Psychometric Properties of the Patient Activation Measure in Family Caregivers of Patients With Chronic Illnesses

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Background: The Patient Activation Measure (PAM) is used clinically and in research to measure an individual's knowledge, skills, and confidence related to their health management engagement. Despite the use of "patient" in the title, the instrument can be used in nonpatient populations. A group at high risk for low activation concerning their own health is family caregivers of patients with chronic illnesses. The psychometric properties of the PAM have not been established in family caregivers.

Objectives: This study aimed to examine the psychometric properties of the PAM 10-item version (PAM-10) in a sample of family caregivers of patients with chronic illnesses. Our focus was on family caregivers' health activation of their own healthcare needs.

Methods: We evaluated the internal consistency reliability of the PAM-10 in a sample of 277 family caregivers. Item-total correlations and interitem correlations were used to assess item homogeneity. Construct validity of the PAM-10 was examined using exploratory factor analysis and testing hypotheses on known relationships.

Results: The PAM-10 demonstrated adequate internal consistency. Item-total correlation coefficients and interitem correlation coefficients were acceptable. Construct validity of the instrument was supported. Factor analysis yielded two factors that explained 62.3% of the variance in the model. Lower levels of depressive symptoms were significantly associated with better activation, providing evidence of construct validity. Caregivers with high activation levels were significantly more likely to engage in and adhere to self-care behaviors such as regular exercise, eating a healthy diet, and engaging in stress reduction strategies.

Discussion: This study demonstrated that the PAM-10 is a reliable and valid measure for family caregivers of patients with chronic illnesses to measure caregivers' health activation of their own healthcare needs.

Key Words: caregiver burden • caregivers • depressive symptoms • healthcare • self-care

Nursing Research, July/August 2023, Vol 72, No 4, 292–300

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DOI: 10.1097/NNR.0000000000000659

Today, an estimated 21% of American adults are family caregivers who provide care to their spouses, parents, children, partners, or loved ones suffering from a disability or illness (AARP & National Alliance for Caregiving, 2020). Generally, family caregiving is unpaid, intensive, and long-lasting work. Nearly one third of caregivers spend more than 20 hours a week providing care or assistance, and more than half care for their sick family members for two or more years (Centers for Disease Control and Prevention, 2019). Family caregivers have reported that while caring for a family member with a chronic illness, they experience stress, mental distress, and physical health problems (Adelman et al., 2014). Caregivers with psychological and physical problems are more likely to develop depression, stroke, or heart disease (National Alliance for Caregiving & AAPR, 2020). Because of the severity of the illness, cognitive and functional impairments, and level of support needed by the care recipient, caregivers commonly ignore their own health and have very poor self-care skills (Mollica et al., 2020). The higher rate of cardiovascular disease in caregivers compared to noncaregivers suggests that poor

health activation may concern caregivers (Ahn et al., 2022; Lee et al., 2003).

Health activation, also known as patient activation, refers to an individual's knowledge, skills, and confidence in their ability to engage in effective self-care (Hibbard et al., 2004). In a study of over 4,000 individuals with chronic illnesses, higher health/patient activation scores were associated with better self-care, higher medication adherence, better quality of life, and higher physical and mental functional status than those with lower health/patient activation scores (Mosen et al., 2007). Health activation has been shown to be positively associated with better self-care behaviors in healthy individuals or individuals with chronic health conditions (Hibbard et al., 2007; Skolasky et al., 2011). Moreover, individuals with higher health activation levels are less likely to smoke, be obese, have a high body mass index, have high blood pressure, have an emergency department visit, or be hospitalized (Greene & Hibbard, 2012).

Health activation appears to be a major correctable problem in caregivers who often neglect their own health and well-being, leading to poor self-care and insufficient preventive health behaviors (Burton et al., 1997); yet, health activation has not been studied in caregivers. Understanding health activation among caregivers will help clinicians and researchers design interventions to promote health activation in this often ignored population (Hibbard & Greene, 2013). To effectively evaluate health activation, including the different degrees of involvement in one's healthcare, a reliable and valid instrument is needed; however, none have been developed to measure this construct in family caregivers.

The Patient Activation Measure (PAM), a reliable and valid instrument developed by Hibbard et al. (2004) to evaluate health activation, has been widely used in several nonpatient and patient populations, including populations with heart disease, diabetes, hypertension, arthritis, and lung disease (Kearns et al., 2020). The PAM has different versions available, including the 22-item original version (PAM-22; Hibbard et al., 2004), a 13-item shortened version (PAM-13; Hibbard et al., 2005), and a 10-item version (PAM-10), which is the most current short version (Insignia Health, n.d.). However, the psychometric properties of any version of the PAM have not been reported in the caregiver population. Therefore, we aimed to test the PAM-10 in a sample of family caregivers to assess activation regarding caregivers' own healthcare.

This study aimed to examine the psychometric properties of the PAM-10 in a sample of family caregivers of patients with chronic illnesses. The specific aims of this study were to examine internal consistency reliability and construct validity of the PAM-10 among caregivers of patients with chronic illnesses. We used Cronbach's alpha, item-total correlation, and interitem correlation to assess internal consistency reliability. Construct validity was examined using exploratory factor analysis and known hypothesis testing. We hypothesized that depressive symptoms would be negatively associated with activation in caregivers. We also hypothesized that caregivers with higher health activation would be more likely to adhere to recommended self-care behaviors than those with lower health activation.

METHODS

Sample and Setting

We used baseline data from a randomized, longitudinal intervention study designed to reduce heart disease risk factors among rural caregivers of patients with chronic illnesses to evaluate the psychometric properties of the PAM-10. Caregivers were recruited from academic healthcare clinics in one southern state in the United States. To be eligible for the primary study, caregivers had to be 21 years or older, live in a rural area defined by rural–urban commuting area codes ≥ 4 (Economic Research Service, U.S. Department of Agriculture, 2020), and provide care for more than 6 months to a family member with chronic illness (e.g., heart failure, stroke with a physical disability, dementia, renal disease, liver disease, and neuromuscular disorder). In addition, caregivers had to have at least two risks for cardiovascular disease.

Procedures

The institutional review board approved the study before recruitment and data collection. All participants received comprehensive information from trained research assistants about the study and signed the consent document. Data were collected by trained nurse researchers using questionnaires. To ensure the accuracy of data collection, we used a secure web-based data capture and archival site, Research Electronic Data Capture (REDCap), hosted at the participating university (Harris et al., 2009). REDCap offers a streamlined process for rapid database construction, an interface for data collection and validation, and an automated export procedure to statistical packages. Data were examined, cleaned, and verified before the psychometric analyses were performed.

Measures

Patient Activation Measure The PAM-10 is a 10-item, self-reported, shortened version of the PAM (Hibbard et al., 2004, 2005; Insignia Health, n.d.). First developed by Hibbard et al. (2004), the PAM assesses health/patient activation and can be used to design a tailored intervention, improve healthcare quality, reduce healthcare costs, and improve outcomes of care (Greene et al., 2015; Hibbard & Greene, 2013). The PAM consists of four conceptual elements: (a) believing that taking an active role is important, (b) having the confidence and knowledge to take action, (c) taking action, and (d) staying the course under stress. Participants were asked to respond using a Likert-type scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) on each item. When the data collection

of PAM-10 was completed, the PAM-10 data were sent, as requested by Insignia Health, which owns the instrument, to calculate and generate scores (Insignia Health, n.d.). The scoring algorithm is proprietary. Possible scores range from 0 to 100, with higher scores indicating higher activation in one's healthcare. The validity and reliability of the PAM-22, PAM-13, and PAM-10 have been established among individuals with chronic conditions (Hibbard, 2017; Hibbard et al., 2004, 2005; Skolasky et al., 2011).

Patient Health Questionnaire Depressive symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001). The PHQ-9 consists of nine items and has been widely used to screen and monitor the severity of depression. Each item was rated by participants using a 4-point Likert scale (0 = *not at all* to 3 = *nearly every day*). Possible scores range from 0 to 27, with higher scores indicating more severe depressive symptoms. A cutoff score of 10 or greater represents the presence of depression and was adopted for this study (Kroenke et al., 2001). The reliability and validity of the PHQ-9 have been supported (Martin et al., 2006). In this study, Cronbach's alpha for our sample of caregivers was .86.

Measures of Patient Adherence Survey Caregivers' adherence to recommended self-care behaviors was assessed using a modified version of the Measures of Patient Adherence Survey from Medical Outcome Study (Hays, 1994; Hays et al., 1994). The modified version comprises 12 items and assesses an individual's adherence to medical/self-care recommendations. The modified version includes seven items from the original scale and an additional five items that are recommended self-care behaviors to reduce the risk of cardiovascular disease. Examples of the items included (a) adequate physical activity, (b) medication adherence, (c) smoking cessation, (d) stress reduction, (e) following a weight loss diet if appropriate, (f) eating a low trans/saturated fat diet, (g) eating a low-fat diet, (h) eating a low salt diet, (i) eating a diet of low/nonfat dairy, (j) adequate whole grain intake, (k) adequate plant protein intake, and (l) increased intake of fruits or vegetables. Caregivers rated how often they were adherent to these self-care behaviors in the past 4 weeks using a 6-point Likert scale (0 = *none of the time*, 1 = *a little of the time*, 2 = *some of the time*, 3 = *a good bit of the time*, 4 = *most of the time*, 5 = *all of the time*). In this study, caregivers were divided into a nonadherent group (those who answered *none/a little/some of the time*) or an adherent group (those who answered *a good bit/most/all of the time*) on each item based on their responses on the item. Internal consistency reliability for our sample of caregivers was supported by Cronbach's alpha at .78.

The Zarit Burden Interview We used caregiver burden as a covariate in our study. Caregiver burden was evaluated using the Zarit Burden Interview (Bédard et al., 2001), which includes 22 items for participants to self-rate on a 5-point Likert scale ranging from 0 (*never*) to 4 (*nearly always*). Scores are summed for a potential range of 0 to 88, with higher scores indicating greater burden. This instrument has demonstrated validity and reliability in several caregiver studies, including studies of caregivers of patients with dementia (Bachner & O'Rourke, 2007). Cronbach's alpha for our sample was .93, which indicates excellent reliability.

Sociodemographic Characteristics Sociodemographic characteristics were obtained using a standard questionnaire. We asked caregivers questions about their age, gender, marital status, race, ethnicity, education, employment status, and the relationship with their care recipient. We collected financial status by asking whether they perceived that they "did not have enough to make ends meet, had enough to make ends meet" or "had more than enough to make ends meet." We also included an item asking about their perceived health status. The possible answers are fair, poor, good, very good, or excellent.

Data Analyses

Data were analyzed with IBM SPSS Statistics (Version 27.0). Descriptive statistics were computed for sample characteristics and each item of the PAM-10 using means and standard deviations or frequencies and percentages. The internal consistency reliability of the PAM-10 was assessed using Cronbach's alpha coefficient, with alpha $\geq .70$ considered sufficient internal consistency (Streiner et al., 2015). Scale consistency, if any item was deleted, was used to determine if Cronbach's alpha coefficient would improve as each individual item was removed from the scale. Item-total correlations and interitem correlations were used to assess item homogeneity. An acceptable coefficient for item-total correlations is greater than .30. An acceptable coefficient for interitem correlations ranges between .30 and .70. A value less than .30 indicates that the item is not correlated well with another item in the scale; a value greater than .70 shows the item is so close to another item as to be repetitive (Streiner et al., 2015).

We examined the construct validity of the PAM-10 by evaluating the factor structure of the scale and testing hypotheses on known relationships (Blakemore et al., 2016; Hibbard et al., 2005). The Kaiser–Myer–Olkin index and Bartlett's test of sphericity were used to detect sampling adequacy and examine suitability for conducting factor analysis. An acceptable value for the Kaiser–Myer–Olkin index is greater than .70 (Pett et al., 2003). The significance value of Bartlett's test of sphericity was set at $p < .05$. Exploratory factor analysis using principal component analysis extraction was performed to examine the dimensionality of the PAM-10. The eigenvalue one criterion—the proportion of total variance accounted for—and the scree plot test were used as indicators of the number of factors to retain. Extracted factors were rotated using varimax rotation. Items with factor loadings greater

than .50 were considered acceptable; thus, loadings less than .50 were ignored (Pett et al., 2003).

We tested known hypotheses using an independent *t*-test and multiple regression analysis. An independent *t*-test was used to compare depressed (PHQ-9 score > 10) and nondepressed caregivers (PHQ-9 score ≤ 10) on PAM-10 scores. Multiple regression was used to examine whether depressive symptoms predicted health activation (PAM-10 score) while controlling for age, gender, years of education, perceived health status, and caregiver burden. We tested our second hypothesis to provide support for construct validity using independent *t*-tests to compare caregivers in the nonadherent group with those in the adherent group for each item of the modified version of the Measures of Patient Adherence Survey on health activation (PAM-10 score).

RESULTS

Sample Characteristics

A total of 277 caregivers were included in the analysis. Their average age was 54 years (Table 1), and most of the caregivers were women, non-Hispanic White, and married or cohabiting. They had completed, on average, 14 years of education, with 66% having more than 12 years of education. The majority considered themselves to be in good health, with about 69% reporting that their health was good, very good, or excellent. More than 80% reported having enough or more than enough to make financial ends meet.

Reliability and Item Homogeneity

Cronbach's alpha for the PAM-10 was .86, indicating adequate internal consistency of this instrument. No significant changes or increases in Cronbach's alpha values were seen when any item was deleted, confirming the retention of all items in the instrument. The results of the item analyses are shown in Table 2. Item-total correlation coefficients of all 10 items were greater than .30 (r = .441 to r = .715), indicating adequate contribution of all items to the instrument. The interitem correlations of the PAM-10 were acceptable (Clark & Watson, 1995). Except for Item 7 and Item 10, the interitem correlations of the PAM-10 ranged between .30 and .70. All the items had at least one correlation coefficient greater than .30, and over three quarters of the correlation coefficient between all individual items and all other items ranged between .30 and .70. All the items were significantly positively correlated with each other.

Validity

In the first step to assess the suitability of the data for factor analysis, the Kaiser–Meyer–Olkin value was .845, and Bartlett's test of sphericity was statistically significant (p < .001), supporting the factorability of the correlation matrix and adequacy for performing principal component analysis. The initial factor extraction demonstrated the presence of two factors with eigenvalues greater than 1, explaining a total of 62.3% of the variance, with factor 1 contributing 47.3% and factor 2 contributing 15.0%. The scree plot also indicated that there were two factors. The items' commonalities were between .469 and .780. Varimax rotation of these two factors was conducted. Factor loadings greater than .5 demonstrated that six items (Items 1, 2, 3, 4, 5, and 6) loaded on Factor 1 and conceptually fit into the concept of "believing that an active role in their own healthcare management is important as is having confidence/knowledge to take action," and four items (Items 7, 8, 9, and 10) loaded on Factor 2 conceptually related to "taking actions and staying the course under stress" (Table 3).

TABLE 1. Characteristics of Sample (*N* = 277)

Characteristic		
Age, year (mean, *SD*)	54	13.8
Gender, female (*n*, %)	215	77.6
Marital status (*n*, %)		
Married/cohabiting	205	74.0
Single/widowed/divorced/separated	72	26.0
Race (*n*, %)		
White	265	95.7
Black and other minorities	12	4.3
Ethnicity (*n*, %)		
Non-Hispanic	273	98.6
Hispanic	4	1.4
Education, year (mean, *SD*)	14	2.5
Employment (*n*, %)		
Employed full-time	96	34.7
Employed part-time	17	6.1
Homemaker	27	9.8
Self-employed	4	1.4
Retired	86	31.0
Unemployed	26	9.4
Disabled	21	7.6
Financial status (*n*, %)		
More than enough to make ends meet	70	25.2
Have enough to make ends meet	155	56.0
Do not have enough to make ends meet	52	18.8
Perceived health status (*n*, %)		
Excellent	8	2.9
Very good	60	21.7
Good	123	44.4
Fair	70	25.3
Poor	16	5.8
Relationship to the care recipient (*n*, %)		
Caring for a spouse	132	47.7
Caring for a parent	53	19.1
Caring for a child	34	12.3
Caring for a grandchild	8	2.9
Caring for other relative	50	18.0

Note. *SD* = standard deviation.

TABLE 2. Item Analyses

Item	Item-total correlations	Cronbach's alpha if item deleted	Interitem correlation									
			Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 1	.441	.861	1.000									
Item 2	.524	.855	.550**	1.000								
Item 3	.485	.858	.350**	.359**	1.000							
Item 4	.636	.847	.475**	.467**	.551**	1.000						
Item 5	.662	.844	.377**	.420**	.496**	.599**	1.000					
Item 6	.672	.845	.362**	.332**	.435**	.591**	.704**	1.000				
Item 7	.543	.860	.133*	.275**	.177**	.254**	.291**	.368**	1.000			
Item 8	.654	.845	.318**	.338**	.338**	.391**	.491**	.434**	.477**	1.000		
Item 9	.715	.840	.321**	.399**	.352**	.480**	.517**	.556**	.461**	.684**	1.000	
Item 10	.562	.856	.105*	.259**	.166**	.294**	.314**	.385**	.722**	.465**	.523**	1.000

*$p < .05$.
**$p < .01$.

The first hypothesis supported construct validity. Caregivers in the nondepressed group had higher activation scores than caregivers in the depressed group (71.6 ± 16.3 vs. 63.5 ± 16.2, $t_{275} = 3.577$, $p < .001$). Depressive symptoms were a significant predictor of activation after controlling for covariates (unstandardized $B = -0.227$, $p = .001$). Higher levels of depressive symptoms were significantly associated with lower activation (Table 4). The second hypothesis was also supported. Caregivers with higher health activation were significantly more likely to adhere to recommended cardiovascular disease self-care behaviors (Table 5).

DISCUSSION

This study supported the reliability and validity of the PAM-10 as a measure of health activation among family caregivers of patients with chronic illnesses. The results of Cronbach's alpha and item analyses demonstrated adequate internal consistency and acceptable item homogeneity. The finding of factor analysis and hypothesis tests supported the construct validity of this instrument. Thus, this study provided evidence that PAM-10 can be used to assess caregivers' knowledge, skills, and confidence in their ability to engage in self-care for their health.

Except for Item 7 and Item 10, the interitem correlations of the PAM-10 ranged between .30 and .70. Item 7 (been able to maintain lifestyle changes) and Item 10 (be confident that can maintain lifestyle changes) each had a weak correlation of less than .30 with most of the other items (i.e., Items 1, 2, 3, 4, 5), which the content of these two items could explain. Both items are related to the ability to make lifestyle changes instead of knowing health management.

TABLE 3. Mean Scores and Rotated Matrix for Principal Component Analysis With Varimax Rotation of the Patient Activation Measure-10 Items

No.	Item	Mean	*SD*	Factor 1	Factor 2	Communalities
4	I am confident that I can tell whether I need to go to the doctor or whether I can take care of a health problem myself.	3.570	0.558	**0.790**	0.224	0.674
1	When all is said and done, I am the person who is responsible for taking care of my health.	3.682	0.482	**0.733**	–0.002	0.538
5	I am confident that I can tell a doctor concerns I have even when he or she does not ask.	3.523	0.599	**0.729**	0.338	0.645
3	I know what each of my prescribed medications do.	3.657	0.533	**0.712**	0.079	0.517
2	Taking an active role in my own healthcare is the most important thing that affects my health.	3.592	0.535	**0.659**	0.187	0.469
6	I am confident that I can follow through on medical treatments I may need to do at home.	3.542	0.554	**0.647**	0.427	0.601
10	I am confident that I can maintain lifestyle changes, like eating right and exercising, even during times of stress.	2.816	0.842	0.066	**0.881**	0.780
7	I have been able to maintain lifestyle changes, like eating right or exercising.	2.769	0.883	0.062	**0.862**	0.747
9	I am confident I can figure out solutions when new problems arise with my health.	3.249	0.631	0.470	**0.668**	0.666
8	I know how to prevent problems with my health.	3.227	0.616	0.404	**0.657**	0.594

Note. Major loadings for each item are bolded. *SD* = standard deviation.

TABLE 4. Multiple Regression Model of Predictors of Patient Activation From Depressive Symptoms Controlling for Covariates

Variables	*B*	*SE*	β	95% CI	*p*
Age	–0.054	0.071	–.045	[–0.193, 0.085]	.446
Gender (male)	1.090	2.321	.027	[–3.479, 5.658]	.639
Years of education	0.569	0.378	.087	[–0.174, 1.313]	.133
Health status (poor/fair)	0.368	2.124	.010	[–3.813, 4.549]	.863
Caregiver burden	–0.227	0.067	–.228	[–0.358, –0.095]	.001
Depressive symptoms	–0.625	0.211	–.202	[–1.040, –0.210]	.003

Note. Model R^2 = .139, adjusted R^2 = .120, $F(6.270)$ = 7.246, $p < .001$. *B* = unstandardized coefficients; β = standardized coefficients; CI = confidence interval; *SE* = standard error.

The dimensionality of the PAM, regardless of version, has not been explored in the caregiver population. The PAM was developed as a unidimensional instrument via a telephone survey of randomly selected adults and was tested using Rasch analysis. Investigators who used the Rasch method to test the psychometric properties have supported the unidimensionality of the instrument (Hellström et al., 2019; Hung et al., 2013; Stepleman et al., 2010). Results of factor analysis in our study did not support the unidimensionality of the PAM-10; instead, we identified two factors in our sample of caregivers. The first factor can be labeled "believing taking an active role in own health is important and having confidence/knowledge in

TABLE 5. Association Between Adherence to Recommended Cardiovascular Self-Care Health Behaviors and Health Activation

Variable	*n*	Mean	*SD*	*SEM*	*t*	*df*	*p*
Thirty minutes of exercise 4 days a week							
None/a little/some of the time	180	66.501	15.279	1.139	–4.419	174.179	<.001
A good bit/most/all of the time	97	75.309	17.625	1.790			
Take prescribed medication							
None/a little/some of the time	22	63.709	18.148	3.869	–1.734	275	.084
A good bit/most/all of the time	255	70.098	16.451	1.030			
Stop or cut down on smoking							
None/a little/some of the time	60	69.560	16.212	2.093	–0.016	275	.987
A good bit/most/all of the time	217	69.600	16.802	1.141			
Reduce stress in your life							
None/a little/some of the time	154	66.255	15.483	1.248	–3.779	248.423	<.001
A good bit/most/all of the time	123	73.768	17.166	1.548			
Follow a weight loss diet, if needed							
None/a little/some of the time	188	66.472	14.725	1.074	–4.335	142.422	<.001
A good bit/most/all of the time	89	76.180	18.541	1.965			
Follow a diet low in trans and saturated fats							
None/a little/some of the time	193	68.190	15.980	1.150	–2.137	275	.033
A good bit/most/all of the time	84	72.811	17.769	1.939			
Eat a low-fat diet							
None/a little/some of the time	207	67.449	15.771	1.096	–3.770	275	<.001
A good bit/most/all of the time	70	75.926	17.649	2.110			
Limit salt in diet							
None/a little/some of the time	160	67.884	16.107	1.273	–2.007	275	.046
A good bit/most/all of the time	117	71.926	17.154	1.586			
Eat low-fat or fat-free dairy products							
None/a little/some of the time	198	68.130	16.420	1.167	–2.330	275	.021
A good bit/most/all of the time	79	73.252	16.753	1.885			
Eat primarily whole grain foods							
None/a little/some of the time	191	67.614	16.312	1.180	–2.987	275	.003
A good bit/most/all of the time	86	73.981	16.637	1.794			
Eat beans, seeds, or nuts 4–5 times per week							
None/a little/some of the time	187	66.912	15.421	1.128	–3.770	155.391	<.001
A good bit/most/all of the time	90	75.158	17.777	1.874			
Eat five servings of fruits or vegetables per day							
None/a little/some of the time	196	67.666	15.656	1.118	–2.861	131.949	.005
A good bit/most/all of the time	81	74.249	18.099	2.011			

Note. SD = standard deviation; *SEM* = standard error of the mean; *df* = degrees of freedom.

healthcare"; the second factor can be labeled "taking action and staying the course under stress." Our study was in line with prior studies in which factor analysis was used to test the psychometric properties of this scale. These studies have yielded two to three factors. For instance, two factors (i.e., "believing active role important/responsibility" and "knowledge and self-confidence") were identified by Moljord et al. (2015) in patients with mental illness. In a study of individuals undergoing elective lumbar spine surgery, Skolasky et al. (2009) identified three factors: "beliefs," "confidence and knowledge," and "action and perseverance." Although the dimensionality of the instrument appears to depend on the type of analysis used, the major concepts purported to be measured are consistent, reflecting the validity of this instrument to measure the concept of health activation.

Previous studies have shown that depressive symptoms were predictive of health behaviors, well-being, and quality of life (Bekhet, 2014; Clements et al., 2020). The results of this study revealed that having greater depressive symptoms was associated with reduced health activation, supporting the validity of the PAM-10 in caregivers. In addition, caregiver burden has been found by others to be predictive of less physical activity, low medication adherence, worse self-care, and worse physical and mental health-related outcomes (de Wit et al., 2018; King et al., 2021). Although not one of the hypotheses in this study, caregiver burden (which we used as a covariate) predicted decreased health activation. This incidental finding further supports the validity of PAM-10.

In a series of studies, Hibbard et al. (2004, 2005, 2007) have shown that preventive behaviors (e.g., regular exercise, being a nonsmoker, following a low-fat diet, and eating more fruits or vegetables), disease-specific self-management behaviors (e.g., using a glucose journal and exercising to control arthritis pain), and consumer behaviors (e.g., ability to find out a qualified healthcare provider) were strongly linked with health activation score (Fowles et al., 2009; Hibbard et al., 2004, 2005, 2007). Our findings are in accordance with that research. Compared to the caregivers with low health activation, caregivers with high health activation were significantly more likely to adhere to self-care behaviors, including getting adequate physical activity; reducing stress in life; following a weight loss diet; eating a low-fat diet; reducing salt intake; eating a diet of low/nonfat dairy; and eating adequate amounts of whole grains, plant proteins, and fruits and vegetables.

Strengths and Limitations

There are some limitations. First, all measures we used in this study were self-reported rather than objectively measured; however, depressive symptoms are subjective, and there are no objective measures of depression. Health activation could be objectively measured as individual behaviors (e.g., activity levels); however, several items on the PAM cannot be measured objectively as they are subjective questions (e.g., confidence or self-efficacy related). Thus, there is little reason to believe that self-report was a significant limitation of this study. Second, most of the caregivers were non-Hispanic White in this study; thus, generalizing findings to other racial and ethnic groups requires caution. Third, more than three quarters of the participants are female. Although our sample reflects the reality that upward of 75% of caregivers are female (Family Caregiver Alliance, 2016), male caregivers may have different degrees of involvement in their healthcare than female caregivers. Future studies are needed to include various races and more male caregivers in order to fulfill the generalizability. The strengths of this study include a robust sample size and psychometric evaluation of caregivers—an understudied at-risk population.

Conclusion

This study demonstrated that the PAM-10 is a reliable and valid instrument for measuring activation in family caregivers of patients with chronic illnesses. In addition, our findings suggest that depressive symptoms are a significant determinant of activation. The PAM-10 is recommended for use as a measure of health activation in family caregivers.

Accepted for publication December 19, 2022.

Research reported in this publication was supported by the National Institute of Nursing Research of the National Institute Health (NIH) under Award Number 1R01NR016824. The authors thank the NIH for supporting the National Center for Advancing Translational Sciences for Research Electronic Data Capture under Award Number UL1TR001998. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

The University of Kentucky Institutional Review Board approved the study.

The protocol is registered with ClinicalTrials.gov. Identifier: NCT03068390. The trial was registered February 24, 2017 (https://clinicaltrials.gov/ct2/show/NCT03068390?cond=Rural+intervention+for+caregiver%27s+heart+health&draw=2&rank=1).

The authors have no conflicts of interest to report.

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