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Functional Impairments Associated with Patient Activation among Community-Dwelling Older Adults

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Abstract

Objectives—Activity of Daily Living (ADL) stages and Instrumental Activity of Daily Living (IADL) stages demonstrated ordered associations with mortality, risk of hospitalization, and receipt of recommended care. This paper explores the associations of stages with three dimensions of patient activation: self-care efficacy, patient-doctor communication and health-information seeking. We hypothesized that higher ADL and IADL stages (greater limitation) are associated with a lower level of patient activation.

Methods—Patient activation factors were derived from the 2004 and 2009 Medicare Current Beneficiary Survey. In this cross-sectional study ($N=8981$), the associations of activity limitation stages with patient activation factors were assessed in latent factor models.

Results—Greater activity limitation was in general inversely associated with self-efficacy, patient-doctor communication and health information-seeking, even after adjusting for sociodemographic and clinical characteristics. For instance, the mean of self-care efficacy across ADL stages I–IV (mild, moderate, severe and complete limitation) compared to stage 0 (no limitation) decreased significantly by 0.17, 0.29, 0.34, and 0.60, respectively. Covariates associated with suboptimal patient activation were also identified.

Discussion—Our study identified multiple opportunities to improve patient activation, including providing support for older adults with physical impairments, at socioeconomic disadvantages, or with psychological or cognitive impairment.

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Keywords

self-care efficacy; patient-doctor communication; health-information seeking; activity limitation; vision; hearing

Providing patient-centered care for older adults requires that they be included as active partners unless their mental or physical frailty precludes it.¹ This shared partnership emphasizes patients' healthful behaviors, self-care of chronic conditions, and participation in decision making¹ as important in reaching better health outcomes. Patient activation is defined as "an individual's propensity to engage in adaptive health behaviors leading to improved health outcomes."² A recent study shows that higher patient activation was associated with a majority of better clinical indicators, more healthy behaviors, preventive care, and lower future costs.³ Greater patient activation was associated with better functional recovery after lumbar spine surgery, potentially through increased physical therapy adherence after spine surgery in adults.² Higher preoperative patient activation was associated with better pain relief, decreased symptoms, improved mental health, and greater satisfaction after total joint arthroplasties (TJA)⁴ and favorable rehabilitation outcomes following orthopaedic surgery.⁵

In response to the Institute of Medicine (IOM) report on medical errors and patient safety,⁶ researchers from the Centers for Medicare and Medicaid Services (CMS) studied Medicare beneficiaries' voluntary actions to protect patient safety and their interactions with health care providers.⁷⁻⁹ CMS developed patient activation instruments to assess self-care efficacy, patient-doctor communication, and health information-seeking among the Medicare population in the Medicare Current Beneficiary Survey.⁹

Physical impairments are prevalent among older adults and can lead to functional impairment and act as major obstacles to patient participation in their own healthcare. Approximately 41% of U.S. individuals aged 65 years and older have at least one limitation in basic activities of daily living (ADLs) or in instrumental activities of daily living (IADLs).¹⁰ It is therefore important to study the extent to which these functional impairments prevent patients from engaging in active self-care and shared decision-making. Understanding the relationships among diverse disability patterns and patient activation levels may inform interventions to augment patient activation among older adults, facilitate their self-management of care, and achieve better health outcomes.

Activity Limitation Stages

Traditional measures of activity limitation use summary scores of limitation across activities of daily living (ADLs) or instrumental activities of daily living (IADL). ADLs entail the basic functions of eating, toileting, dressing, bathing or showering, getting in/out of bed or chairs and walking. IADLs incorporate the domestic life functions of telephoning, managing money, preparing meals, doing light housework, shopping for personal items and doing heavy housework. Functional measures that rely on simple counts of ADLs or IADLs tend to obscure the nature of activity limitations because they cannot associate the counts with specific patterns of functional loss. Activity limitation stages based on the terminology of

the International Classification of Functioning Disability and Health (ICF) were developed in separate ADL and IADL domains.¹¹ Five ADL stages (0–IV) and five IADL stages (0–IV) represent a combination of severity and types of disability with clinically meaningful thresholds of increasing difficulty with self-care and more complex instrumental skills. In this hierarchy, stage 0 represents no difficulty in any of the six component items, and stage IV represents difficulty in all items (Appendix I). Stage III was designed as a non-fitting stage to accommodate people with unusual patterns of limitation. These staging systems have been validated with MCBS data and showed ordered associations with various health outcomes among the Medicare beneficiaries, such as chronic conditions, receipt of recommended care, risk of hospitalization, use of long-term care facilities, and mortality.^{11–14} In alignment with the previous research, it is thus of interest to explore the association of the staging systems with patient activation, which potentially promote healthful behaviors, improve health outcomes and reduce health care costs.

Self-care efficacy

Self-care efficacy or self-care self-efficacy is a measure to assess the extent of an individual's confidence in their ability to engage effectively in self-care activities. Self-care is defined as “activities individuals, families, and communities undertake with the intention of enhancing health, preventing disease, limiting illness, and restoring health.”¹⁵ Self-care skills encompass problem-solving, decision making, resource utilization, forming of a patient/health care provider partnership, and taking action.¹⁶ Self-care involves two dimensions: a) medical management of conditions, such as taking medication; and b) maintaining, adopting or creating new meaningful behaviors such as exercising.¹⁶ Appropriate self-care is associated with beneficial health outcomes including prevention or early detection of disease, better general health status and quality of life, improved clinical outcomes (e.g., reduced hospitalizations and successful management of symptoms), and reduced health care costs.^{17–19} However, lack of appropriate self-care is common: among patients with heart failure, non-adherence to medication was reported in about 40%–60%, and non-adherence to dietary recommendations ranged between 43% and 92%.¹⁷ Patients who lack the ability to recognize symptoms of heart failure tend to delay seeking care.^{20,21}

Self-efficacy plays a key role in adoption of self-care. Bandura coined the term self-efficacy, which refers to individuals' beliefs in their capabilities to undertake behaviors that may influence their lives, such as health outcomes.²² Self-efficacy was inversely associated with pain-related disability and depressive symptoms, and positively associated with activation of pain coping strategies.²³ Assessing self-efficacy in self-care is important in the elderly, because many of them are affected by chronic disease that requires self-management. Identification of chronically ill elders with low self-efficacy for performing self-care activities may help service providers develop multifactorial education and skills training programs to foster self-efficacy and modify health behavior.²⁴

Patient-doctor communication

The second component of patient activation is patient-doctor communication. Communication is a vital element in medical care. Patients who have effective

communication skills express greater satisfaction with care, adherence to treatment, and willingness to file malpractice claims.²⁵ Physician attentiveness and empathy were associated with reduced emotional distress, higher satisfaction, and increased self-efficacy among cancer patients.²⁶

Disability is perceived as a barrier to effective patient-doctor communication. Providers tend to downplay the importance of healthy behaviors and disease prevention in the lives of their disabled patients.²⁷ For instance, physicians are less likely to ask smokers with mobility issues about their smoking histories than they do other smokers during an annual visit²⁸ possibly due to their false belief that smoking helps reduce stress caused by disabilities.²⁷ Patients with disabilities reported being dissatisfied with patient-doctor interactions, some citing that disability was the reason that they were treated unfairly in their doctor's office.²⁹ A better understanding of disability as it relates to respectful patient-doctor interactions could be expected to increase the effectiveness of care at the interpersonal level.

Health information-seeking

The third component in patient activation is health information-seeking behavior. The internet is a popular environment where health information is disseminated. Using a nationally representative survey, researchers³⁰ found that the most consistent influences on ever, or more frequently, using the internet to search for health information were female sex, no full-time employment, greater involvement in other internet activities, new diagnosis, ongoing medical condition, prescribed new medication or treatment, and helping others deal with health issues. Another national study³¹ reported that about one third of Americans looked for health information on the internet over the past year and 8% had taken the information to their physician. The majority of people who presented the internet information to their physicians intended to seek physicians' opinions. Among rheumatology patients, the majority sought information either online or in other sources prior to their initial appointment³². Only one out of five opted to discuss the information with their physicians, with the rest primarily afraid of being perceived as challenging their providers. When information was discussed, greater satisfaction was reported.

Disability and chronic conditions are both associated with information-seeking. However, people living with disabilities are less likely to live in households with computers, to use computers, and to be online. After adjusting for socioeconomic status, hearing disabilities and walking limitation do not contribute to the digital inequity³³. As the number of chronic conditions increases, so does the frequency of internet use to seek health information, but the pattern only holds among younger age groups, not among the older age group (aged 50–75). In addition, greater use of internet as a health information source contributes to a higher chance of changing patient behavior³⁴

Patient-doctor communication, self-care efficacy, and health information-seeking have not been well studied among older adults at different activity limitation stages. We sought to examine associations of activity limitation stages with three patient activation factors. We hypothesized that older adults at higher limitation stages would have lower self-care

efficacy, experience lower quality of patient-doctor communication, and seek health information less frequently.

Methods

Study sample

We used data from the Medicare Current Beneficiary Survey (MCBS), a rotating panel survey of a nationally representative sample of the Medicare beneficiaries conducted by CMS.³⁵ A sample person is usually interviewed each year for four years. The MCBS documents self- or proxy-reported individual-level information including sociodemographics, health and functioning, medical encounters, access to care, usual source of care and satisfaction with care. Patient activation instruments are not collected annually. In this cross-sectional study, we used the 2004 and 2009 MCBS, in which patient activation measures were collected. Our sample included community-living elderly beneficiaries aged 65 years and older.

This study was approved by the University of Pennsylvania Institutional Research Board. Written consent from participants was not required for the study since we used de-identified data. This study conforms to all STROBE guidelines and reports the required information accordingly (see Supplementary Checklist).

Patient activation factors

Although MCBS allows proxy-responses to survey questions, the patient activation supplement requires self-reported beneficiary responses.³⁶ For the ease of interpretation, patient activation responses were reverse-coded with higher scores reflecting desired patient activation characteristics. Self-care efficacy, patient-doctor communication and health-information seeking behavior were identified with exploratory factor analysis (EFA) using nineteen survey questions in the patient activation supplement of 2004 MCBS. The initial factor analysis produced four factors. We kept the factors with at least three indicators (survey items) and with all factor loadings of 0.4 or above. We removed the indicators with cross-loadings of 0.3 or above. Thus we retained three factors, each measured with four survey items. The factor structure was validated with a confirmatory factor analysis (CFA) on 2009 MCBS data, with error covariances added based on modification indices to improve model fit. The final CFA model shows a good fit of the three-factor model: $\chi^2 = 169.68$, $p < .001$, CFI=0.99, TLI=0.99, RMSEA (Root Mean Square Error of Approximation) = 0.018 with 90% CI= (0.015, 0.021), SRMR (Standardized Root Mean Square Residual) = 0.014. The three factors had weak inter-factor correlations ranging between 0.10–0.15. The Cronbach's alpha's for the three factors were 0.74, 0.76 and 0.61, respectively.

In the final CFA, *self-care efficacy* was measured by four Likert questions (very confident, confident, somewhat confident, not at all confident): How confident you are that you can identify when you are having side effects from your medications? How confident are you that you can follow instructions to care for yourself at home? How confident you are that you can identify when it is necessary for you to get medical care? How confident are you that you can follow this kind of instruction, to change your habits or lifestyle? *Patient-doctor*

communication was measure by four Likert questions (always, usually, sometimes, or never): My doctor listens to what I have to say about my symptoms and concerns; My doctor explains things to me in terms that I can easily understand; I leave your doctor's office feeling that all of my concerns or questions have been fully answered; I can call my doctor's office to get medical advice when I need it. *Health information seeking* was measure by Likert questions (always, usually, sometimes, or never): bring with you to your doctor visits a list of questions or concerns you want to cover; read about health conditions in newspapers, magazines, or on the Internet; read information about a new prescription, such as side effects and precautions; take a list of all of your prescribed medicines to your doctor visits.

Activity limitation stages

Five ADL stages and five IADL stages were derived based on respondents' response to survey questions in 2009 MCBS about difficulty performing six ADL and six IADL activities: "Because of a health or physical problem, do you [or sample person if proxy interview] have any difficulty with the following?" Dependent upon whether there was difficulty, each respondent was assigned an ADL and IADL stage with the method described previously.¹¹

Covariates

Covariates were all derived from 2009 MCBS. Age (65–74, 75–84, 85), gender, race/ethnicity (non-Hispanic whites, non-Hispanic black, Hispanic, and non-Hispanic other), education (less than high school, high school, some college, university degree), income (below \$25,000 vs. \$25,000 and above), proxy, metropolitan residency, vision impairment, hearing impairment, and sum of chronic conditions (arthritis, hypertension, myocardial infarction, chronic heart diseases, stroke, cancer, osteoporosis, chronic obstructive pulmonary disease (COPD), Parkinson's, and diabetes). Because patient activation factors were essentially based on cognitive ability, we included patient cognitive and psychiatric disorders as potential confounders, identified as Alzheimer, depression and mental disorders.

Statistical analysis

Data from 2009 MCBS were used for descriptive statistics and modeling. We first assessed weighted sample distribution by functional impairments and covariates. Structural equation models tested the association of activity limitation stages with three latent factors of patient activation (self-care efficacy, patient-doctor communication, and health information-seeking). Two unadjusted models assessed the separate associations of ADL stages and IADL stages with patient activation factors. Due to the high collinearity of ADL and IADL stages, two adjusted models were built in separate ADL and IADL domains, with sociodemographics (age, gender, race/ethnicity, education, income, living arrangement, and metropolitan residence), proxy use, vision and hearing impairments, sum of chronic conditions, and cognitive and psychiatric impairments as covariates in each domain. The statistical analysis took into account the complex survey design including sampling weights, strata and clusters. No imputation was conducted for missing data. Data manipulation and descriptive statistics were done with SAS 9.4 (SAS Institute, Inc.). Latent factor modeling was conducted in Mplus with full-information maximum likelihood estimation.

Results

Table 1 displays sample distribution by ADL stages and all covariates. After excluding beneficiaries who did not answer any of the patient activation questions from the original community sample of 11393, our final sample size was reduced to 9002 beneficiaries who answered at least one patient activation question. Among 9002 beneficiaries, 8981 had valid ADL stages and 8979 had valid IADL stages. The weighted percentage by ADL stages 0–IV were 76.2%, 14.5%, 5.4%, 3.6% and 0.2% respectively, and by IADL stages 0–IV were 70.2%, 17.1%, 6.1%, 6.0% and 0.5%, respectively (Appendix II). Individuals at higher ADL stages were more likely to be older, non-white, with lower education and less income, and were less likely to have a spouse. They tended to have a proxy respondent (for other survey sections), have vision or hearing impairment and cognitive impairment such as the Alzheimer's disease, depression and mental disorder, and have a greater number of other chronic conditions.

Table 2 displays two unadjusted models that show associations of self-care efficacy, patient-doctor communication and health information-seeking with ADL stages and IADL stages separately.

In the unadjusted model that assesses the association of ADL stages with three factors, the mean (or path loading) of all three factors decreases by stages. For instance, the level of self-care efficacy across ADL stages I–IV compared to stage 0 decreased significantly by 0.17, 0.29, 0.34, and 0.60, respectively, expressed in mean. Quality of patient-doctor communication also decreased almost monotonically with ADL stages compared to stage 0, by 0.08, 0.09, 0.14, and 0.35 across ADL stages I–IV. With respect to health information-seeking, significant decrements from stage 0 occurred at stage II and III, at 0.12 and 0.17, respectively. Although stage IV showed a large drop of mean from stage 0 at 0.37, the large standard error 0.23 rendered the result non-significant. Although a small sample size at ADL-IV may play a role, it also suggests that the group may be heterogeneous in their information-seeking behavior. In the IADL model, a similar pattern also surfaced, as self-care efficacy, and health information-seeking to a lesser extent, decreased with IADL stages, with larger decrements occurring at higher stages. The pattern was also found for patient-doctor communication across IADL I–III, but failed to show a significant association at IADL-IV.

Tables 3 and 4 show the fully adjusted models in separate ADL and IADL domains. In the ADL domains (table 3), self-care efficacy decreased with higher ADL stages (greater disability, older age, male gender, minority status, low income), vision and hearing impairments, Alzheimer's disease and depression, but increased with higher education levels. Similarly, but to a lesser extent, patient-doctor communication also decreased with higher ADL stages, hearing impairment, being male, non-Hispanic black race, low income, depression; but improved with higher education levels, living with a spouse, and a greater number of chronic conditions. Health information-seeking did not differ much across higher ADL stages (except stage IV) compared to stage 0. It was less common among males, Hispanics, and those with vision impairment, low income, and Alzheimer's disease; but was more frequent with higher education levels, living with a spouse, metropolitan residence,

and an increased number of chronic conditions. Mental disorders were not associated with any of these activation characteristics.

In the IADL domain, a similar story was told. Self-care efficacy and health information-seeking decreased with higher IADL stages. The quality of patient-doctor communication also declined across stages I–III. Similar associations of covariates with activation were found.

The model measures of association were comparable in both domains, where the amount of variance explaining patient-doctor communication was considerably lower than that accounting for the other two factors. For instance, in the adjusted model in the ADL domain, the effect size was 15% for self-care efficacy and 23% for health information-seeking, compared to 4% for patient-doctor communication.

Discussion

Driven by a population-based survey reflective of the U.S. Medicare population of those 65 years of age and older, our study assessed the associations of activity limitation stages with three patient activation characteristics: self-care efficacy, patient-doctor communication and health information-seeking. The confirmatory factor analysis showed weak correlations among the three latent factors, suggesting their distinctions. The study revealed negative associations between all three factors with greater activity limitation (higher ADL stages and IADL stages) in the unadjusted models. The adjusted models showed similar patterns of effect of functional impairments, with a few exceptions. We also identified important covariates associated with activation characteristics. Older age, male gender, racial or ethnic minorities, lower income, vision and hearing impairments, more chronic conditions, and cognitive and psychiatric impairments such as Alzheimer disease and depression, were all associated with lower self-care efficacy. Higher education was associated with increased self-care efficacy. Similar patterns were found for patient-doctor communication and information-seeking, with a few notable differences: the number of chronic conditions was associated with better quality of patient-doctor communication and more frequent health information-seeking, hearing impairment was negatively associated with communication, and vision impairment was negatively associated with information-seeking.

These findings suggest that older adults with more severe limitations in daily activities have lower self-efficacy in their own medical care, which is reasonable since self-care in health requires more complex physical coordination and cognitive ability than daily activities such as eating or walking. Since self-efficacy is likely an explanation for improved health status, ^{3,16} programs and services to improve self-care efficacy are crucial. The associations of limitation stages with patient activation highlights the importance of enhancing patient activation at lower functional stages and influenced by other modifiable factors in older adults to prevent further functional decline and decreased activation. Interventions to restore and augment self-efficacy after a temporary disabling event such as a major surgery may be warranted to achieve better recovery. A systematic review found that self-efficacy is associated with various post-stroke outcomes, including depression and impaired ADL function.³⁷ For instance, self-efficacy at hospital discharge is a strong predictor of ADL

performance 10 months post-stroke³⁸ and depression is inversely associated with self-care efficacy dimensions (coping, stress reduction and enjoying life) among stroke survivors.³⁹ Among older adults aged 70–79 years, self-efficacy relating to managing instrumental daily activities predicted declines in self-reported functional status.⁴⁰ Augmenting self-efficacy is also relevant to the cognitively impaired individuals. A study suggests that therapies that reintroduce control and self-efficacy through intrinsic motivation may offer psychological and neuropsychological benefits for newly diagnosed patients with mild and moderate Alzheimer's disease.⁴¹ Self-efficacy is negatively associated with caregiver burden among caregivers for Alzheimer's patients.^{42,43} We suggest that interventions targeting self-efficacy and behaviors be adapted to the literacy and cognitive levels of the participants and include the caregivers of the cognitively impaired elderly.

Building and maintaining positive patient-provider relationships and communication are shown to increase patient self-efficacy²⁴ and bolster patient treatment adherence.⁴⁴ Older adults at stage I, II, and III experienced similarly suboptimal patient-provider communication, whereas those at stage IV reported (self or proxy) a steep drop in patient-provider communication quality. Previous research revealed negative biases held by care providers about people with disabilities. Providers downplayed the importance of prevention care in the lives of those living with disabilities, thus failing to recommend these services to them.^{27,28} Older adults with mobility or sensory impairments compared to those without impairments were more likely to express dissatisfaction with their care, including their doctors' lack of thorough understanding of their condition, lack of thorough care, and inadequate patient-doctor communication (questions not fully addressed, incomplete discussion of health problems, and hurried consultation).⁴⁵ To increase providers' awareness of disability, redress their biased assumptions about people living with disabilities, and teach providers skills to overcome communication barriers would be important components in communication skills training and education. Interventions that incorporate self-report patient assessment and trainings that increase physician empathic statements and negotiations in patient interviews were shown to bolster the effectiveness of patient-doctor communication.⁴⁶

Not surprisingly, hearing impairment was also associated with inadequate patient-doctor communication. The hard-of-hearing and deaf patients reported concerns about patient safety jeopardized by ineffective communication, communication problems during physical examinations and procedures, difficulties interacting with office staff, and problems with telephone communication (e.g., lengthy message menus).⁴⁷ They recommended that clinicians' ask patients about their preferred communication approach, and request that patients repeat critical health information to reduce potentially harmful miscommunication.⁴⁷ Interventions to improve patient-doctor communication should especially focus on the disadvantaged sociodemographic groups, individuals with disability and sensory impairments, as well as those with depression. Design and implementation of physician training programs should engage persons with disabilities to improve physicians' understanding of patients' perceptions of their quality of life and build competencies in providing patient-centered care.⁴⁸

Those with a greater number of chronic diseases reported better quality of communication with their doctors. Multimorbidities were also associated with increased health information-seeking in our study, consistent with previous research.^{34,49} The latent factor of health information-seeking emphasizes seeking written information from the internet, newspapers, doctors, and medication labels. This may partially reflect one's health literacy skills.⁵⁰ Previous research found that patients with low health literacy experienced poor patient-provider communication in multiple domains such as general clarity, responsiveness to patient concerns, and explanation of processes of care.⁵¹ Presenting health information to physicians likely positively affected the patient-doctor relationship if physicians had good communication skills.³¹ Thus individuals with multimorbidities seek more health information, which may contribute to improved patient-doctor communication. Communication with severely disabled patients who are unable to communicate due to complete limitation (e.g., complete paralysis) yet with intact cognition is facilitated with medical devices to monitor sensory reaction such as eye blinking or sniffing.⁵² Communication with caregivers becomes crucial for patients with cognitive impairment such as dementia. Further improvement in care for patients who lack communication ability is beyond the scope of this paper.

Health information-seeking frequency did not show a graded decline at higher ADL stages. In both the unadjusted and adjusted models, mobility limitation (stage I) did not seem to affect seeking written health information. In contrast, there is a consistent decrease in seeking information with higher IADL stages. Compared to ADLs, IADLs are more complex tasks and involve greater cognitive processing (e.g., using the telephone and managing money). Greater cognitive impairment naturally affects one's ability to seek and comprehend information. Vision, but not hearing, impairment was also negatively associated with information-seeking, most likely because the survey questions focus on seeking written health information. Innovators may find more efficient interventions to provide health information for the visually impaired, including use of audio messages or interpersonal communication. Individuals with hearing impairment may seek health information to compensate for information deficits during patient-doctor encounters.

We found a negative association of depression with patient-doctor communication, yet those with depression seek information as often as those without depression, after controlling for other variables. Since depression is not primarily a cognitive disorder, individuals with depression may retain the capacity to identify healthcare needs and to seek information, which might explain why those with depression are as keen to find health information as those without. However, those with depression feel a substantial drop in the quality of their communication with doctors, possibly due to their mental health condition and physician attitudes toward caring for those with mental illness. The suboptimal communication with providers perceived by elderly persons with depression may stem from stigmatization of the disease. The deficits in communication is offset with health information seeking.⁵³ In contrast, elderly persons with Alzheimer's disease do not often seek health information likely due to their cognitive impairment.

Dissemination of health information may consider multi-channel interventions, through using graphics, audio messages, written texts, interpersonal communication and remote

communication to accommodate individuals with functional and sensory impairments. For individuals with cognitive impairment, imparting health information and teaching health management skills to their caregivers are recommended.⁵⁴

Strength and Limitations

Our study uses a nationally representative survey with routinely assessed ADL and IADL limitations, sociodemographics and medical conditions. The breadth of the data offers a unique opportunity to explore patient characteristics behind patient activation. Use of latent factors in structural equation models reduces measurement errors. In contrast to use of counts of ADL or IADL limitations^{55,56} that obscure the various types of disability, activity limitation stages convey information about severity of disability as well as the profile of specific activities that can still be performed. By assessing beneficiaries who responded to patient activation questions by self-report, the study was able to exclude beneficiaries who had severe cognitive impairment and were likely to give unreliable responses. In this study, activity limitation stages show a dose-response relationship with self-care efficacy, even after adjusting for covariates. The associations with patient-doctor communication and health information seeking are also in the expected directions. Our study has several limitations, which may point the way to future investigation. Our study is based on cross-sectional data; thus it does not suggest causality. Future studies may use longitudinal data to disentangle the causal relationship between patient activation characteristics and functional impairments and sociodemographic and medical characteristics. Due to a very small sample size at stage IV, we failed to detect a significant effect of it on patient activation. Health information-seeking in this context refers to seeking written information, rather than information from other sources (friends, family members or other social affiliates, or TV and radio). Our results should therefore be interpreted with these features of the available survey data in mind. Finally, our study only applies to non-institutionalized older adults, and excludes those living in long-term care facilities.

Conclusion

This study has explored three major factors in activating older adults' participation in their own care: self-care efficacy, patient-doctor communication, and health information-seeking, and their associations with activity limitation stages. Our study identified multiple opportunities to improve patient participation, including providing support for socioeconomically disadvantaged individuals, and those with physical and sensory impairments. Important stakeholders in the arena of health care, including patients, physicians, and care-givers, should be included in interventions and training programs to promote patient-centered care and to encourage patient participation in their own care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Weighted sample distribution of covariates by Activity of Daily Living (ADL) stages, vision impairment and hearing impairment among enrollees (years) of the 2009 MCBS (N=8981)

Variable	Class	Total (col%)	ADL Stage				P Value
			Stage 0	Stage I	Stage II	Stage III	Stage IV
Total sample weighted percent (raw size)		8981 (100)	6661 (76.2)	1410 (14.5)	525 (5.4)	363 (3.6)	22 (0.2)
Age	65–74	4002 (54.1)	3251 (58.3)	463 (40.6)	168 (41.3)	114 (38.9)	6 (32.6)
	75–84	3592 (34.2)	2602 (32.7)	621 (40.2)	213 (36.7)	146 (36.5)	10 (42.3)
	85	1387 (11.7)	808 (8.9)	326 (19.2)	144 (22.0)	103 (24.6)	6 (25.1)
Sex	Female	5187 (57.8)	3681 (55.6)	894 (63.9)	357 (67.6)	243 (67.3)	12 (52.6)
	Male	3794 (42.2)	2980 (44.4)	516 (36.1)	168 (32.4)	120 (32.7)	10 (47.4)
Race/Ethnicity	NH white	7273 (81.2)	5482 (82.6)	1104 (77.6)	402 (76.4)	269 (72.7)	16 (71.0)
	NH black	694 (7.5)	473 (6.9)	128 (8.8)	58 (11.0)	34 (9.2)	1 (5.0)
	Hispanic	652 (7.3)	470 (7.0)	94 (6.9)	42 (9.0)	44 (12.8)	2 (8.0)
	other	338 (4.0)	218 (3.4)	82 (6.7)	19 (3.5)	16 (5.3)	3 (16.0)
Education	< HS	2043 (20.8)	1330 (18.0)	406 (27.5)	175 (32.6)	126 (33.6)	6 (26.4)
	HS	2675 (29.5)	1980 (29.4)	451 (32.0)	134 (25.0)	103 (28.1)	7 (34.4)
	Some college	2415 (27.8)	1855 (28.6)	345 (25.5)	136 (27.7)	75 (22.0)	4 (22.6)
	University	1825 (21.9)	1481 (24.0)	204 (15.0)	77 (14.8)	59 (16.3)	4 (16.7)
		495 (5.1)	288 (4.0)	115 (7.9)	41 (7.0)	46 (12.4)	5 (25.1)
		418 (4.2)	210 (2.7)	98 (6.9)	63 (11.7)	40 (10.4)	7 (30.9)
Hearing Impairment		3110 (32.7)	2209 (31.4)	542 (36.4)	211 (37.4)	138 (36.8)	10 (45.3)
Vision Impairment	Alone	4616 (53.8)	3643 (56.9)	618 (45.6)	197 (40.6)	151 (43.3)	7 (35.3)
Living Arrangement	Spouse	813 (8.6)	518 (7.5)	164 (11.7)	79 (14.1)	49 (12.9)	3 (10.7)
	Children	442 (4.8)	291 (4.2)	86 (6.4)	38 (7.9)	25 (6.9)	2 (8.7)
	Other	6674 (76.8)	4940 (77.0)	1075 (77.9)	383 (73.8)	258 (72.0)	18 (82.8)
Metropolitan		3544 (39.7)	2355 (35.4)	668 (50.3)	295 (57.6)	211 (61.0)	15 (76.9)
Income <25K		167 (1.8)	104 (1.6)	26 (1.9)	16 (2.7)	17 (4.2)	4 (16.0)
Proxy		109 (1.1)	60 (0.8)	20 (1.2)	15 (2.5)	13 (3.4)	1 (3.5)
Alzheimer's		1620 (17.7)	966 (14.3)	339 (24.7)	189 (36.6)	114 (32.1)	12 (56.7)
Depression		208 (2.5)	132 (2.2)	30 (2.5)	28 (5.6)	15 (4.2)	3 (15.3)
Mental disorder							

Variable	Class	Total (col%)	ADL Stage					P Value
			Stage 0	Stage I	Stage II	Stage III	Stage IV	
Number of other conditions	Mean (SE)	2.37 (0.02)	2.13 (0.02)	3.05 (0.04)	3.27 (0.08)	3.21 (0.08)	3.66 (0.44)	<.0001

Note. Covariate distribution by IADL stage is similar to ADL stage and is not listed. Other conditions include arthritis, hypertension, myocardial infarction, chronic heart diseases, stroke, cancer, osteoporosis, chronic obstructive pulmonary disease (COPD), Parkinson's, and diabetes.

Table 2

Association of patient activation characteristics with ADL stages and IADL stages, respectively, in unadjusted latent factor models among MCBS beneficiaries aged 65 and older enrolled in the 2009 MCBS

	Patient Activation		
	Self-care efficacy	Patient-doctor communication	Health information seeking
Model 1: ADL stages (ref=ADL-0)			
ADL-I	-0.17 (0.02) ***	-0.08 (0.02) ***	-0.04 (0.03)
ADL-II	-0.29 (0.03) ***	-0.09 (0.03) **	-0.12 (0.05) **
ADL-III	-0.34 (0.04) ***	-0.14 (0.04) ***	-0.17 (0.05) ***
ADL-IV	-0.60 (0.20) **	-0.35 (0.15) *	-0.37 (0.23)
Model 2: IADL stages (ref=IADL-0)			
IADL-I	-0.12 (0.02) ***	-0.07 (0.02) ***	-0.01 (0.03)
IADL-II	-0.31 (0.03) ***	-0.13 (0.03) ***	-0.20(0.04) ***
IADL-III	-0.39 (0.03) ***	-0.16 (0.03) ***	-0.27 (0.04) ***
IADL-IV	-0.88 (0.12) ***	-0.13 (0.10)	-0.59 (0.15) ***

Note.

 $p < .001$,

**
 $p < .01$,

*
 $p < .05$. Sample size for model 1 is N=8981; sample size for model 2 is 8979.

Table 3Association of patient activation with Activity of Daily Living (ADL) stages in the adjusted latent factor model ($N = 8258$)

Patient characteristics	Patient Activation		
	Self-care efficacy ($R^2 = 15\%$)	Patient-doctor communication ($R^2 = 4\%$)	Health information seeking ($R^2 = 23\%$)
ADL stages (ref= ADL-0)			
ADL-I	-0.08 (0.02) ***	-0.06 (0.02) **	-0.01 (0.03)
ADL-II	-0.17 (0.03) ***	-0.06 (0.03) *	-0.05 (0.05)
ADL-III	-0.20 (0.04) ***	-0.09 (0.04) *	-0.11 (0.05) *
ADL-IV	-0.47 (0.20) *	-0.37 (0.15) *	-0.38 (0.25)
Vision impairment	-0.07 (0.03) *	-0.06 (0.03)	-0.25 (0.05) ***
Hearing impairment	-0.10 (0.03) **	-0.07 (0.03) *	-0.02 (0.05)
Age (ref=65-74)			
75-84	-0.06 (0.01) ***	-0.01 (0.01)	0.06 (0.02) **
85	-0.13 (0.02) ***	-0.001 (0.02)	-0.02 (0.03)
Gender (ref=female)			
Male	-0.07 (0.01) ***	-0.07 (0.01) ***	-0.36 (0.02) ***
Race and ethnicity (ref= non-Hispanic whites)			
Non-Hispanic Black	-0.07 (0.03) **	-0.06 (0.03) *	-0.06 (0.04)
Hispanic	-0.10 (0.03) ***	-0.04 (0.03)	-0.14 (0.04) **
Non-Hispanic other	-0.07 (0.04)	-0.04 (0.03)	-0.05 (0.05)
Education (ref=less than high school)			
High school	0.11 (0.02) ***	0.08 (0.02) ***	0.30 (0.03) ***
Some college	0.22 (0.02) ***	0.08 (0.02) ***	0.49 (0.03) ***
University degree	0.24 (0.02) ***	0.11 (0.02) ***	0.61 (0.04) ***
Living arrangement (ref=alone)			
With spouse	0.02 (0.02)	0.04 (0.02) *	0.11 (0.03) ***
With children	-0.04 (0.03)	-0.01 (0.03)	-0.13 (0.04) **
With others	-0.05 (0.03)	-0.03 (0.03)	-0.09 (0.05)
Income (ref= \$25k and above)	-0.05 (0.02) **	-0.06 (0.02) **	-0.09 (0.03) **
Metropolitan residence (ref=rural)	-0.002 (0.02)	-0.000 (0.02)	0.10 (0.02) ***
Proxy (ref=no)	-0.08 (0.06)	-0.02 (0.05)	0.000 (0.08)
Number of Chronic conditions	-0.01 (0.005)	0.01 (0.005) *	0.06 (0.01) ***

Patient characteristics	Patient Activation		
	Self-care efficacy (R ² = 15%)	Patient-doctor communication (R ² = 4%)	Health information seeking (R ² = 23%)
Alzheimer (ref=no)	−0.39 (0.09)***	−0.07 (0.07)	−0.34 (0.12)**
Depression (ref=no)	−0.10 (0.02)***	−0.06 (0.02)**	0.02 (0.03)
Mental disorder (ref=no)	−0.004 (0.05)	−0.04 (0.04)	0.10 (0.07)

Note.

*** $p < .001$,
** $p < .01$,
* $p < .05$.

Table 4

Association of patient activation with Instrumental Activity of Daily Living (IADL) stages in the adjusted latent factor model ($N=8256$)

Patient Characteristics	Patient Activation		
	Self-care efficacy ($R^2 = 16\%$)	Patient-doctor communication ($R^2 = 4\%$)	Health information seeking ($R^2 = 23\%$)
IADL stages (ref= IADL-0)			
IADL-I	-0.06 (0.02) **	-0.06 (0.02) **	-0.03 (0.03)
IADL-II	-0.22 (0.03) ***	-0.10 (0.03) ***	-0.20 (0.04) ***
IADL-III	-0.23 (0.03) ***	-0.11 (0.03) ***	-0.18 (0.05) ***
IADL-IV	-0.68 (0.11) ***	-0.09 (0.11)	-0.59 (0.15) ***
Vision impairment (ref= no)	-0.05 (0.03)	-0.06(0.03)	-0.22 (0.05) ***
Hearing impairment (ref=no)	-0.07 (0.03) *	-0.06 (0.03)	0.05 (0.05)
Age (ref=65-74)			
75-84	-0.06 (0.01) ***	0.02 (0.01)	0.07 (0.02) **
85	-0.12 (0.02) ***	-0.01 (0.02)	0.01 (0.03)
Gender (ref=female)			
Male	-0.08 (0.01) ***	-0.07 (0.01) ***	-0.36 (0.02) ***
Race and ethnicity (ref= non-Hispanic whites)			
Non-Hispanic Black	-0.07 (0.03) *	-0.06 (0.03) *	-0.05 (0.04)
Hispanic	-0.10 (0.03) **	-0.03 (0.03)	-0.13 (0.04) **
Non-Hispanic other	-0.07 (0.04)	-0.04 (0.04)	-0.05 (0.05)
Education (ref=less than high school)			
High school	0.11 (0.02) ***	0.08 (0.02) ***	0.29 (0.03) ***
Some college	0.21 (0.02) ***	0.08 (0.02) ***	0.48 (0.03) ***
University degree	0.23 (0.02) ***	0.11 (0.02) ***	0.60 (0.04) ***
Living arrangement (ref=alone)			
With spouse	0.03 (0.02)	0.04 (0.02) *	0.12 (0.03) ***
With children	-0.03 (0.03)	-0.003 (0.03)	-0.11 (0.04) **
With others	-0.04 (0.03)	-0.03 (0.03)	-0.08 (0.05)
Proxy (ref=no)	-0.05 (0.06)	-0.02 (0.05)	0.02 (0.08)
Income (ref= \$25k and above)	-0.05 (0.02) **	-0.06 (0.02) ***	-0.08 (0.03) **
Metropolitan residence (ref=rural)	-0.01 (0.01)	-0.001 (0.02)	0.10 (0.02) ***
Number of Chronic conditions	-0.01 (0.01)	0.01 (0.005) **	0.07 (0.01) ***

Patient Characteristics	Patient Activation		
	Self-care efficacy (R ² = 16%)	Patient-doctor communication (R ² = 4%)	Health information seeking (R ² = 23%)
Alzheimer (ref=no)	−0.30 (0.09)***	−0.05 (0.07)	−0.27 (0.12)*
Depression (ref=no)	−0.09 (0.02)***	−0.06 (0.02)**	0.03 (0.03)
Mental disorder (ref=no)	0.01 (0.05)	−0.04 (0.04)	0.11 (0.07)

Note.

*** $p < .001$,
** $p < .01$,
* $p < .05$.