

Predicting limited health literacy in probability and convenience samples of ED patients

T. Olives MPH MEd, S. Patel BS, R. Patel BA BS, J. Hottinger BS, J. Miner MD
Hennepin County Medical Center • Minneapolis, Minnesota

Introduction

Health literacy is the "capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions."¹ More than 90 million US adults possess limited health literacy, and are at risk for increased emergency department (ED) usage, prolonged hospitalizations, increased health care costs and medication noncompliance.^{2,3,4} Risk factors for limited health literacy include advanced age, lower educational background, lower socioeconomic status, and non-Caucasian ethnicity. Recent studies have demonstrated that up to 25% of urban ED patients possess limited health literacy skills.⁵

Objectives

- Data describing health literacy in the ED is limited.
- We sought to determine the prevalence of limited health literacy among patients in an urban ED and its association with sociodemographic variables.
- We also sought to assess differences in findings across probability (random) and convenience (non-random) samples, in order to estimate the importance of the logistically more difficult probability sampling technique.

Methods

- This was a cross-sectional study conducted in the ED of a Level 1 county hospital. We prospectively screened all patients over a random distribution of 8-hour periods, and over a convenience sample of patients during non-overlapping 8-hour periods between June 10 and August 31, 2008.
- Participants completed a brief demographic survey and a validated written assessment of health literacy, the Short Test of Functional Health Literacy in Adults (S-TOFHLA, Peppercorn Books 2003). Individuals scoring 0-16/36 were considered to possess inadequate, 17-22 marginal, and >22 adequate functional health literacy skills.

Statistical Methods

- Univariate analyses were used to determine baseline characteristics. Associations between limited health literacy (marginal or inadequate scores) and sociodemographic variables were evaluated in a multinomial logistic regression model. We excluded patients <18 years of age, those with high acuity or distress complaints per provider (including sexual assault), prisoners and those in police custody, vulnerable adults, non-speakers of English or Spanish, patients with altered mental status (including intoxication), and repeat visits to the ED if separated by <two weeks.

Results

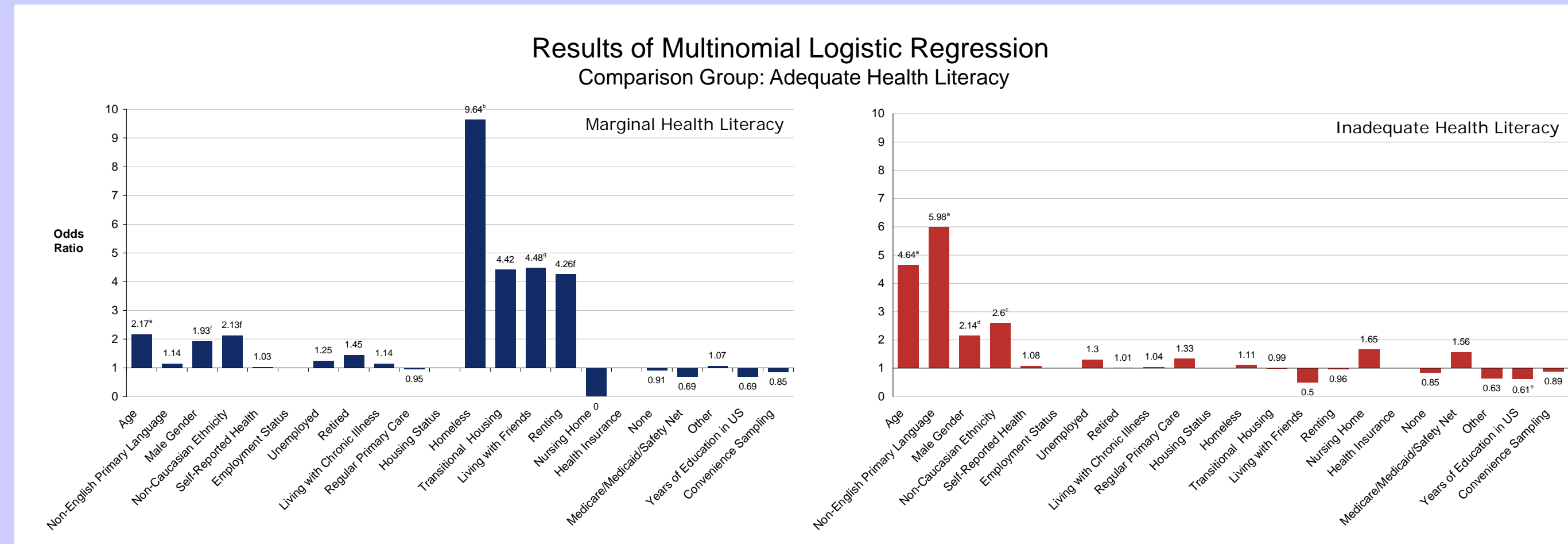


Figure One: Odds of marginal health literacy (S-TOFHLA <17) and inadequate health literacy (S-TOFHLA 17-22) compared to adequate health literacy by regression variables. Increasing age, male gender, non-Caucasian ethnicity, and housing status were significant predictors of marginal health literacy. Increasing age, non-English primary language, male gender, and non-Caucasian ethnicity predicted inadequate health literacy, while greater education in the US suggested a protective effect against inadequate health literacy in this sample.

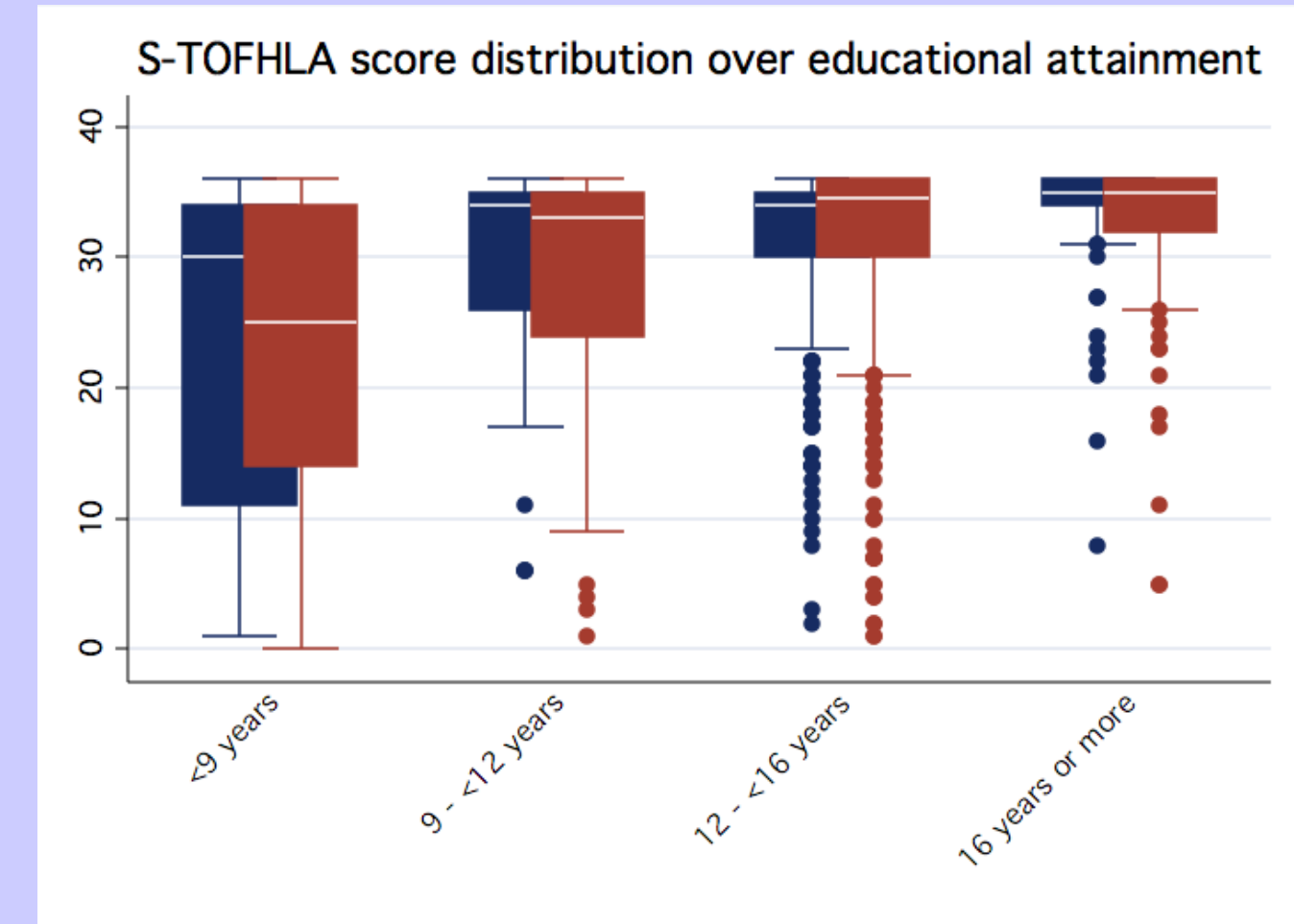
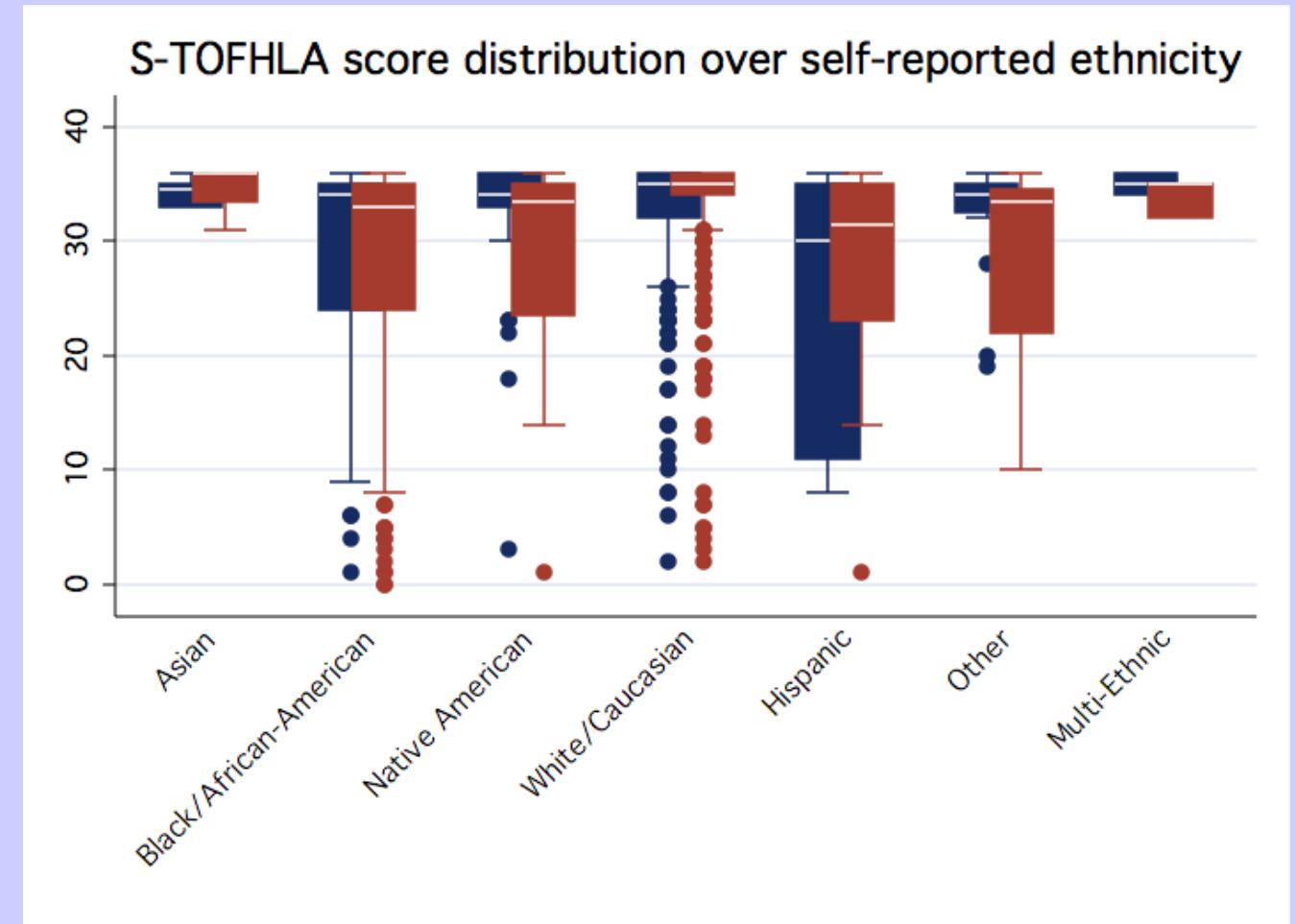


Figure Two: Distribution of S-TOFHLA scores by self-reported ethnicity and educational attainment in probability and convenience samples. Univariate analyses revealed similar baseline characteristics and across probability and convenience samples. S-TOFHLA scores did not differ significantly across probability and convenience samples.

Results

• 8,412 patients presented to the ED during randomly selected 8-hour periods. 3,402 met inclusion criteria; 1,088 (32%) refused surveys. 2,314 (68%) completed demographic surveys, and 423 (18%) completed S-TOFHLAs. 7,518 patients presented during the convenience sample of 8-hour periods. 2,199 met inclusion criteria; 874 (40%) refused surveys. 1,325 (60%) completed demographic surveys, and 537 (41%) completed S-TOFHLAs.

• In probability and convenience samples, the most common exclusions were inability to contact patient (23% and 42%, respectively) and age <18 years (19% and 17%, respectively). Participants were on average younger than those who declined (mean age 36.8 v. 40.8 [T=7.49 p<0.001]). Age and ethnicity were not significantly different across groups. Overall, 15.52% of patients enrolled had inadequate (8.54%) or marginal (6.98%) health literacy.

• Convenience and probability samples were similar across measured predictors, including age, gender, ethnicity, self-report overall health, language preference, housing, employment, and insurance status (complete data not shown). Figure 1 describes score distribution over ethnicity and self-report education. Figure 2 displays results of multinomial logistic

Limitations

- Patients were surveyed at one site; results may not be representative of non-urban or private hospitals.
- Non-English/non-Spanish speakers, intoxicated and acutely ill patients were excluded. Such systematic exclusions may bias our findings.
- The small proportion of patients presenting to the ED who were able to be studied, despite the rigorous approach of our probability sample, may introduce bias. Non-respondents may be different in ways not addressed this investigation and, perhaps, obscured by the rapid pace and emotionally charged environment of the ED.

Discussion

• 15% of those surveyed possessed limited health literacy, and may interpret health care related materials with some difficulty, if at all. Increasing age, non-English first language, male gender, non-Caucasian ethnicity, housing status, and fewer years of US education were associated with limited health literacy. Sampling technique was not predictive of health literacy in this study.

• Limited health literacy presents a difficult problem, and may impede adequate treatment of ED patients. This is particularly true if follow-up or medication instructions are central to patient outcomes from the ED, as is commonly the case. As patients are encouraged to become partners in their own health care, health literacy becomes a pivotal issue in management of care, and has important implications for the viability of the partner paradigm. In our study, more than one in seven patients surveyed had limited health literacy skills.

• Data collection in the emergency department is challenging. In univariate and multivariate analyses, health literacy was not associated with sampling technique. This finding may have important implications for the study of health literacy in EDs, where the delivery of time-consuming survey instruments such as the S-TOFHLA may be interrupted or pre-empted entirely by the fast pace of care and patient acuity.

1. Nielsen-Bohman, L. Health Literacy: A Prescription to End Confusion. National Academy Press (2004).
2. Davis, T.C., M.S. Wolf, P.F. Bass, M. Middlebrooks, E. Kennen, D.W. Baker, C.L. Bennett, et al. (2006). Low Literacy Impairs Comprehension of Prescription Drug Warning Labels. *Journal of General Internal Medicine* 21, 847-851.
3. Keller, D.L., J. Wright & H.A. Pace. (2008). Impact of health literacy on health outcomes in ambulatory care patients: a systematic review. *Ann.Pharmacother.* 42, 1272-1281.
4. Baker, D.W., J.A. Gazmararian, M.V. Williams, T. Scott, R.M. Parker, D. Green, J. Ren, et al. (2004). Health Literacy and Use of Outpatient Physician Services by Medicare Managed Care Enrollees. *Journal of General Internal Medicine* 19, 215-220.
5. Ginde, A.A., S.G. Weiner, D.J. Pallin & C.A. Camargo Jr. (2008). Multicenter study of limited health literacy in emergency department patients. *Acad.Emerg.Med.* 15, 577-580.