

Health Literacy and High Blood Pressure Control Among Ethnic Minorities and Poor Persons Receiving Care in Urban Primary Care Clinics

Sande O Okelo, Kathryn A Carson, Lee R Bone,
Debra L Roter, Mary Catherine Beach, David M Levine,
Edgar R Miller, Michael S Barr, Lisa A Cooper

Johns Hopkins University, Baltimore, MD

American College of Physicians, Washington, DC

Supported by the National Heart, Lung, and Blood Institute
R01R0HL69403 and K24HL083113

Background

- Ethnic minorities and poor persons are:
 - at higher risk for low literacy compared to whites and persons with higher levels of income
 - disproportionately affected by high blood pressure (HBP) and the related complications of heart disease, stroke, and kidney disease

Background

- Research that links health literacy to patient outcomes has produced inconsistent results
 - Some studies show a relationship between low health literacy and poor outcomes (asthma, depression)
 - Others show no relationship of health literacy with outcomes (diabetes, high blood pressure, HIV)
- Mechanisms for observed associations of health literacy with outcomes are not well elucidated
 - Poor adherence, health knowledge, self-efficacy, and self-management behaviors have been proposed

Study Objectives

- To examine the association of health literacy with blood pressure control in a clinic-based sample of ethnic minorities and poor persons
- To determine whether patients' self-reported adherence to HBP management behaviors and/or involvement in decision-making mediate this association



Patient-Physician Partnership to Improve HBP Adherence

- Design: Randomized controlled trial, 2x2 factorial design
- Population: 50 MDs and 500 ethnic minorities and poor persons with high blood pressure (HBP)
- Setting: 18 urban community-based clinics in Baltimore, MD (9 federally qualified health centers)
- Interventions:
 - Physicians: 2 hour individualized communication skills training program on interactive CD-ROM
 - Patients: one-on-one education and activation by community health worker in person and by telephone

Supported by the National Heart, Lung, and Blood Institute

R01HL69403, 09/01/01-08/31/06

Outcomes*

- Health outcomes (BP and diabetes control, quality of life)
- Patient-physician communication behaviors
- Patient adherence
 - Self-reported adherence to meds, diet, and exercise
 - Appointment-keeping (administrative data)
 - Prescription refill rates (automated pharmacy records)
- Patient ratings of care
 - Overall satisfaction, recommendation of MD to a friend
 - Participatory decision-making, respectfulness of MD
- Appropriateness of hypertension care (JNC-7)
- Hospitalizations and ER visits

* Assessed at index visit and at 3 months and 12 months of follow-up

Methods

- Design: cross-sectional survey and examination conducted as part of a randomized controlled trial
- Settings: urban community-based primary care clinics in Baltimore, Maryland
- Participants: 279 ethnic minorities and poor persons with high blood pressure
- Predictor variable: health literacy, measured by the Rapid Estimate of Adult Literacy in Medicine (REALM)
- Outcome variable: Blood pressure control (no/yes)

Rapid Estimate of Adult Literacy in Medicine (REALM)

- Examiner gives patient a laminated copy of the REALM word list (66 words; 22 words/list; 3 lists)
- Examiner says: “I want to hear you read as many words as you can from this list. Begin with the first word on List 1 and read aloud. When you come to a word you cannot read, do the best you can or say ‘blank’ and go on to the next word”
- Raw score is total number of correctly pronounced words

Methods: REALM

- REALM Scoring
 - 0 – 18 = 3rd Grade and Below
 - Will not be able to read most low literacy materials; will need repeated oral instructions, materials composed primarily of illustrations, or audio or video tapes.
 - 19 – 44 = 4th to 6th Grade
 - Will need low literacy materials; may not be able to read prescription labels.
 - 45 – 60 = 7th to 8th Grade
 - Will struggle with most patient education materials.
 - 61 – 66 = 9th grade or higher (high school)
 - Will be able to read most patient education materials.
- <9th grade = low health literacy
- 9th grade or higher = adequate health literacy

Blood Pressure Control

- Measured as the average of 3 readings with the automatic oscillometric (Omron HEM 907) monitor
- Uncontrolled BP defined as follows:
 - Persons with high blood pressure (HBP) only: SBP \geq 140 and/or DBP \geq 90 Hg
 - Persons with HBP and diabetes or chronic kidney disease: SBP \geq 130 and/or DBP \geq 85 mm Hg

Covariates*

- Demographic factors: age, gender, educational attainment, annual household income, health insurance status and type
- Adherence: measured using the Hill-Bone HBP Therapy Compliance Scale (HBS)
- Participatory decision-making (PDM) style: measured with 3 questions regarding whether or not the physician gives the patient choice, control or responsibility for their treatment

*Measured by interview

Hill-Bone High Blood Pressure Therapy Compliance Scale

- How often do you decide NOT to take your HBP medicine?
- How often do you eat salty food?
- How often do you shake salt on your food before you eat it?
- How often do you eat fast food?
- How often do you make the next appointment before you leave the doctor's office?
- How often do you miss scheduled appointments?
- How often do you forget to get prescriptions filled?
- How often do you run out of HBP pills?
- How often do you skip your HBP medicine before you go to the doctor?
- How often do you take someone else's HBP pills?

Response options: All of the time, Some of the time, None of the time.

Lower scores indicate better adherence.

Measurement of Physicians' Participatory Decision-Making Style*

Patient is asked:

- If there were a choice between treatments, how often would this doctor ask you to help make the decision?
- How often does this doctor make an effort to give you some control over your treatment?
- How often does this doctor ask you to take some of the responsibility for your treatment?

*Kaplan SH et al, Medical Care 1995;33:1176-1187

Each item contributes 33.3 points. Maximum score is 100 points.

Analyses

- Descriptive statistics, t-tests and chi-square tests to examine associations of literacy and BP control with covariates
- Logistic regression to test for the presence, strength, and statistical significance of the association of literacy with BP control
 - Unadjusted
 - Adjusted for potential confounders
 - Conducted analyses stratified by patient race

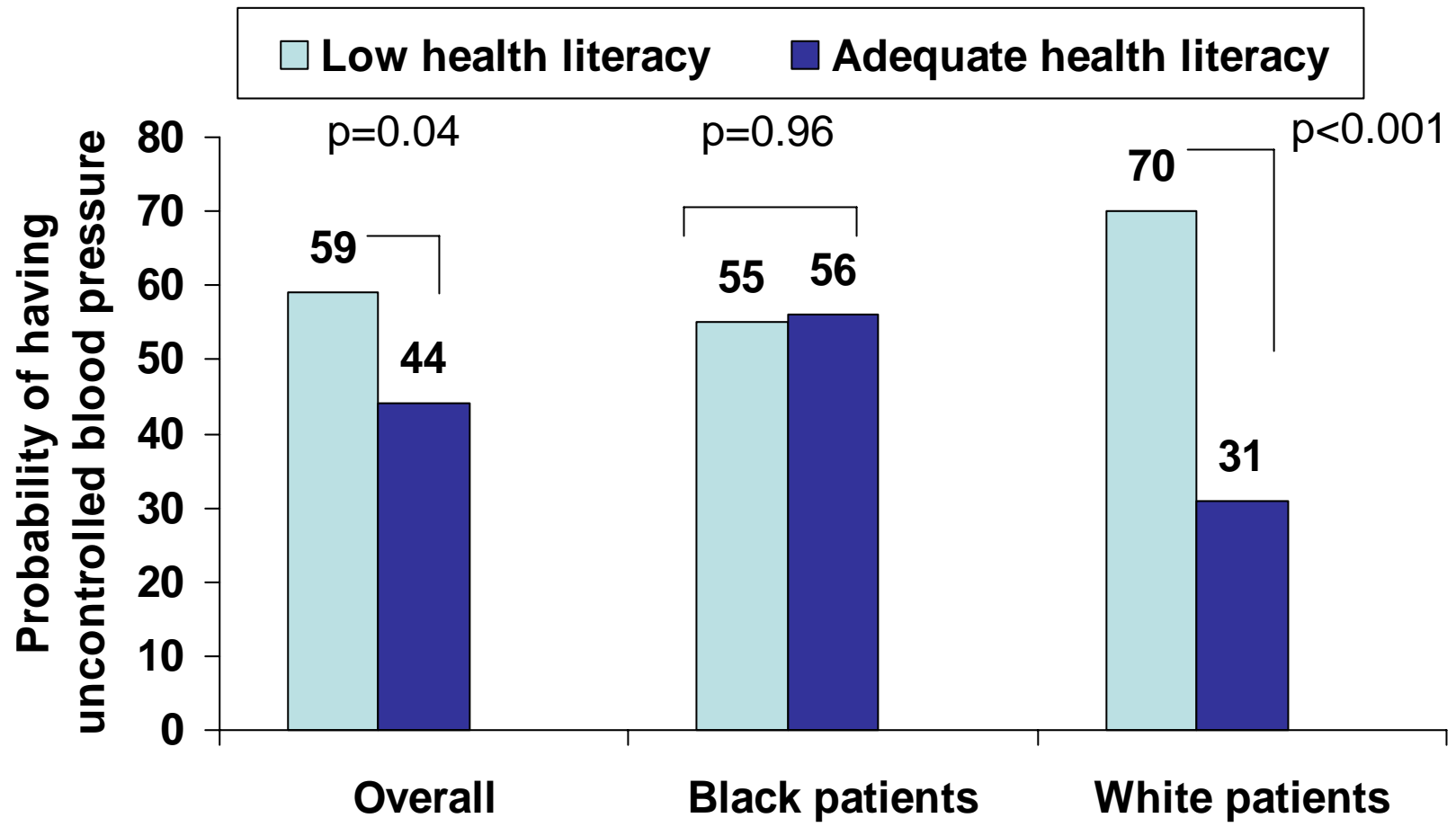
Demographic Characteristics of Patients by Literacy Level

Demographic Characteristic	Patients with low literacy N=103	Patients with adequate literacy N=176	P-value
Mean age, yrs	62.0	60.8	0.44
Mean education, yrs	10.6	12.5	<0.001
Women (%)	59	70	0.06
African-American (%)	76	53	<0.001
Medicaid insurance (%)	43	23	0.001
Annual household income <\$10,000 (%)	46	32	0.03

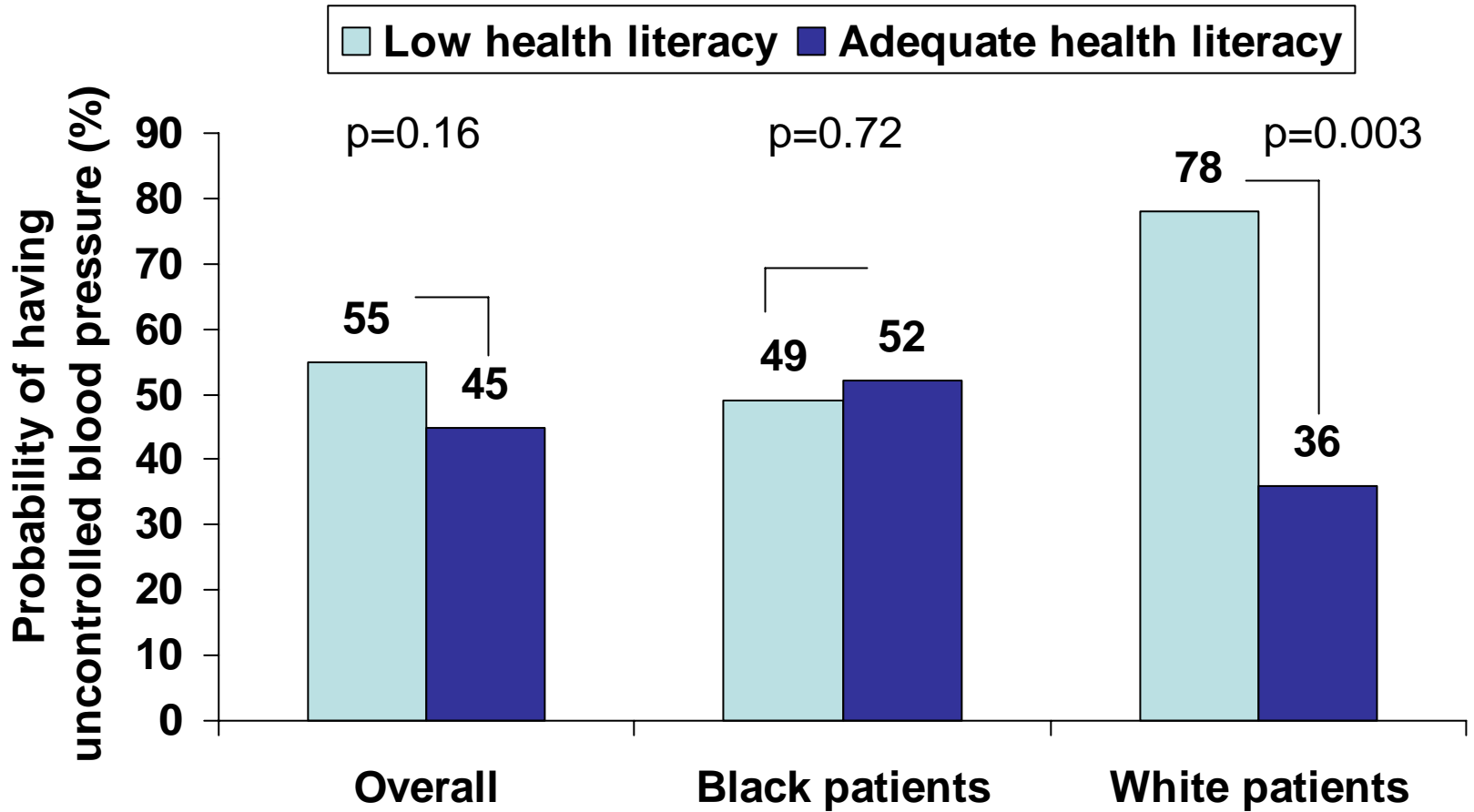
Clinical and Behavioral Characteristics by Literacy Level

Behavior	Patients with low literacy N=103	Patients with adequate literacy N=176	P-value
Comorbid diabetes (%)	50	60	0.10
Mean BMI, kg/m ²	33.1	32.8	0.82
Mean PCS score, SF12	39.2	40.7	0.31
Mean MCS score, SF12	49.5	50.9	0.31
Mean HBS, appointments	2.88	2.60	0.03
Mean HBS, medications	10.55	10.20	0.17
Mean PDM score	65.8	72.2	0.03

Unadjusted probability of uncontrolled blood pressure among patients with low and adequate health literacy



Adjusted probability of uncontrolled blood pressure among patients with low and adequate health literacy



Adjusted for income, comorbid diabetes, self-reported adherence, and PDM score

Conclusions

- In this urban sample of patients, low health literacy is associated with worse blood pressure control
- Patients with low health literacy also report less adherence to appointments and less participatory decision-making with their physicians
- After adjusting for income, comorbid diabetes, adherence, and participatory decision-making, the association between literacy and blood pressure control is statistically significant among whites, but not among blacks

Implications for Research and Patient Care

- Future studies should:
 - Examine other mechanisms by which low literacy may be associated with poor blood pressure control (e.g., patient-physician communication)
 - Explore whether the impact of literacy on other health outcomes differs among African Americans and whites
- This work may help inform the development of appropriate interventions for low literate patients with chronic disease

Odds of uncontrolled blood pressure among patients with low health literacy relative to those with adequate literacy

	Overall	Blacks	Whites
Unadjusted OR (95% CI)	1.80 (1.09, 2.97)	0.98 (0.53, 1.82)	5.03 (1.84, 13.75)
Adjusted OR* (95% CI)	1.51 (0.85, 2.69)	0.88 (0.44, 1.77)	6.35 (1.89, 21.31)

Reference group is those with adequate health literacy. *Adjusted for income, comorbid diabetes, self-reported adherence to medications, and PDM score.