physician self-efficacy was associated with screening for risky health behaviors in adolescents.¹⁶ Opacic found an association between physician assistant student self-efficacy and clinical performance.³³ Provider self-efficacy scores are also currently used to measure impact of provider interventions, such as interventions to improve pain management by providers.³⁴ Thus, the TBC and MIM self-efficacy scales add to our ability to assess provider self-efficacy, specifically in the content areas of team-based care and the management of mental illness.

The correlations in convergent validity testing ranged from small to moderate. All were statistically significant. We did not have gold standard measures of self-efficacy in participating in team-based care or management of mental illness as a comparison measures and the measures for which we tested for correlation were not evaluating identical constructs. Rather, we theorized that they were related constructs. Therefore, correlations were expected to be moderate rather than high. McDowell notes the lack of gold standards in behavioral measures as a limitation of construct validity testing. He also notes that correlations of $.60$ represent an “extremely strong association”.³⁵ Therefore, even though we had low to moderate associations, they met our hypothesized expectation. We did not add additional measures of discriminant validity due to limitation in the total number of items in the survey. Instead, we tested correlations between the MIM and the measures expected to correlate with the TBC scale and vice versa to evaluate discriminant validity. These correlations were all less than $.20$, indicating little or no association with the items that were not expected to be associated with the individual scales.

The TBC scale may be useful as a tool to assess primary care practice transformation. For example, in an evaluation of 25 practices that underwent practice transformation in the Patient Centered Medical Home model, Cronholm et al. found that a major barrier to successful implementation was physician reluctance to shift away from “physician-centric care”.³⁶ Also, in a recent survey of 93 care managers, lack of engagement by the primary care team was noted as a challenge to implementing the Collaborative Care Model.³⁷ By assessing provider self-efficacy as well as provider attitudes, prior to implementing team-based models of care, preparation for changing roles can be tailored to meet the needs of providers. Crabtree et al. also stress the need to assess changing roles as a fundamental requirement of Patient Centered Home evaluation.³⁸

The MIM and TBC scales may prove useful specifically when implementing team-based models of care for primary care patients with mental disorders. The MIM may be useful alone to assess provider self-efficacy when simply managing patients with mental illness. Resident and post-graduate curricula to manage mental illness could be evaluated with the MIM scale. Beyond their global scores, individual items may point to specific areas where coaching and/or education may be useful. In a comprehensive review of interventions to improve primary care physician diagnosis and management of mental illness, Hodges et al. pointed to the importance of conducting a needs assessment of physicians prior to setting learning objectives.³⁹ This instrument offers a novel method of pre-curricular assessment.

This study has limitations. Notwithstanding that the survey sample included diverse practice settings in the state of Colorado, it was drawn only from Colorado, which is not representative of primary care practices across the US or internationally. For example, Colorado has a high rural population and providers in this area are less racially and ethnically diverse than in other regions of the US. International training for primary care physicians varies significantly and may affect the MIM scale. Also, the team structure of clinics varies internationally and may affect the TBC scale. These scales must be tested elsewhere in the US and internationally to assure generalizability. Additionally, we did not assess test-retest reliability due to sample size. Larger-scale testing of the scales is required for that assessment. Another possible limitation is the high mean scores on both the MIM and TBC. This positively skewed distribution could be addressed with the addition of more items aimed at more high-level tasks. Additionally, this study does not assess the relationship of self-efficacy with actual practice patterns.

Conclusion

Implementing effective team-based care for patients with mental illness in primary care would be improved if PCPs have the skills and confidence both to manage mental illness and to participate in team-based care. We developed two scales to assess self-efficacy in these areas. These two self-efficacy scales have high internal validity and good construct validity. Although further testing of the association of the instrument with actual practice patterns is needed, these scales show promise for the assessment of provider self-efficacy in the management of mental illness and participation in team-based care.

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Figure 1.
Response Rate Flow Diagram

Figure 2.
Distribution of Team-Based Care Self-efficacy Items

Figure 3.
Distribution of Management of Mental Illness

Table 1

Characteristics of Providers and their Practices

Characteristic	Category	Number (Percent)
Clinical practice site	Private Practice	177 (44)
	Non-academic hospital	64 (16)
	Managed Care Organization	60 (15)
	Community Health Center	50 (13)
	University-based practice	34 (9)
	VAMC	10 (3)
	Other	4 (1)
Setting	Urban, inner city	75 (19)
	Urban, non-inner/suburban	244 (61)
	Rural	81 (21)
Number providers at practice	1 (just myself)	37 (9)
	2–5	114 (28)
	6–10	111 (28)
	Greater or equal to 11	137 (34)
Primary professional role	Clinician	315 (78)
	Clinician-Educator/Researcher	41 (10)
	Clinician-Administrator	42 (10)
Medical specialty	Family medicine	198 (49)
	Internal medicine	202 (50)
Years since residency	Less than 5	42 (10)
	5–9	54 (13)
	10–19	126 (31)
	Greater than or equal to 20	175 (44)
Gender	Male	228 (57)
	Female	169 (42)
Race	Non-white	35 (10)
	White	351 (87)
Ethnicity	Hispanic	14 (4)
	Non-Hispanic	366 (91)

VAMC= Veterans Administration or Military Center

Table 2

Results of Factor Analysis of Self-Efficacy in Team-Based Care, Management of Mental Illness and Management of Chronic Medical Illness

Items <i>I am confident that I can...</i>	Factor Loading		
	TBC	MI	CMI
Team based care items			
rely on the care manager to contact your patients to monitor their progress toward meeting their goals for their chronic medical or mental illness(es)?	.913	-.045	.011
collaborate with the care manager who uses treatment algorithms to make medication adjustments to improve blood pressure control in your patients with uncontrolled hypertension?	.882	-.038	-.035
collaborate with the care manager who uses treatment algorithms to make medication adjustments to improve symptom control in your patients with uncontrolled major depressive disorders?	.827	.056	.003
rely on the care manager to work with your patients to develop specific plans to meet their goals for their chronic medical or mental illness(es)?	.815	.002	.006
encourage team members to contribute to creative solutions to improve patient care within your practice?	.802	.125	-.003
rely on the care manager to contact patients in your panel with diabetes who are overdue for their HbA1c to schedule them to come in to clinic for follow-up testing?	.795	-.084	.028
establish a positive atmosphere among the members of the clinical team?	.675	.128	.023
Mental illness items			
treat bipolar disorder?	-.065	.777	-.246
diagnose bipolar disorder?	-.067	.761	-.144
treat generalized anxiety disorder?	.015	.712	.178
diagnose generalized anxiety disorder?	.003	.657	.243
treat major depressive disorders?	-.001	.651	.249
have a productive conversation with a psychologist to care for a patient with bipolar disorder?	.033	.649	-.142
diagnose major depressive disorders?	-.035	.619	.332
have a productive conversation with a psychiatrist to care for a patient with bipolar disorder?	.076	.597	-.101
treat your patients who have both chronic medical and mental illness?	.095	.593	.050
manage an acutely suicidal patient?	.076	.560	-.074
Chronic medical illness items			
treat chronic obstructive pulmonary disease?	-.026	-.057	.814
diagnose chronic obstructive pulmonary disease?	.034	-.089	.771
treat hypertension?	-.014	-.055	.745
diagnose hypertension?	-.043	-.063	.681
treat two or more co-morbid chronic medical illnesses?	-.024	.190	.546
have a productive conversation with a pulmonologist to care for a patient with chronic obstructive pulmonary disease?	.154	-.063	.453
Eigenvalue	6.915	3.212	2.411
Proportion of variance explained by factor	.440	.204	.153

Factor Loadings > .40 in bold

MI = Mental Illness; TBC = Team-Based Care; CMI = Chronic Medical Illness

Table 3

Correlations of the Team-based Care and Mental Illness Management Scales with Team-based Care and Mental Illness Care Constructs

Construct	Team-based Care Correlation (r)	Mental Illness Management Correlation (r)
Both Constructs		
Communication self-efficacy	0.30 [*]	0.40 [*]
Team-based Care Constructs		
Attitudes Toward Health Care Teams	0.40 [*]	0.09
Practice Monitor	0.28 [*]	0.17 [*]
Team Climate Inventory	0.25 [*]	0.14 [*]
Mental Illness Management Constructs		
Mental health knowledge	0.04	0.24 [*]
Experience managing mental illness	0.13 [*]	0.48 [*]
Commonness of mental illness in practice	0.12 [*]	0.35 [*]
Preparedness to manage mental illness after residency	0.09	0.41 [*]

* p-values <0.05

Tests for convergent validity shaded; tests for discriminant validity not shaded