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# Socio-demographic predictors associated with capacity to engage in health care

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## Socio-demographic predictors associated with capacity to engage in health care

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### Abstract

Patient engagement is essential to improve outcomes and reduce healthcare costs. This study aimed to examine the socio-demographic factors associated with one's capacity to engage in their health care. An observational, cross-sectional study was performed including patients from five medical/surgical units of four health systems. Patients' engagement capacity was assessed using the person engagement index (PEI) instrument which contains four subscales: engagement in health care, technology use in health care, proactive approach to health care, and psychosocial support for health care. Separate general linear models were applied for the PEI total score and each of the four subscale scores. Our results show that younger age was associated with greater technology use in health care. Individuals with higher educational levels have a greater overall engagement and the use of technology in their health care. A higher level of psychosocial support was found among blacks and those being employed. No difference in the proactive approach was found by one's socio-demographic factors. This study illustrated that an individual's age, race, educational level, and employment status were associated with the capacity to engage in different aspects of health care activities. Providers need to assess one's readiness for engagement to deliver customized interventions based on their needs and capacity to engage.

### Keywords

Patient-centered care, patient engagement, precision engagement

### Introduction

Patient engagement has become a fundamental strategy to reform the health care system. Prior studies have shown that effective patient engagement improves health outcomes, increases patient safety and lowers healthcare costs.<sup>1-3</sup> Individuals need to understand their disease conditions through effective communication with providers and involving them in treatment decisions which are effective patient engagement strategies that focus on the role of the patient and provider as partners in care.<sup>4-6</sup> Educating patients about their disease condition is just one aspect of engaging them in their care. In order for patients to play an active role and develop a partnership with providers requires assessing their ability to engage, understanding their health literacy, and helping them prepare and participate in their care interactions.<sup>7</sup> These patient-centered approaches require a shift in care delivery as well as a person's ability to manage their health conditions.

Socio-demographic factors are an important consideration in health care and should be a focus in determining individualized strategies and engaging people in their

health. Studies have shown that gender, socioeconomic status, income, and level of education impact certain aspects of patient engagement with healthcare (i.e., patient-provider interactions).<sup>8-10</sup> For example, Bertakis (2009) discussed the different approaches males and females took in communicating with their providers about their health and found that women may seek care more often but men were more likely to discuss health risk factors.<sup>9</sup> This knowledge can be used by providers seeking to engage males and females in their health journey and structure their communication differently based on the individual needs of the patient. Given these important considerations, there is an ongoing interest in identifying patient characteristics that are associated with patient engagement and interaction with providers to further guide the customized interventions based on patients' needs and their level of engagement in health care.

The Person Engagement Index (PEI) was developed to measure and assess a person's capacity to engage in their health journey in order to structure their care interactions.<sup>11</sup> The details of the psychometric evaluation of the PEI are published elsewhere.<sup>11</sup> The purpose of this study was to examine, explore, and understand the socio-

demographic factors identified in the initial study of developing and validating the PEI <sup>11</sup>. This knowledge can help providers identify individuals who might lack engagement in their health journey and structure communication and care planning differently, based on their capacity and needs. Furthermore, the importance of education as a key component of partnering with patients to optimize self-management of health, a greater understanding of their capacity to engage in their health care provides additional assessment data to appropriately counsel and guide patients in their health care journey.

## Methods

### Study Design

Data were analyzed from an Institutional Review Board (IRB) approved cross-sectional study of 338 participants from five medical-surgical units to investigate factors associated with the participants' capacity to engage in their health care.

### Subjects and Settings

Participants were recruited from five inpatient medical/surgical units at four health systems (two West Coast; two East Coast). Eligible participants included adults over the age of 18 years old and English speaking. During their inpatient stay, participants agreed to complete the survey on an electronic interactive technology platform (i.e., an interactive television monitor or tablet).<sup>11</sup>

### Measure

An individual's engagement capacity in health care activities was assessed by the 24-item Person Engagement Index (PEI).<sup>11</sup> Participants were rated on a five-point Likert Scale with 1 meaning strongly disagree and 5 meaning strongly agree. Four latent dimensions represent the PEI: *engagement in health care* (e.g., 'If I have a concern about my health, I take action to address it'); *technology use in health care* (e.g., 'I have the skills to use technology to assist me with my health care'); *proactive approach to health care* (e.g., 'I am able to access health care for prevention and illness when I need it'); and *psychosocial support* (e.g., 'I have the necessary support from family or friends in my life to achieve my health goals'). The PEI subscale and total scores are summations of relevant item scores. The subscale and total scores are then scaled to a 0-100 scale with higher scores indicating a greater capacity for engagement in health care activities. The PEI subscale and total scores can be categorized into three engagement levels 'Low' (0-33), 'Medium' (34-66), and 'High' (67-100). The final 18-item PEI instrument tested in the instrumentation study demonstrates good reliability with a Cronbach's alpha coefficient of 0.896 for the overall scale and correlation subscale coefficients ranging from 0.728 to 0.885 for the four subscales.<sup>11</sup>

### Statistical Analysis

All statistical analyses were performed using IBM SPSS (version 24, IBM Corp., Armonk, NY) with statistical significance assumed for p-values < 0.05, two-sided. Summary statistics were computed as mean (standard deviation) or frequency (percentage). For continuous variables with a skewed distribution, the median and inter-quartile range were reported. The PEI total and subscale scores were compared among participant characteristic groups using non-parametric tests. Spearman's rank-order correlation was used to examine the association of age with the PEI total and subscale scores. The Mann-Whitney test was utilized for two-group comparisons, while the Kruskal-Wallis test was applied for the comparison of three or more groups, followed by *post-hoc* comparisons of differences among groups. We performed general linear models separately for the PEI total and each of the four PEI subscale scores to identify the socio-demographic predictors associated with the PEI scores.

## Results

### Sample Characteristics

Table 1 displays participant socio-demographic characteristics. A total of 338 participants admitted to medical-surgical units was included. Participants were on average 55.81 (SD 17.85; range: 18-98) years old; 176 (52.1%) were male, and 182 (54.9%) were white.

### Sample Patient Engagement Scores

Overall, the participant mean total PEI score was 77.36 (SD 9.19). On average, the subscale mean scores were *engagement in health care*, 38.81 (SD 5.05); *technology use in health care*, 11.77 (SD 3.04); *proactive approach to health care*, 17.76 (SD 2.18), and *psychosocial support subscale*, 9.02 (SD 1.59).

### Socio-demographics associated with a person's capacity to engage

Table 2 shows the results of the PEI total and subscale scores by participant categorical demographics. Education was the only predictor that was significantly associated with the PEI total score ( $p = 0.013$ ); individuals with college and advanced education had higher PEI total scores than those with less than high school education. The PEI subscale *engagement in health care* score was significantly predicted by one's age ( $r = 0.119$ ,  $p = 0.029$ ) based on the Spearman's rank-order correlation. *Technology use in healthcare* was negatively correlated with one's age ( $r = -0.216$ ,  $p = 0.001$ ); older age showed less engagement in health care through the use of technology. Furthermore, relationship status, education level, and employment status were found to be associated with an individual's technology use in health care. *Post-hoc* comparisons revealed that marriage ( $p = 0.039$ ), higher education ( $p = 0.001$ ), and being employed ( $p = 0.001$ ) were associated with greater use of technology in health care.

**Table 1. Sample Demographics**

Variable	Mean $\pm$ SD/ Frequency (%)
Age	55.81 $\pm$ 17.85
Gender	
Male	176 (52.1%)
Female	155 (45.9%)
Unknown	7 (2.0%)
Ethnicity—Hispanic or Latino	
Yes	99 (29.3%)
No	239 (70.7%)
Race	
White	182 (54.9%)
Black or African American	56 (16.6%)
Other	39 (11.5%)
Unknown	61 (18.0%)
Relationship	
Married/Cohabiting/Civil Union	172 (50.9%)
Single	55 (16.3%)
Divorced/Widowed/Separated	102 (30.2%)
Unknown	9 (2.7%)
Education	
Less than high school	45 (13.3%)
High school or equivalent	184 (54.4%)
College and above	98 (29.0%)
Unknown	11 (3.3%)
Employment	
Employed full-time/part-time	99 (29.3%)
Retired	114 (33.7%)
Non-employed	116 (34.3%)
Unknown	6 (1.8%)

The PEI subscale *proactive approach to health care* scores was positively associated with age ( $r = 0.116$ ,  $p = 0.032$ ), suggesting that as people age, they were more likely to be proactive with health care activities. In addition, a statistically significant difference in participant education level ( $p = 0.044$ ) for this subscale was observed. Participants with a college and advanced education compared to those with less than a high school education level showed a greater capacity to engage in proactive health care activities ( $p = 0.039$ ). There was a significant difference in the participants' relationship status ( $p = 0.046$ ) for the PEI *psychosocial support subscale*; unlike people who were married or cohabitated, single people had a lower level of psychosocial support ( $p = 0.015$ ).

### **Multivariable Regression**

Table 3 presents results from the general linear regression model for the association between the PEI total and subscale scores and participant characteristics. Participant educational level remains statistically significant ( $p = 0.049$ ) in predicting the PEI overall total score after controlling for other demographic variables (i.e., age, gender, race, ethnicity, employment, and relationship status) in the model, but age became insignificant after the adjustment of other variables. We did not identify differences in demographic characteristics in predicting PEI subscale *engagement in health care*. The PEI subscale, *technology use in health care*, was significantly predicted by one's age ( $p = 0.001$ ) and educational level ( $p = 0.002$ ), while technology use was no longer predicted by one's relationship ( $p = 0.422$ ) and employment status ( $p = 0.074$ ).

We did not identify demographic characteristics for predicting *proactive approach to health care*; age and education became insignificant after controlling for other demographic variables in the model. For the PEI subscale *psychosocial support*, relationship status, however, became insignificant, while race and employment status became significant in the adjustment model. We found a lower level of psychosocial support among individuals who were white as compared to black ( $p = 0.018$ ) and other races ( $p = 0.040$ ), and also being non-employed was associated with lower psychosocial support than those who were employed ( $p = 0.006$ ) and retired ( $p = 0.032$ ).

### **Discussion and Implications**

#### **Principle Findings**

This study examined patient engagement in health care as measured by the PEI instrument among the sample participants admitted to medical-surgical units. We investigated the association between socio-demographic variables and the following four aspects of PEI: *engagement in health care*, *technology use in health care*, *proactive approach to health care*, and *psychosocial support in health care*.

Being younger and having a higher level of education were consistently found to be associated with *technology use in health care*.<sup>12–14</sup> Younger generations are more comfortable using technology and performing medical-related tasks through health information technology. Older adults reported less confidence in their ability to use health information technology and less interest in using technology for health care related tasks. Findings from Pew Internet Research has reported major barriers that prevent older adults from using technology: difficulties in learning new technology, negative attitudes toward using technology, and physical challenges to use technology.<sup>15</sup> In addition, individuals with higher educational levels tend to have a greater overall engagement in their health care and

**Table 2. PEI total and subscale scores by patient groups**

	PEI Total		Engagement in Health Care		Technology Use in Health Care		Proactive Approach to Health Care		Psychosocial Support	
	Median (IQR)	p	Median (IQR)	p	Median (IQR)	p	Median (IQR)	p	Median (IQR)	p
Gender										
Male	77.00 (16.00)	--	38.00 (8.00)	--	12.00 (3.01)	--	18.00 (4.00)	--	10.00 (2.00)	--
Female	77.00 (14.00)	0.925	39.00 (7.76)	0.955	12.00 (4.00)	0.598	18.00 (4.00)	0.527	10.00 (1.00)	0.921
Ethnicity—Hispanic or Latino										
Yes	76.50 (14.75)	--	37.68 (8)	--	12.00 (3.00)	--	18.00 (4.00)	--	10.00 (2.00)	--
No	77.00 (14.05)	0.995	39.00 (7.77)	.822	12.00 (4.00)	0.959	18.00 (4.00)	0.613	10.00 (1.00)	0.486
Race										
White	76.00 (16.00)	--	38.00 (8.40)	--	12.00 (4.02)	--	18.00 (4.00)	--	9.53 (2.00)	--
Black or African American	80.00 (14.00)	--	39.50 (7.75)	--	12.00 (3.00)	--	18.23 (3.00)	--	10.00 (1.00)	--
Other	77.00 (16.00)	0.295	40.00 (8.00)	.363	12.00 (4.00)	0.649	18.00 (3.45)	0.352	10.00 (1.00)	0.136
Relationship										
Married/Cohabiting / Civil union	78.00 (14.00)	--	38.50 (8.00)	--	12.00 (3.00)	--	18.00 (4.00)	--	10.00 (1.00)	--
Single	76.00 (12.00)	--	37.00 (7.00)	--	12.00 (4.00)	--	18.00 (4.00)	--	9.00 (2.00)	--
Divorced/Widowed / Separated	76.50 (16.00)	0.349	39.00 (8.00)	.388	12.00 (5.25)	0.039	18.00 (4.00)	0.728	10.00 (1.00)	0.046
Education										
Less than high school	74.00 (13.50)	--	37.00 (8.12)	--	11.00 (5.50)	--	17.00 (3.00)	--	9.00 (2.00)	--
High school or equivalent	77.00 (13.00)	--	38.00 (7.49)	--	12.00 (4.00)	--	18.00 (4.00)	--	10.00 (1.00)	--
College and above	79.50 (15.05)	0.007	39.50 (8.00)	.195	13.00 (3.00)	0.000	19.00 (4.00)	0.044	10.00 (1.25)	0.260
Employment										
Employed	77.00 (13.00)	--	37.00 (8.00)	--	13.00 (3.00)	--	18.00 (3.00)	--	10.00 (1.00)	--
Non-employed	75.50 (16.75)	--	38.00 (8.94)	--	12.00 (3.00)	--	18.00 (4.00)	--	10.00 (2.00)	--
Retired	79.00 (14.00)	.130	40.20 (8.00)	.105	12.00 (5.25)	0.000	18.00 (3.00)	0.194	10.00 (1.00)	0.061

use of health technology. Health literacy and obtaining and comprehending health information from online sources are less of an issue among those who are highly educated.<sup>16</sup>

Consistent findings were found in the literature that females, compared to males, were more frequently seeking health care behaviors or more engaged in health care activities.<sup>17-20</sup> However, in our study, gender was not significant in predicting the four aspects of engagement in health care. In addition, we did not observe differences in any of PEI total and subscales by relationship status. Prior research has found that patients who live alone and are retired tend to have a higher patient activation in health care.<sup>21</sup> A review paper found that individuals with chronic conditions who live alone often pay more attention to their health to maintain independence; they also actively seek social connections outside their home.<sup>22</sup> However, we did not find any difference in the PEI total and subscale scores by patients' gender groups and relationship status.

The absence of significant findings in our study may result from the sample including hospitalized individuals in the acute phase of their disease; this situation may make this population more concerned about their health condition and more engaged with their health care team.

We found that the level of psychosocial support in health care is higher among blacks and individuals who are employed. Mixed findings were found in the literature in terms of the amount of social support received by different racial groups. Earlier studies reported that blacks, as compared to whites, are more likely to have smaller social networks, and more likely to have support from family members,<sup>23,24</sup> while others found a similar amount of social support whites and blacks give and receive.<sup>6,25</sup> In addition, our finding regarding employment difference in social support is consistent with prior studies that a higher social support exists among employed groups as compared to unemployed or self-employed groups.<sup>27</sup> These

**Table 3. Statistics of general linear model for the PEI total and subscale scores**

PEI Factors	Source	Type III Sum of Squares	df	Mean Square	F value	Pr > F	R Squared	Adjusted R Squared
1 Engagement in Health Care	Age	6.32	1	6.32	0.24	0.624	0.038	-0.004
	Gender	3.37	1	3.37	0.13	0.721		
	Race	67.89	2	33.94	1.29	0.277		
	Hispanic	24.69	1	24.69	0.94	0.334		
	Education	52.07	2	26.04	0.99	0.373		
	Employment	34.18	2	17.09	0.65	0.523		
	Relationship	7.14	2	3.57	0.14	0.873		
	Error	6629.04	252	26.31				
	Total	400164.99	264					
2 Technology Use in Health Care	Age	83.99	1	83.99	10.37	0.001*	0.166	0.130
	Gender	0.01	1	0.01	0.002	0.969		
	Race	14.40	2	7.20	0.89	0.412		
	Hispanic	0.09	1	0.09	0.01	0.916		
	Education	100.53	2	50.27	6.21	0.002*		
	Employment	42.59	2	21.30	2.63	0.074		
	Relationship	14.03	2	7.01	0.87	0.422		
	Error	2041.19	252	8.10				
	Total	38730.07	264					
3 Proactive Approach to Health Care	Age	3.73	1	3.73	0.75	0.387	0.064	0.023
	Gender	4.78	1	4.78	0.96	0.327		
	Race	10.98	2	5.49	1.11	0.332		
	Hispanic	3.10	1	3.10	0.63	0.430		
	Education	25.77	2	12.88	2.60	0.077		
	Employment	23.29	2	11.64	2.35	0.098		
	Relationship	2.42	2	1.21	.244	0.784		
	Error	1250.46	252	4.96				
	Total	83922.07	264					
4 Psychosocial Support	Age	0.07	1	0.07	0.03	0.866	0.089	0.050
	Gender	0.05	1	0.05	0.02	0.895		
	Race	16.21	2	8.10	3.14	0.045*		
	Hispanic	0.49	1	0.49	0.19	0.664		
	Education	0.88	2	0.44	0.17	0.843		
	Employment	2450	2	12.25	4.75	0.009*		
	Relationship	13.94	2	6.97	2.70	0.069		
	Error	650.29	252	2.58				
	Total	21918.22	264					
PEI total	Age	19.78	1	19.78	0.23	0.629	0.069	0.029
	Gender	15.37	1	15.37	0.18	0.670		
	Race	329.05	2	164.52	1.94	0.145		
	Hispanic	32.84	1	32.84	0.39	0.534		
	Education	516.49	2	258.24	3.05	0.049*		
	Employment	462.39	2	231.19	2.73	0.067		
	Relationship	69.35	2	34.67	0.41	0.664		
	Error	21343.23	252	84.70				
	Total	1586906.80	264					

\*p&lt;0.05

demographic differences in social support can play an essential role in improving patient engagement in health care activities.

### **Limitations**

We acknowledge several limitations in our study, including those traditionally associated with survey research such as convenience sampling and lack of flexibility in response items. Because we used data from a convenience sample of

inpatient medical/surgical patients, our findings may not generalize to other samples with different disease acuity levels such as individuals with chronic conditions. Additionally, although our sample of participants were recruited from four geographically diverse institutions within the United States, the possibility of regional variation on our results is a future consideration of study. A majority of the participants had a high school educational level and were English language speaking only.

The PEI has not been validated in any other language; thus, sub-populations may exist in which the PEI is more or less appropriate.

### **Conclusion and Clinical Implications**

Our results have important implications for patient education and patient-provider communications. The PEI is a patient self-reported tool to assess level of engagement with health care activities, that can help open the conversations to discuss a patient's needs, wants, and preferences related to their health care goals. The PEI can be used as additional assessment data for providers to enhance patient engagement through the use of the Interactive Care Model, a five phase care delivery process model that fosters the patient-provider relationship to partner with patients in their care. <sup>5</sup>To better promote patients to manage their own health and understand their self-care needs, the PEI total scores and subscale scores can be interpreted using three levels of engagement capacity: low, medium or high. Thus, depending on the level of engagement capacity, providers can recommend tailored interventions. For example, for patients with low total PEI scores, the provider may consider asking the patient what they are most concerned about with their health and assess what the patient knows about his or her disease. With patients that have medium PEI scores, it may be important to assess what the patient wants for their health. For patients who have high PEI scores, the discussion may center on promoting and maintaining health goals.

One universal intervention would not work for each person since individuals may be at different phases to be ready to engage in their health care. Frequent assessment of a person's capacity by health care providers is helpful for facilitating communication between patients and providers. Also, understanding the many factors associated with individuals' willingness to engage in health care activity is important for designing and delivering customized education, communication and interventions. Future research needs to investigate other predictors such as clinical characteristics (e.g., type of disease, depression, cognitive function) and psychosocial factors (e.g., problem-solving ability, quality of life), geographic factors (e.g., access to care) that may thwart the patients' ability to engage in health care activities. In addition, further examination should focus on diverse patient populations across the care continuum.

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