The Effect of Health Literacy on Medication Safety in the Elderly

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Context

- Limited health literacy may decrease medication safety
- Evidence for how it affects medication management in the primary care setting is limited

Objective

- To evaluate medication safety
  - Using indicators of medication discrepancy and medication use
- Among elderly primary care patients
  - Non-adequate (inadequate and marginal) functional health literacy (FHL) vs. adequate FHL
- Hypothesis
  - More medication discrepancy and inappropriate use are associated with lower FHL

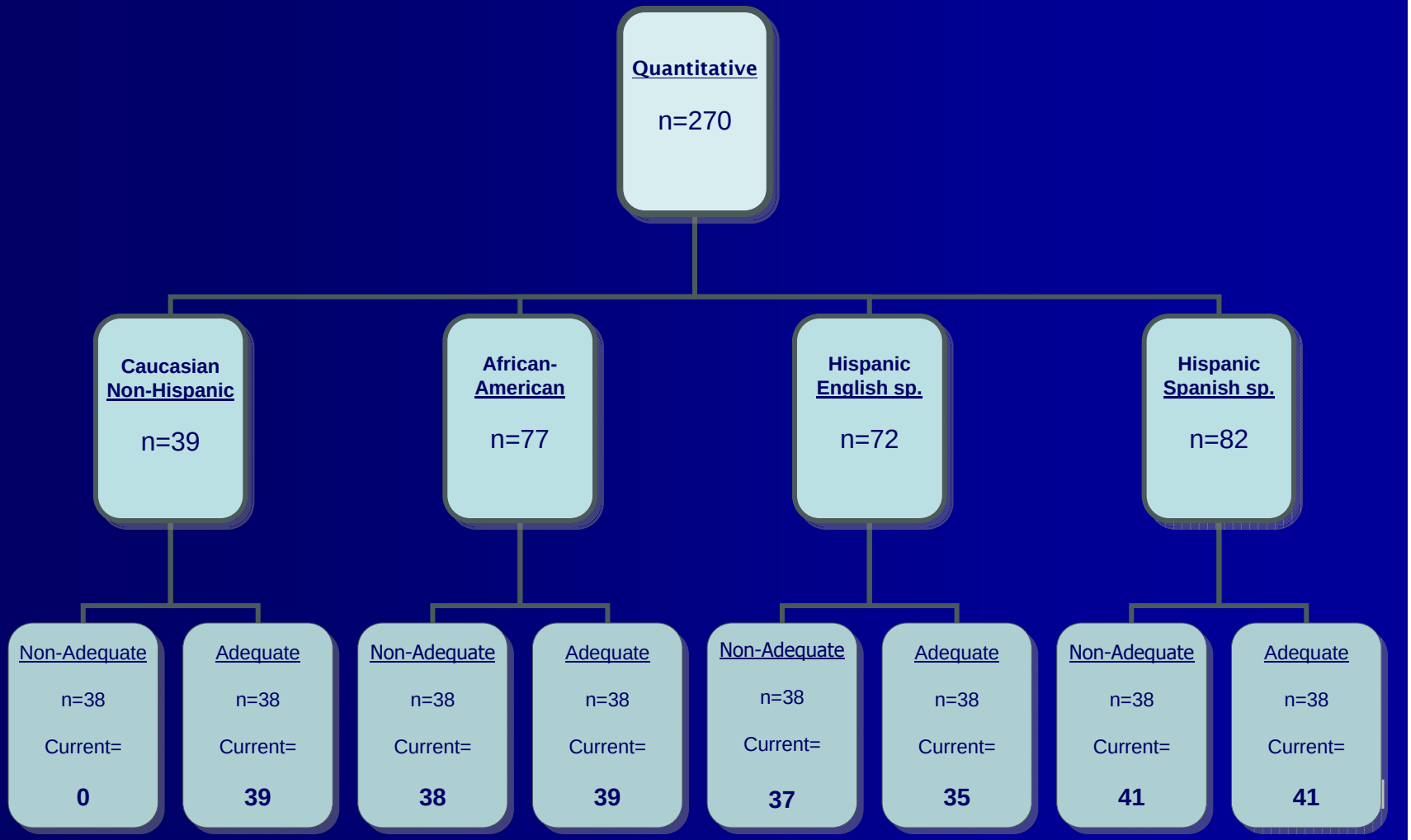
Design

- Cross-sectional
- Mix Methods
- The study proceeded in three phases:
  - 1) patient recruitment
  - 2) medication interview + medical record review (quantitative)
  - 3) cognitive interview in a subset of patients (qualitative)

Setting & Participants

- 6 primary care clinics affiliated with the Southern Primary-care Urban Research Network (SPUR-Net)
- A purposive sample of 270 patients at least 65 years of age
  - Taking at least five medications
  - Either English or Spanish speaking

Recruitment Strategy & Enrollment



Results: Patient & Meds Characteristics

- 270 patients
- Age: 72 ± 6 (65 – 94 y/o)
- Gender: 66% female
- Education:
  - < high school (61%); High school (18%); Some college (11%); College (5%); Postgraduate (5%)
- Language: 70% English + 30% Spanish
- 116 (43%) patients with non-adequate FHL vs. 154 (57%) patients with adequate FHL
  - Non-adequate FHL (74 patients with inadequate FHL + 42 patients with marginal FHL)
- 3,062 medications
  - 76% Rx; 24% OTC
- Average number of medications per patient: 8 ± 3 (4 – 24)
  - Number of prescription meds: 6 ± 3 (1 – 21)
  - Number of OTC meds: 2 ± 2 (0 – 22)

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Outcome measures

- 1) Medication discrepancy
  - Discrepancy between medications patients take at home and medications documented in the medical record
- 2) Medication use by the patient
  - including medication knowledge, missed dose, extra dose, and problems (adverse reactions)

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Results: Total Medication Discrepancy (n = 270 Patients 3,062 Medications)

- 83% of patients in the study had at least 1 medication discrepancy

Patient Takes at Home	Meds in the Medical Record	
	Yes	No
Yes NonA-FHL vs. A-FHL	1,676 (55%) 55% vs. 55% (p = 0.99)	473 (15%) 13% vs. 17% (p < 0.005)
No NonA-FHL vs. A-FHL	913 (30%) 32% vs. 28% (p < 0.01)	X

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Results: Medication Discrepancy & FHL

Error Type	FHL (β)	OR	*p*-value
Take Meds but Not Recorded	0.34	1.4	$P < 0.05^a$
	0.34	1.4	$P < 0.05^b$
	0.31	1.4	$P = 0.05^c$
Recorded but Not Take Meds	– 0.21	0.8	$P < 0.01^a$
	– 0.21	0.8	$P = 0.07^b$
	– 0.25	0.8	$P < 0.05^c$

a=Simple logistic regression; b=variance matrix adjustment; c=GEE adjustment

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Results: Medication Discrepancy (multinomial regression analysis)

- FHL effect is not observed.
- OTC medication is more likely to be taken by patients but not recorded in the medical chart [$\beta=2.63$; $p<0.001$].
- Spanish-speaking Hispanics are more likely to have medications recorded in the medical chart even though they do not take them [$\beta=0.59$; $p<0.005$].

Results: Medication Use

- Medication knowledge
  - 76% NA-FHL vs. 87% A-FHL; $p<0.005$
- Missed doses in a week (out of 2,142 meds): 136 (6.4%)
  - 6.5% NA-FHL vs. 6.2% A-FHL ; $p=0.76$
- Extra doses taken in a week (out of 2,140 meds): 4 (0.2%)
  - 0% NA-FHL vs. 0.3% A-FHL ; $p=0.09$
- Medications reported by patients who experienced problems (out of 2,121 meds): 98 (4.6%)
  - 3.6% NA-FHL vs. 5.3% A-FHL ; $p=0.07$

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Results: Medication Discrepancy & Use (Rx vs. OTC)

Medication Outcomes	Rx 2,317 (76%)	OTC 744 (24%)	*p*-value
Take Not Recorded	141 (6%)	331 (44%)	$P < 0.001$
Recorded Not Take	757 (33%)	156 (21%)	$P < 0.001$
Reason Correct	1,238 (79%)	540 (92%)	$P < 0.005$
Missed Dose	98 (6%)	38 (7%)	$P = 0.951$
Extra Dose	4 (0.3%)	0 (0%)	$P = 0.471$
Med Problem	89 (5.8%)	9 (1.6%)	$P < 0.001$

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Discussion

- **Medication discrepancy**
  - Medications patients take at home but not recorded in the chart
    - Adequate FHL is positively associated. Most of these medications were OTC medications.
    - Simple logistic regression and variance matrix adjustment showed significance; generalized estimating equation adjustments showed marginal significance. The FHL effect is not observed in the multinomial logistic regression model.
  - Medications recorded in the chart but not taken by patients
    - Adequate FHL is negatively associated. More of these medications were prescription medications.
    - Simple logistic regression and GEE adjustment showed significance. The FHL effect is not observed in the multinomial logistic regression model.
  - Spanish-speaking Hispanics were less likely to take medications listed in the chart
    - Shown from the multinomial logistic regression model.

Discussion

- **Medication use**
  - Adequate FHL is associated with better understanding (knowledge) for taking medications.
  - There appears to be more adverse medication reactions associated with prescription medications. Also, adequate FHL may be associated with more self-reports of medication problems.

- **Limitations**
  - Sample size per race/ethnicity group and FHL group is small
  - Question of whether TOFHLA is the best measure

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Questions? Comments?

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