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Patient activation

Racial disparities in patient activation: Evaluating the mediating role of health literacy with path analyses

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ABSTRACT

Objective: The aim of this study was to use path analysis methods to determine if health literacy mediates the relationship between race and patient activation.
Methods: We performed a secondary analysis of data from a randomized controlled trial in elderly, urban, minority patients using path analysis. Path analysis was used to evaluate the mediation of race on patient activation through different variables. Several models were tested for best fit for their effects on patient activation.
Results: Across all models, significant mediation paths were identified from race to lower patient activation through health literacy. This relationship remained significant throughout alternative model testing for covariate combinations. The best-fit model included an indirect effect of sex on patient activation through health literacy indicating that the mediation effect of health literacy on patient activation was most profound for African American males. Health literacy had a bigger influence on patient activation for participants with a greater comorbidity than for those with fewer conditions. No significant direct effect was shown between race and patient activation in any of the models.
Conclusion: Racial disparities in patient activation were fully mediated by health literacy skills.
Practice implications: Future interventions to improve racial disparities in patient activation need to be targeted at improving health literacy.

1. Introduction

Patient activation is a person's willingness to manage his or her own health [1]. As patients are required to manage complex medical decisions, the concept of empowering patients for effective self-care has become increasingly acknowledged as a critical goal [2–4]. Studies have shown that being an actively engaged participant in one's care has been associated with better health outcomes [5]. Higher levels of activation have been associated with healthier behaviors and better health related outcomes whereas lower levels of activation have been associated with worse physical health, depression and anxiety, and readmission within 30 days of hospital discharge [3,6–9]. The concept of activation has important ramifications, as being an effective, informed manager of one's own health can influence the process and outcomes of care and reduce health care costs [3,10].

Hibbard et al. devised the Patient Activation Measure (PAM) to measure activation, and studies have linked health literacy and patient activation [1,11,12]. Activation involves the empowerment and motivation needed to manage one's health. Health literacy involves an array of skills needed to promote health, including not only the capacity to derive meaning from written words, numbers, documents, and images, but also, the capacity to fulfill self-care tasks, gather information, and interact successfully in health care contexts [13]. An integral component to being more activated is seeking and using relevant health information [7]. Therefore, being

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able to understand and process health information becomes important. Both health literacy and patient activation have been found to influence decision making in older adults [4].

Patient activation has been shown to differ by race and ethnicity: African Americans have demonstrated lower levels of patient activation than whites, even after controlling for other characteristics [11]. Activation has been shown to be lower in medically underserved populations [7,14]. The etiology of this relationship between race and activation has not been elucidated. Resolving the gaps in activation has been proposed as one strategy for reducing racial disparities in health outcomes [11].

As health literacy has been linked both to race [15] and patient activation, health literacy may be an important mechanism residing within this causal pathway. Therefore, we performed path analyses to evaluate the direct and indirect relationships between race and patient activation, examining health literacy as a mediator of this relationship [16].

2. Methods

Participant recruitment, data collection procedures and the majority of the measures used in our current analyses have been previously described in the Steps to Health study [16]. Race was categorized into a three-level variable: Black or African–American, White, and Other (including American Indian/Alaskan Native, Asian, multi-racial, and unknown), with White as the referent group. We examined the normality of continuous endogenous variables such as literacy score and PAM by comparing kernel density estimates to ideal normal curves. We also compared the sample means and medians to assess the symmetry of the distributions. We found that these variables were sufficiently distributed for use to model linear relationships.

Health literacy was measured using the short version of the Test of Functional Health Literacy in Adults (S-TOFHLA) [17,18]. This validated test consists of two parts, the first part measures reading comprehension with regards to medical topics. Scores ranged from 0 to 36. We analyzed literacy scores as a continuous variable.

Patient activation was measured using the validated Patient Activation Measure (PAM) and was evaluated during the baseline assessment of the Steps to Health Study [1]. The PAM is a 21-item questionnaire that is scored on a scale of 0–100, 0 = the lowest possible activation and 100 = the highest possible activation [1]. We analyzed PAM scores as a continuous variable in our models.

In order to produce the most parsimonious model both the direct and indirect effects were examined for each of the following covariates: race, age, gender, Patient Health Questionnaire 9 (PHQ9) score for depression and number of comorbidities. Path analysis was performed through maximum likelihood estimation using MPLUS software, version 7.3 [19]. Race was included in the models as an exogenous variable while education, literacy score, and PAM were treated as endogenous variables. We allowed for correlation between education and literacy score. Model fit was evaluated using the chi-square statistic, Akaike Information Criterion (AIC), root mean square error of approximation (RMSEA), and comparative fit index (CFI). Initially, all direct paths were included in the model. At each step of the modeling procedure, paths with $p > 0.05$ were removed and model fit was evaluated resulting in the final model. Standardized path coefficients are presented.

3. Results

The analytic cohort for these analyses was taken from the Steps to Health Study ($n = 263$), excluding non-English speakers ($n = 15$) and, as per scoring guidelines, excluding those who answered "strongly agree" to every question on the PAM questionnaire ($n = 25$), leaving 225 people included in the analyses. Characteristics of this sample are presented in Table 1. Mean age was 71, 40.9% male, 26.2% White, 67% Black, and 6.7% classified as other race. Approximately forty five percent reported having greater than high school education and forty one percent had low literacy based on the S-TOFHLA. Twenty seven percent had greater than two comorbidities. Compared to Whites, Blacks were more likely to be female ($p < 0.001$), have completed less than high school regarding education ($p = 0.0003$) and have lower health literacy ($p < 0.001$).

All models included one exogenous variable, racial status (White, Black or other), with three endogenous variables: highest grade achieved, health literacy score, PAM. We found a suggestive association, though not statistically significant, in the bivariate model between race and patient activation (path coefficient −0.129, SE 0.71, $p = 0.068$). With the addition of literacy score and

Table 1
Basic demographics of the study population.

Variable			All $N = 225$	Black/African American $N = 151$	White $N = 59$	Other Race $N = 15$	p-Value
Gender	N (%)	Male	92 (40.9)	48 (31.8)	38 (64.4)	6 (40.0)	<0.0001
		Female	133 (59.1)	103 (68.2)	21 (35.6)	9 (60.0)	
Age at enrollment	N		225	151	59	15	0.3694
	Mean (SD)		71.3 (5.4)	71.0 (5.5)	71.9 (5.5)	71.9 (4.5)	
	Median (IQR)		70.0 (67.0, 75.0)	70.0 (67.0, 74.0)	71.0 (67.0, 76.0)	72.0 (69.0, 74.0)	
Age at enrollment (grouped)	N (%)	65–69	102 (45.3)	72 (47.7)	24 (40.7)	6 (40.0)	0.9024
		70–74	65 (28.9)	42 (27.8)	17 (28.8)	6 (40.0)	
		75–79	40 (17.8)	25 (16.6)	13 (22.0)	2 (13.3)	
		80+	18 (8.0)	12 (7.9)	5 (8.5)	1 (6.7)	
Highest grade completed	N (%)	<HS	51 (22.7)	42 (27.8)	6 (10.2)	3 (20.0)	0.0003
		HS or GED	73 (32.4)	57 (37.7)	12 (20.3)	4 (26.7)	
		>HS	101 (44.9)	52 (34.4)	41 (69.5)	8 (53.3)	
Literacy level	N (%)	Low	93 (41.3)	82 (54.3)	7 (11.9)	4 (26.7)	<0.0001
		High	132 (58.7)	69 (45.7)	52 (88.1)	11 (73.3)	
Total number of comorbidities	N (%)	[0] None	97 (43.1)	60 (39.7)	32 (54.2)	5 (33.3)	0.0715
		[1] 1	67 (29.8)	43 (28.5)	16 (27.1)	8 (53.3)	
		[2] 2+	61 (27.1)	48 (31.8)	11 (18.6)	2 (13.3)	

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