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2nd Place: Patient Activation Among Diverse Populations: A Systematic Review (Final Research Paper)

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2nd Place: Patient Activation Among Diverse Populations: A Systematic Review (Final Research Paper)

Comments

Megan Kenney won Second Place in the 2016-2017 Kevin and Tam Ross Undergraduate Research Prize for her essay about patient activation (a measure of an individual's knowledge, skill, and confidence in managing his or her own health and health care) among diverse populations. This essay is the original scholarship that emerged from that research.

Patient Activation Among Diverse Populations:
A Systematic Review

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ABSTRACT

The purpose of this article was to review the current research regarding patient activation among diverse populations. Patient activation is defined as an individual's knowledge, skill, and confidence in managing his or her own health and health care. A total of 62 articles were used in this review (54 primary research articles, six retrospective analyses, and two systematic reviews). Articles were obtained using the EBSCO search engine through the Leatherby Libraries at Chapman University. Preliminary and secondary searches were conducted using the keywords "patient activation." Only articles published within the last ten years (2007 to 2017) were included to ensure the most current data was examined. Two landmark studies from 2004 and 2005 were included as well. All articles were required to meet the relevance of the paper: an overview of patient activation among diverse populations. Additional articles related to the patient activation measure as well as the theory, outcomes, and interventions of patient activation were included. The selected articles presented data from normal, low socioeconomic status and minority, older adult, chronically ill, obese, diabetic, HIV-infected, mentally ill, neurological, orthopedic surgical, hospitalized, clinical, and parental populations. Patient activation was significantly associated with a wide range of positive health outcomes and clinical markers. Higher patient activation scores were related to lower healthcare costs, beneficial health behaviors, and improved confidence in health management. Emphasizing patient activation bodes a more sustainable future health care system.

INTRODUCTION

The average US citizen spends $316,000 in healthcare expenses over their lifetime (1). Healthcare encompasses a vast field of producers and providers whose sole purpose is managing the health of the greater community. Despite advancements in healthcare over the past century, trends regarding disease in the US today are bleak. In 2012 around 50% of the adult population (117 million people) in the US suffered from one or more chronic health conditions (2). Chronic diseases now account for seven of the top ten causes of mortality (3). These statistics, and many others, present the somber truth that the current healthcare system is not functioning properly.

In 2012, with the passage of the Affordable Care Act (ACA), more than 30 million previously uninsured US residents received access to insurance coverage (4). The goal of the ACA was to increase access, reduce disparities, and promote higher quality of care for all US residents (4). Instead of incentivizing clinicians to see as many patients as possible, the ACA instituted a "value-based payment" system for Medicare (5). This tied quality and efficiency of care to the fee-for-service payments (5). Since the passage of the ACA the rate of hospital acquired conditions has decreased by 17% (5). Concurrently the Congressional Budget Office projects Medicare to spend $160 billion (20%) less in 2019 (6). Improving quality of care resulted in better health outcomes and reduced costs (5). The ACA is just one example of healthcare reform seeking to amend flaws in the current system.

Improving quality of care shifts the focus of the current healthcare system from disease-oriented to prevention-oriented (7). Promoting prevention long term bodes a more sustainable healthcare system in which outcomes are improved and cost is reduced. Preventative medicine focuses on promoting health, preventing disease, and managing the health of specific populations

(8). Preventative practices encourage the consumer to manage their own health rather than rely on external supports such as medication, clinicians, or treatment.

Patient Activation refers to a consumer's engagement with their personal health. The social cognitive theory of health explains that the first step in creating any positive change is knowledge (7). If knowledge is lacking, one is simply not able to recognize what is beneficial or detrimental to their well-being. Knowledge is the catalyst for change, but change is not made possible without a certain degree of self-efficacy. The concept of patient activation focuses on promoting health through increased knowledge, skill, and self-efficacy of the consumer.

Purpose

The purpose of this review was to present the current research regarding patient activation. Patient activation has been studied in numerous populations. This article serves to organize the evidence-based findings into respective populations. Patient activation is relevant to both clinicians and consumers. Thus the goal of studying patient activation is to inform both parties of the benefits that higher activation produces. The decrease cost and improved outcomes that result with increased patient activation further the effort to create a more sustainable health care system (9).

BACKGROUND

Patient activation is defined as an individual's knowledge, skill, and confidence in managing his or her own health and health care (10). The extent to which the consumer recognizes the responsibility of managing his or her own health and health care, and the degree to which they feel competent are critical aspects of patient engagement (11).

First, in accord with the social cognitive theory of health, patient activation relies on the availability, administration, or active seeking of health-based knowledge. Increased patient activation is associated with attaining health information (12). Consumers with higher patient activation scores are thus twice as likely to access online health information (13). Patients with higher activation levels are also more likely to ask questions in medical encounters, as well as seek out communication with their doctor outside of the office (10), (14). The use of health information starts the casual pathway to changes in health behavior (12).

Second, the necessary skill set for patient activation may be specific to the complexity of a condition. Shared-decision making, however, is a more universal skill that is frequently studied alongside patient activation. The execution of shared-decision making rests on the clinician presenting the full spectrum of evidence-based treatment options and allowing the patient to make a decision based on personal preference (15). Higher decision self-efficacy (as measured by the Decision Self-Efficacy Scale) has been associated with higher patient activation (16). Incorporating decision aids into patient activation interventions increased outcome patient activation scores (15).

Third, patient activation requires a degree of confidence, or self-efficacy. Consumers with the highest patient activation report increased feelings of being capable and confident, whereas consumers with the lowest patient activation report feelings of being overwhelmed (11). Confidence, as described by the social cognitive theory of health, is the foundation of motivation (7). Motivation begets change in behavior, which is the primary goal of patient activation (7). All three pillars of patient activation: knowledge, skill, and confidence are required for optimal activation of the health consumer.

The Patient Activation Measure (PAM)

Hibbard and colleagues (2004) developed a quantitative measure of patient activation

called the Patient Activation Measure (PAM). The developmental process of the PAM was

comprised of four stages: conceptualizing activation, preliminary scale development, extension

and refinement of the PAM, and national scale testing (18). Hibbard and colleagues created

statements regarding knowledge, skill, and confidence in health and health care. The Rasch

model was used to construct an interval-level, unidimensional, Guttman-like scale from the rated

responses of the preliminary statements. The five possible responses to each statement are:

strongly disagree, disagree, agree, strongly agree, or not applicable. The location of an individual

on the scale indicates how activated they are. The final 22-item PAM is shown below in Table 1.

The scale is divided into four levels of patient activation: Level 1- believing an active role is

important; Level 2- having confidence and knowledge to take action; Level 3- taking action to

maintain or improve health; and Level 4- continuing health behaviors under stress. The

progression of the scale indicates the developmental nature of patient activation. Final validation

of the PAM, based on a US national probability sample (n= 1,515), found the 22-item PAM to be

a valid and reliable instrument for measuring patient activation (18).

Table 1. The 22-Item Patient Activation Measure (Hibbard 2004)

Believes Active Role Important	
1	When all is said and done, I am the person who is responsible for managing my health condition
2	Taking an active role in my own health care is the most important factor in determining my health and ability to function
Confidence and Knowledge to Take Action	
3	I know what each of my prescribed medications do
4	I am confident I can tell my health care provider concerns I have even when he or she does not ask
5	I am confident that I can tell when I need to go get medical care and when I can handle a health problem myself
6	I know the lifestyle changes like diet and exercise that are recommended for my health condition
7	I am confident that I can follow through on medical treatments I need to do at home
8	I am confident that I can take actions that will help prevent or minimize some symptoms or

	problems associated with my health condition
9	I am confident that I can find trustworthy sources of information about my health condition and my health choices
10	I am confident that I can follow through on medical recommendations my health care provider makes, such as changing my diet or doing regular exercise
11	I understand the nature and causes of my health condition(s)
12	I know the different medical treatment options available for my health condition
Taking Action	
13	I have been able to maintain the lifestyle changes for my health that I have made
14	I know how to prevent further problems with my health condition
15	I know about the self-treatments for my health condition
16	I have made changes in my lifestyle like diet and exercise that are recommended for my health condition
17	I am confident I can figure out solutions when new situations or problems arise with my health condition
18	I am able to handle symptoms of my health condition on my own at home
Staying the Course under Stress	
19	I am confident that I can maintain lifestyle changes like diet and exercise even during times of stress
20	I am able to handle problems of my health condition on my on at home
21	I am confident I can keep my health problems from interfering with the things I want to do
22	Maintaining the lifestyle changes that are recommended for my heath condition is too hard to do on a daily basis

In 2005, Hibbard and colleagues created a shortened form of the 22-item PAM in an effort to make administration easier in clinical settings (10). The 13-item PAM is shown below in Table 2. A Rasch analysis was utilized to identify items that could be excluded without loss of precision and reliability (10). The same data used in validation of the 22-item PAM was again used in the formation of the 13-item PAM. A data analysis found the shortened PAM to be reliable and valid (10).

Table 2. The 13-Item Patient Activation Measure (Hibbard 2005)

1	When all is said and done, I am the person who is responsible for managing my health condition
2	Taking an active role in my own health care is the most important factor in determining my health and ability to function
3	I am confident that I can take actions that will help prevent or minimize some symptoms or problems associated with my health condition
4	I know what each of my prescribed medications do
5	I am confident that I can tell when I need to go get medical care and when I can handle a health problem myself
6	I am confident I can tell my health care provider concerns I have even when he or she does not ask

7	I am confident that I can follow through on medical treatments I need to do at home
8	I understand the nature and causes of my health condition(s)
9	I know the different medical treatment options available for my health condition
10	I have been able to maintain the lifestyle changes for my health that I have made
11	I know how to prevent further problems with my health condition
12	I am confident I can figure out solutions when new situations or problems arise with my health condition
13	I am confident that I can maintain lifestyle changes like diet and exercise even during times of stress

Since its inception, both forms of the PAM have been translated and tested in the Netherlands (19), Germany (20)(21), Italy (22), Denmark (23), and Singapore (24). Results on the validity of the PAM are mixed within countries. Further research is needed to test proposed adjustments. The PAM has also been tested in a variety of populations: mental health (25), clinicians (26), those living in rural areas (27), those with neurological conditions (28), hospitalized patients (29), parents of children in pediatric care (30), those undergoing lumbar spine surgery (31), and multimorbid older adults (32).

Effect of Patient Activation on Outcomes

The current research upholds that patient activation is associated with beneficial health behavior and improved outcomes. In a study done by Greene and Hibbard (2012), patients with higher levels of activation were less likely to smoke or have a high BMI, and more likely to have received preventative care (33). Higher levels of patient activation have also been associated with regular exercise, following a low fat diet, increased consumption of fruits and vegetables, and readiness to change (18), (34). Patient activation is associated with increased likelihood to receive preventative screenings, such as pap smears and mammography for women (9). Higher patient activation is also associated with decreased hospitalization and emergency department use (9), (35). Patient activation can be used as a predictor for future health behavior and potential outcomes (12).

Effect of Patient Activation on Cost

Patient activation is also associated with lower healthcare costs (36). Greene and colleagues (2015) found that those at higher patient activation levels of three and four had projected medical costs (inpatient and outpatient care, emergency department, and pharmacy costs) 8% lower than those at level one and 13% lower than those at level two (9). Being aware of a patient's activation level can prove useful to clinicians for predicting cost of care (36).

Patient Activation Interventions

It is clear that patient activation has important health implications and introduces the need for successful intervention strategies. Thus a variety of patient activation interventions (PAIs) have been developed and tested. The goal of a successful PAI is to increase a patient's knowledge, skill, and confidence in healthcare. Research showed that tailoring PAIs to subjects' baseline patient activation level produced higher gains in their activation scores, along with improved clinical indicators and decline in inpatient and emergency department use (37). Patient activation interventions have been adapted and shown to increase patient activation in a variety of populations including those of low socioeconomic status (SES) (15), those with chronic conditions (38), and those undergoing mental health treatment (39). Alegría et al (2008) found that participants from a mental health clinic selected for a PAI were 29% more likely to attend treatment appointments in the future than the control group (40). Those with the lowest baseline PAM scores showed the greatest increases in activation after an intervention (41). Interventions that utilize web-based software have also been proven effective in increasing patient activation levels (42). In a study by Lorig et al (2010), participants with diabetes undergoing an online diabetes self-management intervention showed improved HbA1c, patient activation, and self-efficacy after six months (43).

METHODS

A total of 62 articles were used in this review. Articles were obtained using the EBSCO Search Engine through the Leatherby Libraries at Chapman University. A preliminary search using the keywords "patient activation" was first performed. Articles were selected that met inclusion criteria and fit the relevance of the paper. A total of 32 articles were obtained from the EBSCO search engine. A secondary search was done in which the references of the preliminary articles were searched using the keyword "activation." Referenced articles that contained the keyword, and met inclusion criteria and relevance of the paper were included. The relevance of the study was an overview of patient activation among diverse populations. To control this, utilization of a unified measurement system, the PAM, was required of all primary research articles. Two articles, however, were included for background purposes that measured outcomes after a patient activation intervention. Additional articles related to the PAM as well as the theory, outcomes, and interventions of patient activation were included as well. Only articles published within the last ten years (2007 to 2017) were included to ensure the most up to date data was analyzed. Two landmark studies from 2004 and 2005 were included. Country of publication, age, or population was not restricted. A total of 54 primary research articles, six retrospective analyses, and two systematic reviews were included.

RESULTS

Normal Populations

Patient activation has been measured in larger populations without respect to illness. A study done by Hibbard and Cunningham in 2007 assessed the national patient activation trends of adults over 18 in the US. The study found that 41.4% were in level 4, 37.2% were in level 3,

14.6% were in level 2, and 6.8% were in level 1 (44). A graph of the distribution is shown below

in Figure 2. A more recent study conducted in 2011 found comparable values for each of the

levels (level 4- 46%, level 3- 33%, level 2- 14%, level 1- 7%) (33). Fowles et al. (2009) found

that higher levels of patient activation were associated with higher education, greater family

income, and those who were married. Employees with higher-ranking professional jobs and

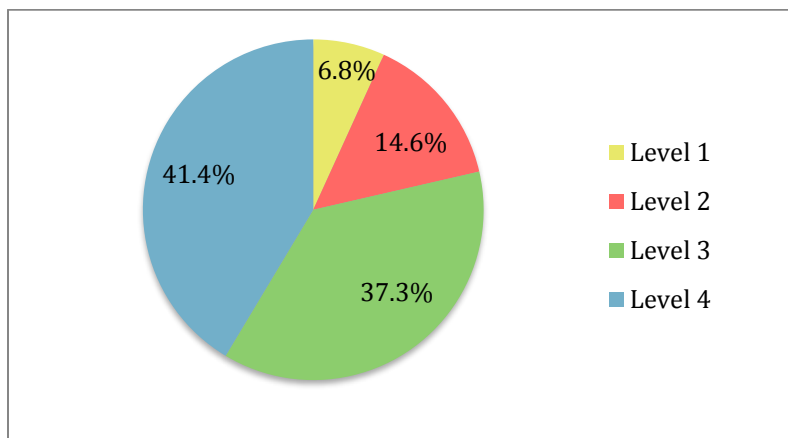greater job satisfaction also had higher patient activation levels (34).

Figure 2. Distribution of patient activation levels among US adults (Hibbard 2008)

Low Socioeconomic Classes and Minorities

Research has shown that patient activation is associated with demographics (45). Hibbard

et al. (2008) sought to quantify the racial and ethnic disparities of patient activation in three

large-scale, representative populations (n=2,224, n=1,515, n=801). Respondents of non-Hispanic

white ethnicity scored four points higher than those of African American ethnicity on the PAM

(45). Social environmental factors, such as trust in physician, work climate, and social climate,

were all associated with higher patient activation (45). Various beneficial health outcomes were

also significantly related to patient activation (45). The researchers stimulated the effect of

removing the racial disparity by giving African Americans four additional PAM points. The

resulting data represented the potential for improvement in health and behavior of those disadvantaged populations.

Health centers offer primary health care services to patients in areas were cultural or economic barriers otherwise limit access to healthcare, and are therefore useful for studying patient activation in low SES populations (46). Patients of health center settings showed lower levels of patient activation when compared to the US population (46). However, patients in these settings seemed to respond well to PAIs. Patients receiving a communication activation intervention in a health center setting showed greater patient-provider communication in a dose-response relationship (47). Patient activation interventions have a greater effect on those starting at lower levels of patient activation in low SES populations (48). Even more so, PAIs combined with decision aids, showed the greatest improvements in PAM scores (15).

In Spanish-speaking populations a greater emphasis is placed on communication skills to facilitate patient activation. Patient activation interventions were shown to increase PAM scores as well as decision self-efficacy (DSE) scores in Spanish-speaking patients (16). Additionally, PAIs were most effective for those who lacked question-asking skills or needed encouragement to ask questions (16). DeCamp et al. (2016) examined the parent-patient activation measure (P-PAM) scores of both Spanish and English speaking patients and found that Spanish-speaking parents scores were on average 10 points lower (30). Demographics should be taken into account when tailoring PAIs to meet the needs of the individual.

Older Adults

Older adults are faced with challenges of adapting to modern healthcare policy and expectations of more active participation in their care (49). The aging population requires far more healthcare services, with nearly half of lifetime healthcare expenditure being incurred after

the age of 65 (1). Lower patient activation is associated with older age, decreased health-related quality of life, difficulties with activities of daily living (ADLs) and instrumental activities of daily living (IADLs), and depression in older adults (over 65 years old) (50) (51). Higher levels of patient activation have been associated with higher functional status, health care quality, and adherence to select health behaviors (32). Subjects age 85 and older had two times the odds of decreasing in PAM score after a one-year follow-up than younger subjects (52). Similarly in older adults, having poorer baseline health was associated with decreased PAM scores (52). Patient activation scores were not found to be a significant predictor of hospitalization or emergency department use in a population of chronically ill older adults, however functional dependency was (49). This presents the potential disconnect between patient activation and those with functional dependency. The PAM has been tested and remained reliable and valid for the older adult population (32).

Chronic Conditions

In 2012 approximately 50% of the adult population (117 million people) in the US suffered from one or more chronic health conditions (2). Increased patient activation levels in the chronically ill are associated with changes in health behaviors (38). PAM scores were significantly associated with self-management services, self-management behavior, medication adherence, satisfaction of care, quality of life, and functional status in the chronically ill (53). In a study done by Hibbard et al. (2015), increases in PAM scores over four years in subjects with chronic conditions were associated with improved medical adherence, self-management, health behavior, functional health, and decreased emergency department visits (54). Patients with chronic diseases in patient activation levels 1 and 2 required more frequent visits at primary care

settings (55). Although in patients with chronic kidney disease, patient activation was not associated with progression of the disease (from stage 1 to 5) (56).

Chronic health condition management is influenced by level of patient activation (57). Patients with chronic conditions who stated that their self-management embodied "compliance" had lower PAM scores whereas patients who reported that their management embodied "being in control" had higher PAM scores (57). The obstacles to higher levels of patient activation were lack of knowledge and confidence (57). Patient activation interventions aimed at addressing these factors have been successful in those with chronic conditions in increasing PAM score (38).

Obese Populations

More than one third of adults in the US (78 million people) are obese as indicated by a body mass index of greater than 30 kg/m^2 (3). Obesity is a chronic condition that is heavily influenced by environmental and lifestyle factors. The estimated medical cost of obesity has risen to approximately $147 billion per year (58). A study conducted by AuYoung (2016) on obese subjects found that higher patient activation was associated with increased fruit and vegetable consumption, but not associated with physical activity (59). More research needs to be conducted on the effects of PAIs in obese populations. Obesity is a reversible chronic condition that leads to secondary health risks such as diabetes, heart disease, and stroke. Given the previous data on the associations between patient activation and beneficial health behaviors, PAIs should prove useful to obese populations in managing their health.

Diabetic Populations

Diabetes is the leading cause of adult blindness, kidney failure, and lower limb amputation (other than those caused by injury) (3). Diabetes management and health outcomes

are significantly associated with patient activation (60). Those with higher activation levels were less likely to progress from normal to pre-diabetes, and from pre-diabetes to diabetes (61). Baseline patient activation is associated with better systolic blood pressure, diastolic blood pressure, high density lipoproteins (HDL), low density lipoproteins (LDL), and triglycerides (TG) at three years follow-up (61). At two years follow-up patient activation was associated with HbA1c and LDL testing, and HbA1c control (60). Those with higher levels of activation were more likely to perform feet checks, receive eye exams, and exercise regularly (62). High patient activation was overall associated with less difficulty in managing diabetes (62).

Interventions designed to increase patient activation levels in diabetes patients have also been successful. Such interventions reduced HbA1c, systolic blood pressure, body weight and LDL (63). An online intervention resulted in better HbA1c, increased physical activity, and increased self-efficacy (43).

HIV-Infected Populations

More than 1.2 million people in the US are living with HIV (64). HIV is a manageable, chronic disease that responds to most treatments available. In a study done on HIV infected patients, higher patient activation was associated with increased viral suppression and greater antiretroviral adherence (likely a cause and effect relationship) (65). Increased patient activation was also associated with an increase in the odds of having a CD4 cell count greater than 20 cells/ml (65). Subjects with HIV showed improved health management behavior with increased patient activation levels.

Mental Health Populations

Managing mental illness, like other chronic health concerns, requires active participation of the health consumer. Severe depression is associated with lower levels of activation, younger

age, and higher retrospective risk scores (66). However, higher baseline PAM scores were associated with reduction in Personal Health Questionare-9 (a measure of depressive disorders) score, increased remission, and better response to treatment at one year follow-up (66).

Mental health populations respond to PAIs with significant improvements in PAM score (39). Interventions aimed at mental health populations increased PAM scores and feelings of empowerment (40). After attending PAIs patients were 29% more likely to attend subsequent appointments (40). In a study done by Goldberg et al. (2013), those with mental illness who received a PAI had higher mean scores of patient activation and self-management tools for medical illness (67). The PAM has been tested and maintains reliability and validity in mental health populations (25). Maintaining high levels of patient activation in mental illness populations, especially in those with depression where feelings of hopelessness persist, is useful for better self-management and treatment compliance.

Neurological Populations

Neurological disorders, whether genetic or caused by injury, are characteristically different from most chronic conditions. Lifestyle changes in those with neurological disorders most often have minimal impact on patient symptoms (28). Medication and treatment compliance has been shown to reduce symptoms in some patients. Thus motivating patients in this population to adhere to treatment protocols is imperative to their well-being. In patients with multiple sclerosis patient activation was positively correlated with self-efficacy and quality of life (68). Packer et al. (2015) confirmed that the PAM is internally reliable and valid for use in neurological populations (28).

Orthopedic Surgical Populations

Patient activation is a valuable tool for patients that require an active role in recovery. In patients undergoing total joint arthroscopy, higher levels of baseline patient activation were associated with greater pain relief, satisfaction, and improved activity after surgery (69). In patients undergoing lumbar spine surgery increased baseline patient activation was associated with increased participation and engagement in physical therapy post surgery (70). Lower levels of patient activation were associated with low self-efficacy, decreased hope, and external locus of control (70). The PAM also remained reliable and valid when tested on the individuals undergoing lumbar spine surgery (31). PAM scores can be used to predict patient participation post surgery, and can therefore be useful to clinicians. Future research should be done to test whether PAIs are more effective pre or post surgery.

Hospitalized Populations

Patient activation levels can also be used to predict hospitalization. In a study done by Begum et al. (2011), patients that scored within level 1 were 1.4 times more likely to be hospitalized and 1.3 times more likely to have visited the emergency department than level 4 patients (35). Patients with unplanned hospital admissions possessed lower levels of activation than those with planned hospitalizations (29). Mitchell et al. (2014) sought to explore the association between patient activation and 30-day post discharge hospital utilization (71). The study showed a dose effect of patient activation on hospital utilization. Patients who scored in PAM level 1 had a 2.27 times increased likelihood of reutilization, level 2 had a 1.78 times increased likelihood, and level 3 had a 1.42 times increased likelihood (71). The PAM has also been proven to be a valid and reliable measure in hospitalized patients (29).

Clinicians

Understanding a patient's PAM score can prove extremely useful to clinicians (10). Hibbard et al. (2010) created a derivation of the original PAM for clinicians, the Clinician Support for Patient Activation Measure (CS-PAM) using a Rasch analysis that was proven reliable and valid (26). The CS-PAM measures the clinician's level of endorsement and belief about the importance of patient self-management. Clinicians' scores were positively correlated with use of self-management support tools and strategies to change patient behavior (72). Female primary care providers tended to have CS-PAM scores that were on average 5 points higher than male providers (72). However, there is a disconnect in current clinician beliefs and the theory of patient activation. Clinicians are less likely to promote patients making independent judgments and actions, functioning as members of a health care team, and seeking health information (26).

In regards to patients' perceptions of physicians, patients who experienced quality personal exchanges with their physicians had higher reported PAM scores (14). In addition, patients who felt that they were being treated fairly and respectfully also reported higher PAM scores (14). Clinicians play an integral role in the activation of patients. They are responsible for providing information, teaching skills, and bolstering confidence in their patients. It is important that clinicians understand their role in promoting patient self-efficacy in health management (26).

Parental Populations

Children rely on their parent's knowledge, skill, and confidence to manage their health. Measuring a parent's activation is beneficial for the child's outcome as well as the child's physician. A Parent Patient Activation Measure (P-PAM) exists to quantify a parent's level of activation in regards to their child (73). In parents of children undergoing hematopoietic stem

cell transplant, individual PAM scores and P-PAM scores were almost identical. Higher levels of

P-PAM scores were observed in younger parents, those with higher individual PAM, and those

with children who had been sick longer (73). Similar research should be conducted in older adult

populations whose children serve as general health care managers.

Overview of Data

Patient activation has been tested among diverse populations. The resulting data has

shown predominantly positive outcomes related to higher levels of patient activation. Patient

activation was rarely ever associated with negative outcomes. In some studies, patient activation

failed to be significantly related to or to predict health outcomes as expected. The table below

provides an overview of the data collected in this article.

Table 3. Overview of data collected from the literature

Population	High Levels of PA are associated with:	Low Levels of PA are associated with:
Normal	- Higher education, greater family income, being married, higher-ranking professional jobs, greater job satisfaction (34)	- Lower levels of education, lower family income (34)
Low SES/Minorities	- Non-Hispanic white populations (45)	- African American populations (45) - Patients of health centers (46) - Spanish-speaking populations (30)
Older Adults	- Higher functional status, health care quality, adherence to select health behaviors (32)	- Older age, decreased health-related quality of life, difficulties with ADLs and IADLs, depression (50) (51)
Chronic Conditions	- Self-management services, self-management behavior, medication adherence, satisfaction of care, quality of life, functional status (53) - Decreased emergency department visits (54) - Self-management theory of "being in control" (57)	- More frequent visits at primary care settings (55) - Self-management theory of "compliance" (57)
Obese	- Increased fruit and vegetable intake (59)	*More research needs to be conducted in obese populations
Diabetic	- Decreased likelihood of progressing to pre-diabetes or diabetes (61) - Better systolic blood pressure, diastolic blood pressure, HDL, LDL, and TG at three years follow-up (61)	- Increased likelihood of progressing to pre-diabetes or diabetes (61) - Increased hospitalization rates (61)

	- HbA1c and LDL testing, and HbA1c control at 2 years follow-up (60) - More likely to perform feet checks, receive eye exams, and exercise regularly (62) - Less difficulty in managing diabetes (62)	
HIV- Infected	- Increased viral suppression, greater antiretroviral adherence, increased odds of having a CD4 cell count greater than 20 cells/ml (65).	- Lower levels of educational attainment (65)
Mental Health	- Reduction in PHQ-9 score, increased remission, better response to treatment one year later (66).	- Higher PHQ-9 scores, decreased rates of remission (66)
Neurological	- Self-efficacy and quality of life (68)	- Lower levels of educational attainment and unemployed (68)
Orthopedic Surgical	- Greater pain relief, satisfaction, and improved activity after surgery (69) - Increased participation and engagement in physical therapy post surgery (70)	- Low self-efficacy, hope, and external locus of control (70)
Hospitalized	- Planned hospital admissions (29)	- Unplanned hospital admissions (29) - 1.78-2.27 times increased likelihood of hospital reutilization (29) - 1.3-1.4 times more likely to have visited the emergency department (35)
Clinicians	- Utilizing self-management support tools and strategies to change patient behavior (72) - Female primary care providers (72).	- Decreased likelihood of indicating beliefs about the importance of patient knowledge and involvement in his/her care (72) - Male primary care providers (72)
Parents	- Younger parents, those with higher individual PAM, and those with children who had been sick longer (73)	- Lower individual PAM scores (73)

DISCUSSION

Patient activation is a measure of a patient's knowledge, skill, and confidence in managing their health and health-care. The goal of this article was to organize the findings regarding patient activation into respective populations. The article contained data from normal, low SES and minority, older adult, chronically ill, obese, diabetic, HIV-infected, mentally ill, neurological, orthopedic surgical, hospitalized, clinical, and parental populations. The selected articles sought to associate patient activation with positive health outcomes to further support its

power and legitimacy. Patient Activation was shown to be significantly associated with a wide range of positive health outcomes across all of the populations. Higher patient activation scores, as measured by the PAM, were also associated with lower healthcare costs, beneficial health behaviors, use of self-management tools, and improved confidence (9), (12), (16), (18), (53). Patient activation can be used to gauge a patient's ability to manage their health and predict the trajectory of their health care (54).

There exists a small amount of research regarding patient activation relative to other topics in healthcare. The lack of research presents limitations in proving the significance of patient activation. The current evidence in regards to patient activation is unsystematic, making comparison between studies and populations difficult. The bulk of the literature published in the last ten years has been conducted by only a handful of researchers, one of which serves as a consultant and holds ownership of the company that licenses the PAM. Potential bias may confound statistical results in favor of patient activation.

CONCLUSION

A great deal of diverse evidence exists related to patient activation. More research should be conducted on patient activation to bolster its reliability and validity as a means to improved health outcomes and decreased healthcare costs. New researchers should undertake studying patient activation in a variety of populations. A more unified model of patient activation and PAIs should be developed for better cross comparison of evidence.

Despite limitations in the research, patient activation possesses authentic motives in improving patient care and creating a more sustainable health care system. Patient activation presents an invaluable tool for the changing healthcare environment. As focus shifts to quality of

care and prevention-oriented treatment, patient activation provides a means of reliable execution. Empowering consumers to be in control of their own health reduces reliance on health services, and has been shown to reduce overall costs (36). Preventative health relies on the premise that a consumer is both informed and actively works to maintain health and prevent disease. Switching to a preventative outlook on health requires the three hallmarks of patient activation: knowledge, skills, and confidence. Fostering patient activation could be the answer to our debilitated health care system today.

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