Development of a Scale to Measure Pharmacists' Self-Efficacy in Performing Medication Therapy Management Services

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Abstract

Background—Measuring community pharmacists' self-efficacy in performing medication therapy management (MTM) services can be useful for tailoring interventions and predicting participation.

Objective—To identify relevant survey constructs related to the Wisconsin Pharmacy Quality Collaborative (WPQC) MTM program and to evaluate scale validity.

Methods—The 31-item MTM Self-efficacy Scale was developed using previous research, identifying critical program components, and beta-testing. After administration to pharmacists in the 53 WPQC pilot sites, summary statistics and exploratory factor analysis (EFA) were conducted. Parallel analysis was used to determine the optimal number of factors. Internal consistency reliabilities were calculated.

Results—Baseline participation rate was 94% (N=76). The 11-point scale (0–10) item means ranged from 2.83±3.05 to 7.82±2.19. Parallel analysis produced a 3-factor solution, accounting for 56% of the variance. Low factor loadings or unacceptably high cross-loadings resulted in 17 item deletions. The final EFA on the remaining 14 items retained the original 3-factor solution and increased the proportion of explained variance (72%). The factors relate to MTM tasks (alpha = 0.92), personal interactions (alpha = 0.86), and goal setting (alpha = 0.84). Overall Cronbach's alpha = 0.90.

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Conclusion—Constructs for measuring self-efficacy were identified that may aid in future research predicting whether pharmacists engage in and persist in providing MTM services.

Keywords

Self-efficacy; Medication therapy management; Community pharmacy; Scale validation; Research methods

INTRODUCTION

Community pharmacists have the opportunity to participate in a number of medication therapy management (MTM) programs, including Medicare Part D, yet pharmacist participation rates are variable.[1,2,3] If pharmacists lack confidence in their ability to provide MTM services, it is doubtful that full participation by pharmacists in an MTM program will be realized. Self-efficacy, or confidence in one's abilities, is a core component of Bandura's Social Cognitive Theory (SCT).[4] According to SCT, individuals are capable of altering their behavior and environment through their perceived self-efficacy or belief in their abilities to perform specific tasks in order to achieve specific results.[5] Through self-reflection, individuals evaluate their own knowledge, skills, attitudes and perceptions of self-efficacy. People tend to engage in activities in which they feel confident and competent and avoid those in which they do not.[6] The greater their sense of efficacy, the more effort, persistence and perseverance they employ on a given activity. SCT has previously been applied to predict community pharmacists' choice of tasks associated with correcting drug-therapy problems. Lack of confidence was found to be a barrier to the implementation of pharmaceutical care services.[7]

At present, an appropriate tool to measure pharmacists' self-efficacy in performing MTM services does not exist. Studying pharmacists' self-efficacy to perform MTM services has the potential to contribute to our understanding of how self-perceptions of competence affect self-regulatory strategies, motivation, and achievement of practitioner performance and ultimately, clinical outcomes.

The first objective of this study was to identify self-efficacy constructs and items relevant to MTM services and develop an instrument to measure pharmacists' perceived self-efficacy in performing MTM services. The second objective was to evaluate internal and construct validity of the self-efficacy instrument.

Developing and evaluating this MTM self-efficacy instrument was done in conjunction with the Wisconsin Pharmacy Quality Collaborative (WPQC) MTM program. The WPQC is a consortium of third party payors, pharmacies, and the Pharmacy Society of Wisconsin, that has created a quality-based MTM demonstration project that aligns incentives for both pharmacists and payors. The WPQC Program is described in detail elsewhere.[8] Pharmacists may bill participating payors for Level 1 services (point of care services such as tablet-splitting, cost saving opportunities, adherence) and Level 2 services (comprehensive medication review by appointment). Aspects of this program are similar to Medicare Part D MTM programs, such as providing Level 2 services to patients using four or more chronic medications.

METHODS

Instrument Development

A three-step approach was used to develop the 31-item MTM Self-efficacy Scale. First, a literature review was conducted to identify items from previous research. Because an MTM-specific scale was not found, critical aspects of the WPQC-MTM program were reviewed for relevancy. Second, a draft of survey items was created to fit into four domains associated with

different aspects of self-efficacy beliefs that were identified by Bandura.[5] Thirty-two survey items were drafted to fit into the domains: goal-setting (6 items), effort investment (9 items), persistence in the face of barriers (12 items), and recovery from setbacks (5 items). Items were written to resemble the specificity and complexity of the tasks to be performed, because when individuals are familiar with the tasks, their task-specific self-efficacy will more closely correspond to the required performance.[6] In the domain 'persistence in the face of barriers' items were created that had increasing levels of task complexity, as suggested by Bandura, thereby capturing variance in the level of difficulty pharmacists' believed they could surmount to perform Level 2 services (see Table 1, Domain 3). An 11-point unipolar scale was used (0 not at all capable; 10 highly certain can do) so as to increase sensitivity, and convergent and discriminant validity, and to avoid ceiling effects, which have been cited with studies using 5-point self-efficacy scales.[6,9–11] Third, the draft survey was beta-tested with colleagues and non-participating pharmacists. As a result of item revisions, the final instrument included 31 items across all four domains.

Study Population

The study sample consisted of 106 pharmacists working at 53 participating pilot WPQC pharmacies and who had completed the required training in motivational interviewing and the services documentation/billing system, as described elsewhere.[8] A letter introducing the study was sent to the pharmacists along with a consent form. Pharmacists who consented to participate in the study were sent either a 3-page survey containing the self-efficacy instrument via U.S. mail or e-mailed a link to access a web-based version of the survey. Study subjects reported their preferred format for survey response when they consented to the study. The study received exempted human subject's approval through a university institutional review board.

Data Analysis

Data were analyzed using STATA IC (Vs 10) and SPSS (Vs 17.0). Due to the low rate of missing data (less than 10%), conditional mean imputation was used to generate a single complete data set to maximize statistical power.[12]

To determine the factor structure of the MTM Self-efficacy Scale, a principal components analysis (PCA) of the 31 items was conducted. Parallel analysis was used to determine the optimal number of factors to extract.[13,14] Parallel analysis involves comparing eigenvalues from the actual study data with eigenvalues produced by a PCA on multiple (n=1,000 in this study) randomly generated data sets with the same characteristics as the study data set.[14] In parallel analysis, the number of factors to retain is equal to the number of actual study eigenvalues that exceed the randomly produced eigenvalues. An oblique rotation was then performed to determine which items loaded most highly on which factor. Following the guidelines of Comrey and Lee (1992), items were conservatively retained only if they achieved rotated factor loadings of 0.55 or greater on their primary factor.[15] Also, items with factor cross-loadings of 0.32 or greater on any secondary factor were discarded.[16] A final PCA was then conducted on the subset of retained items. Finally, internal consistency reliabilities (Cronbach's alpha) were calculated for the overall item set, and on each set of subscale items.

RESULTS

Subject Characteristics

Of the 81 consented pharmacists, 76 (94%) completed the survey. The sample was 55% female, the mean age was 39.8 years (range 24 to 62) and average years of pharmacy experience was 15.4 (range 1 to 39). Approximately half of the respondents (48%) had a PharmD or post-baccalaureate PharmD degree, with one reported MS degree and two BCPS certifications.

Summary statistics of the pharmacists' self-efficacy measures are provided in Table 1. Responses occurred across the entire range of values (i.e. 0–10) for a majority of items. The scale item means ranged from 2.83±3.05 to 7.82±2.19. Six items had means above 7.0 while two items exhibited low means (4.0 or lower). All but one item had a standard deviation greater than 2. Pharmacists perceived themselves as less capable of setting monthly targets for Level 2 services than for Level 1 services. "Space" and "privacy" items had the highest means and low variance, indicating that these pharmacy environment-related items were perceived barriers likely overcome by this practitioner group.

Factor Structure

Parallel analysis on the original 31 items indicated a 3-factor solution, accounting for 56% of the variance. Seventeen items were deleted due to low factor loadings (<.55) on their primary factor, or unacceptably high cross-loadings (>.32). The final PCA on the remaining 14 items retained the original 3-factor solution, while increasing the proportion of explained variance to 72% (see Figures 1 and 2). Table 2 contains the final 14-item, 3-factor scale. The first factor (labeled "MTM tasks") included six items, and the Cronbach's alpha was 0.92. The second factor (labeled, "Personal interactions") included five items, and the Cronbach's alpha was 0.86. The third factor (labeled, "Goal setting") included three items, and the Cronbach's alpha was 0.84. The overall Cronbach's alpha for the final 14-item scale was 0.90.

DISCUSSION

This study identified constructs of interest in measuring pharmacists' self-efficacy in performing MTM services and provided evidence of the reliability of the scales. PCA and a parallel analysis confirmed that a 3-factor structure of the instrument was a better fitting model than the originally proposed 4-factor structure. Factor 1 or "MTM tasks" consisted of items that did not relate to direct patient or provider interactions, but instead referred to tasks associated with conducting an MTM service intervention, and more specifically, entering, retrieving and appealing claims. Although one could argue that conducting a more comprehensive Level 2 service involves personal interactions, the item language focused on the complexity of the case rather than the individual patient. Within "MTM tasks" two items written purposefully to gradually increase the Level 2 service complexity were retained, thus offering a means to differentiate those pharmacists who perceived themselves as more capable of performing comprehensive MTM services. In the second factor, "Personal interaction," the items relate to dealing with and overcoming patient and physician rejection. Interestingly, items originally intended as either persistence or recovery-based items were actually dispersed among the first two factors. On further review, the items may have been so specific to MTM interventions that persistence is required if one desires to recover from setbacks related to the services, and thus, the items loaded together, and a more differentiating "personal interaction" factor title was given. The third factor, "Goal setting" was the most closely anticipated set of items and maintains one of the fundamental components of Bandura's theory. Specific and challenging goals lead to higher performance. Goal setting affects the effort and persistence spent on a task and is a self-regulating mechanism.[17]

Considering the conservative approach used to interpret the factor loadings, seventeen items were eliminated from the MTM Self-efficacy Scale. Further analysis of deleted items showed that an additional construct may have been included originally. Seven items (planning for Level 2 services, assigning personnel tasks, gathering materials for an MTM intervention, meeting quality network requirements, overcoming privacy concerns, overcoming space needs, and achieving buy-in from support personnel), may be measuring physical and psychological work system changes that pharmacists had to implement and think about prior to conducting any MTM services. Overcoming privacy and space concerns are physical characteristics of the

pharmacy and likely needed to be addressed prior to participating in the WPQC program. These concerns would not affect knowledge or behavior of an activity. Other items related to personnel buy-in, assigning personnel to tasks, and planning when services will be provided, may also have been addressed via personnel training and/or a cultural paradigm shift that had already been taking place. Although many of these items were reported in the literature as perceived barriers to providing MTM services, they do not appear to be necessary for pharmacists already committed to an MTM program. Whether or not this construct would be necessary to predict a pharmacists' general ability to initiate MTM services remains unknown, hence the fourth factor may need to be explored in future studies.

LIMITATIONS

Caution must be exercised in generalizing results because of the small, select sample size. Participating pharmacists were highly motivated to perform MTM services. However, self-reported items showed variability possibly because level of experience actually performing MTM was diverse. In addition, the participating pharmacy sites represent a variety of owner models including national, regional and independent pharmacies.[8]

Ideally, 100–200 cases should be used to analyze data using factor analysis. This was not possible with the study's fixed sample size. Thus, this analysis is preliminary and additional data will improve the interpretation and scale development.

CONCLUSIONS

The development of a scale to measure pharmacists' self-efficacy in performing MTM services would be useful to pharmacists and researchers in designing and implementing programs. It is anticipated that the developed scale will be utilized to measure change in self-efficacy as Medicare Part D MTM programs, and pilots such as WPQC, expand to include more payors or participant benefits, and thus more pharmacist experience in conducting MTM services. Identified areas in which pharmacists perceive they lack the capability or confidence may be augmented through pharmacist training and mentoring. Lastly, this scale may supplement an evaluation of the work system in order to screen pharmacists for inclusion into an advanced practice initiative. Additional research would need to determine at which self-efficacy scoring level pharmacists would be more likely to perform MTM services. The continued use and refinement of this scale has implications for pharmacy practice-related research and may aid in predicting whether pharmacists engage in and persist in providing MTM services.

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PA -- Parallel Analysis for Principal Components
PA Eigenvalues Averaged Over 1000 Replications
            PCA         PA          Dif
   1.    12.40217    2.453441     9.948729
   2.     2.825478   2.224173      .6013056
   3.     2.126984   2.055452      .0715328
   4.      1.89752   1.914206     -.016686
   5.     1.534116   1.785684    -.2515671
   6.     1.322048   1.676088    -.3540398
   7.     1.075337   1.572657    -.4973202
   8.      .9155685  1.475374     -.559806
   9.      .8103921  1.385993    -.5756007
  10.      .7564446  1.298516    -.5420718
```
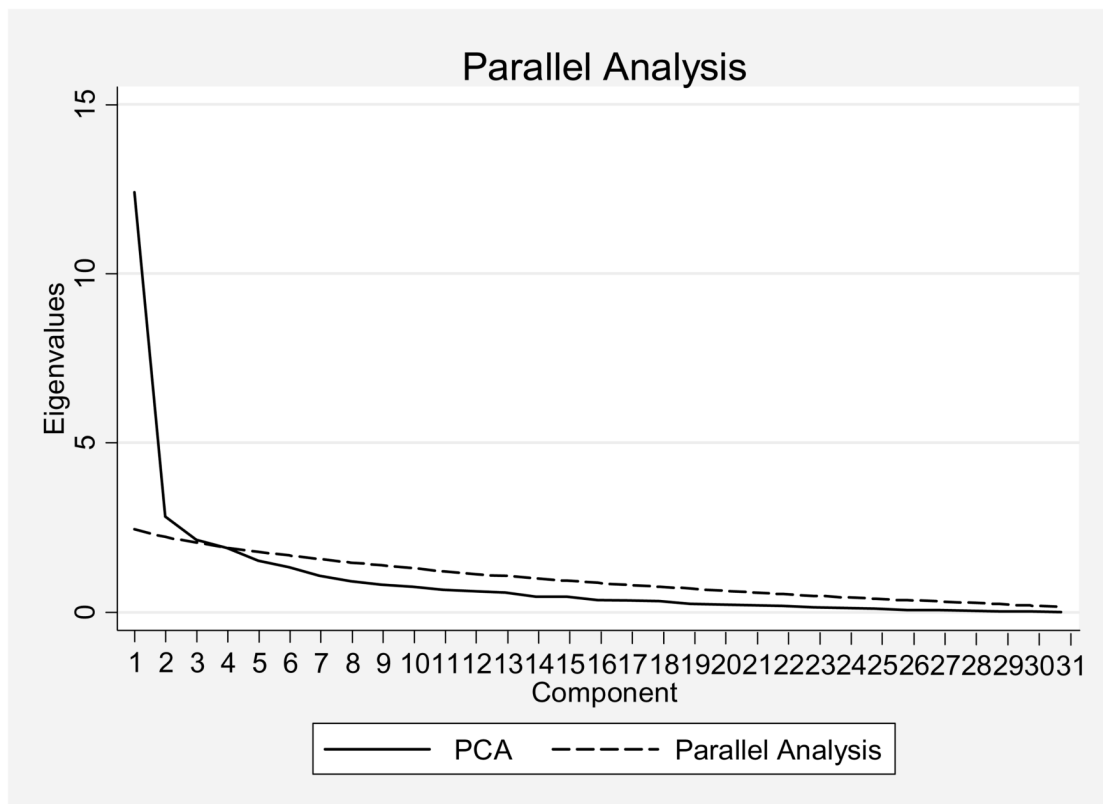

Figure 1.
Parallel Analysis results of the original 31 items.

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-------------------------------------------------------------
    Variable |  Factor1    Factor2    Factor3 |  Uniqueness
-------------+----------------------------------+-------------
  enterprobs |   0.9787    -0.1375    -0.0003 |    0.1353
 retrievprobs |   0.9610    -0.0868    -0.0259 |    0.1539
  appealclaim |   0.8119    -0.1402    -0.0420 |    0.4342
  err_recover |   0.5704     0.1310     0.2516 |    0.4021
     l2_4_12 |   0.7620     0.2620    -0.0573 |    0.2249
     l24_12_3 |   0.7517     0.2624    -0.0128 |    0.2117
    motiv_nos |  -0.1561     0.8444     0.1334 |    0.2820
    pt_reject |  -0.0533     0.8001     0.1234 |    0.3053
       rec_md |  -0.0451     0.8646    -0.0779 |    0.3266
   competence |   0.2834     0.7335    -0.1017 |    0.2775
       coping |   0.0627     0.6980    -0.0574 |    0.5029
     l1target |  -0.0822    -0.0026     0.9634 |    0.1243
     l2target |  -0.0261     0.0092     0.9309 |    0.1438
         idl1 |   0.2391     0.0236     0.6243 |    0.4278
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Figure 2.
Final factor solution (oblique rotated)

Table 1

MTM Intervention Self-efficacy Measures Using an 11-point Rating Scale (0 not at all capable, 10 highly certain can do) (N=76) Reported as Mean and Standard Deviation.

Original Domains and Item (condensed language)	Code	Mean	SD
Original Domain 1: Goal Setting			
Set monthly Level 1 targeted interventions	L1target	5.75	3.06
Set monthly Level 2 targeted interventions	L2target	4.75	2.99
Plan when Level 2 interventions will be provided	planL2	5.89	2.91
Original Domain 2: Effort Investment			
Use system/document services for non-covered patients	doc_nonc	4.52	3.27
Use system/capture payment from non-participating payors	bill_nonpay	2.83	3.05
Provide MTM services when your time is limited	your_time	4.73	2.61
Provide MTM services when the patient's time is limited	pt_time	4.64	2.18
Assign supportive personnel to MTM tasks	assign	5.51	2.45
Gather all materials/equipment needed for MTM services	gather	6.73	2.52
Proactively identify patients for Level 1 interventions	idL1	7.19	2.50
Use payor-identified Level 2s to initiate encounters	L2list	6.39	3.05
Proactively identify patients not on payor list for Level 2s	idl2own	5.44	2.75
Ensure 12 quality network requirements are met	qual-netw	7.33	2.54
Original Domain 3: Persistence in the face of barriers			
Motivate patients who are not interested in receiving service	motiv_nos	5.28	2.31
Solicit patient participation despite recent rejection	pt_reject	4.75	2.21
Perform a medication reconciliation during a chaotic time	med_rec	5.12	2.85
Gain recommendation acceptance from reluctant prescriber	rec_md	5.79	2.15
Overcome privacy concerns when delivering MTM services	privacy	7.82	2.19
Overcome space limitations when delivering MTM services	space	7.81	2.09
Achieve buy-in from supportive personnel	buy-in	6.92	2.14
Conduct Level 2 on patient - 1 health condition & 4 meds	L2_1_4	6.55	2.86
Conduct Level 2 on patient - 4 health conditions & 12 meds	L2_4_12	6.69	2.53
Conduct Level 2–4 conditions, 12 meds, & 3 prescribers	L2_4_12_3	6.51	2.65
Conduct Level 2–4 conditions, 12 meds, 3 prescribers & limited English proficiency	L2_english	4.17	2.56
Original Domain 4: Recovery from setbacks			
Overcome problems while entering information into system	enterprobs	5.49	2.76
Overcome problems while retrieving information from system	retrieveprobs	5.37	2.77
Appeal a rejected MTM claim	appealclaim	3.39	2.78
Think of several solutions when encountering MTM problem	solutions	6.01	2.43
Recover from error made during MTM recommendation	err_recover	5.51	2.40
Maintain strong belief in competence despite MD refusal to accept clinically appropriate recommendations	competence	7.20	2.20
Rely on personal coping abilities to remain calm when multiple patient issues are occurring at the same time	coping	7.43	1.97

Table 2

MTM Self-efficacy Survey Items Retained in 3 Factor Solution

Factor and Item (condensed language)	Code	Mean	SD
Factor 1: MTM Tasks			
Overcome problems while entering information into system	enterprobs	5.49	2.76
Overcome problems while retrieving information from system	retrieveprobs	5.37	2.77
Appeal a rejected MTM claim	appealclaim	3.39	2.78
Recover from error made during MTM recommendation	err_recover	5.51	2.40
Conduct Level 2 on patient - 4 health conditions & 12 meds	L2_4_12	6.69	2.53
Conduct Level 2–4 conditions, 12 meds, & 3 prescribers	L2_4_12_3	6.51	2.65
Factor 2: Personal Interactions			
Motivate patients who are not interested in receiving service	motiv_nos	5.28	2.31
Solicit patient participation despite recent rejection	pt_reject	4.75	2.21
Gain recommendation acceptance from reluctant prescriber	rec_md	5.79	2.15
Maintain strong belief in competence despite MD refusal to accept clinically appropriate recommendations	competence	7.20	2.20
Rely on personal coping abilities to remain calm when multiple patient issues are occurring at the same time	coping	7.43	1.97
Factor 3: Goal Setting			
Set monthly Level 1 targeted interventions	L1target	5.75	3.06
Set monthly Level 2 targeted interventions	L2target	4.75	2.99
Proactively identify patients for Level 1 interventions	idL1	7.19	2.50