Health literacy and medication awareness in outpatient neurology

Jori Fleisher, MD
Roma Bhatia, BA
Colton Margus, BA
Amy Pruitt, MD
Nabila Dahodwala, MD, MS

Summary

As researchers continue to illuminate the complexities of neurologic disorders and their management, the clinician faces an equally intensifying burden: how to communicate these advances effectively to patients. Health literacy (HL) refers to a person's ability to find, comprehend, and use basic information and resources in order to make appropriate decisions related to his or her health. We describe the first study of low HL prevalence using a validated measure in a cohort of adult neurology outpatients without dementia. Of 201 subjects, 20.5% had low HL and 26% were unable to name any of their medications. In a multivariate regression model controlling for demographic and clinical factors, low HL was associated with lower education, greater disease duration, each 1-point decrease in the Folstein Mini-Mental State Examination, and the presence of a caregiver. As clinicians, we must incorporate specific communication and patient education strategies into our daily practice to truly optimize our patients' care.

Arrays of therapies enable neurologists to achieve greater disease control in the outpatient setting. However, to optimize care and reduce the medical and financial hazards of hospitalizations, providers must ensure that patients understand the indications, dosing, and adverse effects of prescribed medications.¹ The ability to comprehend medical instructions has been the subject of extensive research leading to the concept of health literacy (HL). HL is defined as “the degree to which individuals have the

Department of Neurology (JF, CM, AP, ND), University of Pennsylvania School of Medicine, Philadelphia; and the Mayo Medical School (RB), Mayo Clinic, Rochester, MN.

Funding information and disclosures are provided at the end of the article. Full disclosure form information provided by the authors is available with the **full text of this article at Neurology.org/cp**.

Correspondence to: Jori.Fleisher@uphs.upenn.edu

Patients with low HL have great difficulty understanding and managing their medical conditions, but may hide these difficulties from their providers...

capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”² Previous studies in internal medicine have found low HL to be a remarkably common, independent predictor of morbidity, mortality, and excess resource utilization. Patients with low HL have great difficulty understanding and managing their medical conditions, but may hide these difficulties from their providers due to embarrassment, lack of insight, or hurried office visits. Using validated instruments, studies have demonstrated low HL in 35%–80% of individuals ≥ 65 years^{3,4} and roughly 50% of adults in various disease cohorts.⁵ Low HL is associated with poorer self-management, and higher hospitalization rates, health care costs, and mortality.^{6–10}

Several studies have assessed neurologic symptom recognition. One study of adults at high cerebrovascular risk found only 54% could identify the brain as the organ damaged in stroke.^{11–15} While symptom knowledge is critical, HL is a prerequisite for understanding basic health language and instructions. To date, the burden and effect of low HL in neurology has only received preliminary attention. A study of adults with epilepsy found lower HL predictive of lower quality of life, although this study was limited by the lack of a validated HL assessment.¹⁶

Given the high prevalence and complexity of neurologic disease, it is important for neurologists to recognize low HL in their patients and take steps to overcome it. We therefore aimed to measure HL and medication awareness in the ambulatory neurology population. We sought to assess the validity of a screening question and determine the association of demographic, clinical, and social factors with low HL and medication awareness.

METHODS

Subject recruitment

The Institutional Review Board of the University of Pennsylvania approved this study. Written informed consent was obtained from all participants, using a 5-page approved institutional template edited for maximum readability. Research staff randomly approached adults ≥ 18 years old presenting to the outpatient neurology clinic waiting room at the Hospital of the University of Pennsylvania for an office visit or neurodiagnostic procedure between June 2011 and February 2012. We described the study’s aims as improving physician communication by understanding how medical information is understood. Subjects with visual acuity $< 20/100$ or Folstein Mini-Mental Status Examination (MMSE) score < 19 were excluded.

Interviews

Research staff asked the subject’s chief neurologic complaint, comorbidities, and medications taken for any neurologic conditions. Only medications related to subjects’ neurologic diagnoses were considered in the final analysis of medication awareness. Subjects were asked a validated screening question for low HL, “How confident are you filling out medical forms by yourself?” with response choices of “extremely,” “quite a bit,” “somewhat,” “a little bit,” or “not at all.”^{17–19} Using yes/no responses, we documented the presence of a caregiver, assistance for medication administration or medical appointments, and the presence of friends or family members in the health care field of whom the subject might ask health-related questions (“health resources”).

Figure 1 CONSORT diagram

Individuals declining participation did not differ significantly from participants by sex or race. MMSE = Folstein Mini-Mental State Examination.

Research staff administered the Short Test of Functional Health Literacy in Adults (S-TOFHLA), a validated assessment of HL using medical prose with 36 cloze-format items^{5,20,e1} and 4 numeracy items based on standardized pill bottles, appointment slips, and blood glucose readings. Results were scored as previously validated, with inadequate and marginal grouped as low HL.^{e2} Finally, socioeconomic and educational background was obtained.

Chart review

Following the interview, we reviewed each subject's electronic medical record to obtain the subject's provider type (resident or attending), physician-documented neurologic diagnoses, duration of diagnosis, age, race, insurance status (self-pay, private, public), list of medications for all neurologic diagnoses on the interview day, and percentage of missed neurology appointments within the past 5 years.

Data analysis

Descriptive statistics were calculated for each variable. We analyzed the screening question's performance with Spearman rank correlation coefficient and area under the receiver operating characteristic curve (AUROC) analyses. We calculated each subject's medication awareness as the ratio of medications correctly reported compared to the provider's list. Two-tailed *t* tests, χ^2 , and Wilcoxon rank-sum tests were used for univariate analyses as appropriate, comparing subjects with adequate vs low HL. We conducted multivariate logistic regression analyses to evaluate associations between low HL and subject characteristics. All covariates with a *p* value < 0.20 in univariate analyses were candidates for inclusion in the final model. Model fit was assessed via likelihood ratio testing. A *p* value $\leq$ 0.05 was considered significant.

RESULTS

Participant characteristics

We approached 244 individuals, and a total of 201 subjects were analyzed with a mix of new and follow-up visits (figure 1). Follow-up visits were to the same physician. Demographic characteristics of the sample are displayed in table 1. The demographics of individuals declining participation did not differ from participants by race or sex (55.88% vs 51.74% African American, *p* = 0.12, in decliners and participants, respectively; 44.12% vs 47.26% male, *p* = 0.35, in decliners and participants, respectively). The primary neurologic diagnoses were epilepsy (25.9%), multiple sclerosis (18.4%), and follow-up after stroke (15.4%), with 71.14% of subjects seen by residents.

Supplemental Data

Neurology.org/cp

Table 1 Characteristics of study participants from outpatient neurology clinic at the Hospital of the University of Pennsylvania

Variable	% (n = 201)	Variable	% (n = 201)
Health literacy, %		Resident neurologist, %	71.1
Inadequate	10.5	Caregiver present, %	29.9
Marginal	10.0	No medical assistance, %	75.4
Adequate	79.5	Appointment assistance, %	
Mean age, y (SD)	46.8 (15.0)	Rarely or never	44.8
Female, %	52.7	Yes, <50% of appointments	14.4
Race %		Yes, >50% of appointments	40.8
African American	51.7	No health resources, %	44.3
White	46.3	Neurologic diagnosis,^a %	
Asian/Pacific Islander	1.0	Epilepsy	25.9
Other	1.0	Headache/chronic pain	19.4
Education level, %		Neuroimmunology/multiple sclerosis	18.4
Less than high school	16.0	Neurovascular	15.4
High school graduate	33.5	Neuromuscular	14.4
Some college	27.0	Psychogenic or non-neurologic	8.5
College graduate	13.0	Cognitive	4.0
Graduate/professional	10.5	Spinal cord	3.0
Annual income, %		Movement disorder	2.5
<\$10,000	41.5	Neuro-oncology	1.5
\$10–50,000	24.6	Medical comorbidities,^a %	
>\$50,000	24.6	Hypertension	52.6
Prefer not to answer	9.2	Diabetes	21.0
Insurance status, %		Cardiovascular disease	11.5
Medicare	13.4	COPD or asthma	21.5
Medicaid	44.3	Cancer (past or current)	12.5
Private	36.8	Arthritis	37.5
Self-pay	5.5	Depression or anxiety	50.5
MMSE, median (IQR)	29 (28–30)	Hearing loss	19.5

Abbreviations: COPD = chronic obstructive pulmonary disease; IQR = interquartile range; MMSE = Folstein Mini-Mental Status Examination.

^aTotal >100% given multiple diagnostic categories and multiple comorbidities in many patients.

Overall, 20.5% of participants had low HL (10.5% inadequate, 10% marginal HL; figure 2A). Medication awareness was notable for a bimodal distribution, with 26% of subjects unable to name any medications, and 47% naming all (figure 2B).

Health literacy screening question

The screening question “How confident do you feel filling out medical forms by yourself?” had poor correlation with an individual’s HL level (Spearman rho 0.27). However, using “somewhat

Figure 2 Distribution of health literacy and medication awareness

(A) The distribution of total Short Test of Functional Health Literacy in Adults (S-TOFHLA) scores within the study population is shown ($n = 201$). Vertical lines demarcate levels of health literacy (HL) as defined by the S-TOFHLA: 0–53 inadequate, 54–66 marginal, and 67–100 adequate. Inadequate and marginal grouped together as low HL. (B) The distribution of medication awareness is demonstrated, as measured by the percentage of neurologic medications named by the participant compared to the medications documented by the participant's provider. The bimodal distribution is highlighted.

confident” as a cutoff, the performance improved with AUROC 0.68 (95% confidence interval [CI] 0.58–0.78), sensitivity 95.63%, and specificity 31.71% for adequate HL.

Demographic and clinical associations with low health literacy

In univariate analyses, low HL was strongly associated with multiple demographic, clinical, and social factors (table 2). Compared to those with adequate HL, individuals with low HL were more likely to be male, to be African American, to be covered by public insurance, to earn <\$10,000 per year, and to have lower education. Participants with low HL were an average

Table 2 Comparison of demographic, social, and clinical factors with low health literacy^a

Variable	Low HL	Adequate HL	p Value
Number	41	160	
Demographic characteristics			
Mean age, y (SD)	51.41 (16.05)	45.66 (14.52)	0.028
Male, %	68.29	41.88	0.003
African American, %	74.36	47.47	0.003
Public insurance, %	80.49	51.88	0.001
Income, %			0.003
<\$10,000	70.59	39.86	
\$10–50,000	20.59	28.67	
>\$50,000	8.82	31.47	
≤ High school diploma, %	73.17	43.12	0.001
Resident physician, %	85.37	67.50	0.024
Social support			
Caregiver present, %	53.66	23.75	<0.001
Other assistance w medication, %	58.54	15.72	<0.001
Assistance with appointments, %	70.73	51.25	0.025
Presence of health resource, %	48.78	57.50	0.316
Clinical factors			
Median MMSE score (IQR)	28 (25–29)	29 (28–30)	<0.001
≥3 Comorbidities, %	60.98	47.50	0.331
<50% Medications correctly named, %	73.53	32.28	<0.001
No diagnostic agreement, %	34.15	18.75	0.033
Neurologic diagnosis, %			
Neurovascular	21.95	13.75	0.195
Neuromuscular	12.20	15.00	0.805
Multiple sclerosis/neuroimmunology	9.76	20.62	0.120
Headache/chronic pain	19.51	19.38	0.984
Epilepsy	41.46	21.88	0.011
Movement	7.32	1.25	0.059
Cognitive	9.76	2.50	0.056
Spinal cord	2.44	3.12	1.000
Neuro-oncology	2.44	1.25	0.498
Benign imaging/psychogenic	0	10.62	0.026
Median diagnosis duration, y (IQR)	5 (1–18)	3 (1–10)	0.080
Abbreviations: HL = health literacy; IQR = interquartile range; MMSE = Folstein Mini-Mental State Examination.			
^a Total >100% given multiple diagnostic categories and multiple comorbidities in many patients.			

of 5.75 years older and had a one-point lower median MMSE score. In a subgroup analysis excluding the 7 individuals with MMSE <24, the latter relationship persisted, with median scores in the low vs adequate HL groups as follows: 28 (interquartile range [IQR] 26–29) vs 29.5 (IQR 28–30), $p < 0.001$.

Table 3 Independent factors associated with low health literacy

Variable	OR	95% CI	p Value
Each additional year of age	1.03	0.99–1.06	0.089
Male	1.85	0.75–4.56	0.181
African American	2.06	0.77–5.50	0.147
Medicaid or Medicare insurance	1.97	0.70–5.51	0.198
High school graduate or less ^a	2.98	1.11–7.96	0.029
Each missed point on MMSE ^a	1.46	1.19–1.80	<0.001
Each additional year of neurologic disease ^a	1.05	1.01–1.09	0.010
Presence of caregiver ^a	4.99	1.97–12.63	0.001

Abbreviations: CI = confidence interval; MMSE = Folstein Mini-Mental State Examination; OR = odds ratio.

^aSignificant at the $p < 0.05$ level. All potential predictors as determined by $p < 0.20$ in univariate analyses (see table 2) were included in the initial model, with subsequent backwards elimination, assessment for confounding, and likelihood ratio testing for model fit.

Individuals with low HL were more likely to have social support in place, although the extent of caregiver assistance was not explicitly defined. Despite assistance and adequate cognition, those with low HL correctly named fewer medications than those with adequate HL (35.03% v 68.52%, $p < 0.01$). There was no difference in missed appointments between individuals with low and adequate HL ($p = 0.28$).

After controlling for age, sex, race, and insurance status (table 3), low HL remained strongly associated with low education (odds ratio [OR] 2.98, 95% CI 1.11–7.96) and low MMSE score (OR 1.46 for each missed point, 95% CI 1.19–1.80). Longer duration of neurologic disease predicted low HL (OR 1.05 for each year of illness, 95% CI 1.01–1.09), as did the presence of a caregiver (OR 4.99, 95% CI 1.97–12.63).

DISCUSSION

In a cohort of outpatients without dementia at an academic neurology clinic, 20.5% of subjects had low HL and 26% were unaware of any of their neurologic medications. A previously validated screening question performed moderately well in identifying individuals with adequate HL, with 96% sensitivity and 32% specificity. Factors associated with low HL include education, MMSE score, disease duration, and caregiver presence.

Prior studies, including a large systematic review,⁵ have found a higher prevalence of low HL compared to our study (50% vs 20.5%). Possible explanations are different study settings, samples, and measurement tools. Some proficiency in navigating the health care system is necessary to schedule and attend an appointment at a tertiary care specialty clinic with complicated referral systems and the often months-long wait for appointments. This navigational skill is itself a component of HL. Compared to more easily accessible primary care offices or emergency rooms, academic specialty clinics may unintentionally prevent patients with low HL from accessing care.^{e3,e4} Additionally, we excluded individuals with significant cognitive impairment, whereas other studies have included these individuals, confounding HL measurements.⁵ Therefore, our study likely underestimates the prevalence of low HL in the broader population of neurology outpatients.

In screening for HL using the question “How confident do you feel filling out medical forms by yourself?” the cutoff of “somewhat confident” or higher had high sensitivity and low specificity for predicting individuals with adequate HL. In practice, then, utilizing

Practically, the burden falls on neurologists to recognize low HL as a barrier to disease management and a potential contributor to morbidity and mortality.

follow-up strategies—such as teach-back—are necessary to confirm understanding. Further studies are needed to determine which screening instruments are clinically feasible, reliable predictors of HL, and whether the associations identified in this study are generalizable to the broader neurology outpatient population. Perhaps the safest approach to ensuring adequate understanding of disease management is to employ “universal precautions”: using clear, plain-language communication and simple analogies with all patients.^{e5}

Consistent with the literature, individuals most at risk of low HL in this study include those with less education.^{3,5,e6-e8} Also consistent with previous studies,^{3,e6,e8} African American race was associated with low HL in univariate analyses, and moderately associated in a limited model adjusted for age, sex, insurance, MMSE, disease duration, and caregiver (OR 2.73, CI 1.08–6.95, $p = 0.035$). However, the inclusion of education in our final model lowered the point estimate by over 25%, demonstrating that education is a powerful confounder in the relationship between race and HL, consistent with abundant evidence that reports of racial disparities may be biased by differences in social and environmental contexts.^{e9-e12}

Despite our exclusion of individuals with dementia, we found a moderate difference in the MMSE scores of individuals with low and adequate HL. This association remained even with a conservative cutoff, such that even mild cognitive impairment is associated with low HL. Complicated polypharmacy and jargon-heavy language may be well beyond the level of understanding for an individual with borderline cognition and low HL, leading to excess morbidity and mortality.⁹

Disease duration was a strong predictor of low HL in this cohort, even after adjustment for age and cognition. Clinicians may assume that patients with chronic disease are more familiar with disease management, and save lengthier explanations for newly diagnosed patients. However, our results suggest that this assumption could further disadvantage patients with chronic disease and low HL, who are also subject to polypharmacy with disease progression. In addition, we found that patients seen by trainees were more likely to have low HL compared to attendings' patients. This association disappeared after adjusting for socioeconomic and insurance status. These points bear consideration for 2 reasons. Resident neurologists receive little if any training in the effect of HL on disease management, although their patients are more likely to have low HL given the propensity of trainee clinics to serve uninsured or underinsured populations. Conversely, attending neurologists often have less time allotted per patient appointment—for example, 60-minute attending initial visits compared to 60–90-minute resident initial visits—and may, by virtue of their established patient base, have a higher proportion of patients with chronic disease as compared to trainees. Thus, neurologists with the greatest expertise have the least time to spend engaging in explanation and shared decision-making. Therefore, all neurologists should prioritize continual assessment of disease and therapy comprehension with their patients.

While our finding that patients with caregivers are 5 times as likely to have low HL may appear reassuring in that they have assistance, this bears examination. First, the extent of assistance was not clearly defined. Patients may have answered affirmatively based on the presence of a spouse, partner, or family member, whether or not that person assists with any health-related behaviors. Furthermore, the few studies regarding caregiver HL are concerning. In a study of paid caregivers, 36% had inadequate HL and 60% made errors with medication administration.^{e13} In a study of mothers administering medication to their children, parents

with low HL were one-third as likely as those with adequate HL to correctly measure a single dose.^{e14} We should therefore be cautious in interpreting the presence of a caregiver as a safety net for individuals with low HL.

Limitations of this study include the small sample size, particularly for individual disease categories, limiting the ability to analyze individual diagnoses as factors in HL. Future studies of disease-specific cohorts, or studies powered to analyze differences between diagnostic categories, will be critical. Moreover, studies conducted at a single tertiary care center have an inherent selection bias, as patients referred for academic specialist evaluation may have greater disease severity and access to care. However, the demographics of our study population closely approximate those of the community we serve according to US Census data. In 2011, the population of Philadelphia County was 45.9% white, 52.8% female, and 12.1% aged 65 years or older (in our sample: 46.3%, 52.7%, and 10.5%, respectively).^{e15} Furthermore, while we analyzed missed appointment patterns and the demographics of nonparticipants compared to participants to limit healthy volunteer bias, people with low HL may participate less frequently in research and thus be underrepresented.⁵ This limitation would bias our prevalence estimate towards the null, underestimating the true scope of the problem. Although simple recollection of medications reflects a necessary but insufficient prerequisite for medication adherence, future studies using validated measures of adherence are needed. Finally, this initial study was observational rather than interventional in nature, with future studies needed to delineate evidence-based interventions in our specific populations. However, outstanding tools are available from the Agency for Healthcare Research and Quality (www.ahrq.gov/qual/literacy/).

Despite these limitations, at least 20% of neurology outpatients are unable to process basic medical communication, and even more are unable to name any of their medications. Practically, the burden falls on neurologists to recognize low HL as a barrier to disease management and a potential contributor to morbidity and mortality. Further efforts are necessary to either refine screening tools for low HL or adopt the universal precautions approach to HL. We must evaluate the effect of HL on disease-specific outcomes and hospital readmissions, and moreover, develop specific interventions. The rise of electronic medical records and smartphones provides timely opportunities to develop and provide HL-guided treatment instructions, patient education, and medication reconciliation. Ancillary staff can be trained to use such tools given physician time constraints. We must also recognize the important role that caregivers play and examine the burdens of and strategies to overcome their low HL. Additionally, efforts should be made by providers, pharmacists, and pharmaceutical companies to reduce unnecessarily complicated jargon, including unwieldy drug names.

Estimates suggest that the majority of the 30 million currently uninsured adults becoming newly insured under the Patient Protection and Affordable Care Act have low HL.^{e16} Decades of translational research have yielded many therapies for previously untreatable neurologic conditions. We must recognize HL as a formidable but surmountable barrier. Only then can we translate the benefits of this research to all patients.

REFERENCES

1. Gellad WF, Grenard JL, Marcum ZA. A systematic review of barriers to medication adherence in the elderly: looking beyond cost and regimen complexity. *Am J Geriatr Pharmacother* 2011;9:11–23.
2. Ratzan SC, Parker RM. Introduction. In: National Library of Medicine Current Bibliographies in Medicine: Health Literacy. Bethesda: National Institutes of Health, U.S. Department of Health and Human Services; 2000.
3. Gazmararian JA, Baker DW, Williams MV, et al. Health literacy among Medicare enrollees in a managed care organization. *JAMA* 1999;281:545–551.
4. Parker RM, Wolf MS, Kirsch I. Preparing for an epidemic of limited health literacy: weathering the perfect storm. *J Gen Intern Med* 2008;23:1273–1276.
5. Paasche-Orlow MK, Parker RM, Gazmararian JA, Nielsen-Bohlman LT, Rudd RR. The prevalence of limited health literacy. *J Gen Intern Med* 2005;20:175–184.

6. Bostock S, Steptoe A. Association between low functional health literacy and mortality in older adults: longitudinal cohort study. *BMJ* 2012;344:e1602.
7. Baker DW, Wolf MS, Feinglass J, Thompson JA. Health literacy, cognitive abilities, and mortality among elderly persons. *J Gen Intern Med* 2008;23:723–726.
8. Wolf MS, Gazmararian JA, Baker DW. Health literacy and functional health status among older adults. *Arch Intern Med* 2005;165:1946–1952.
9. Baker DW, Wolf MS, Feinglass J, Thompson JA, Gazmararian JA, Huang J. Health literacy and mortality among elderly persons. *Arch Intern Med* 2007;167:1503–1509.
10. Bennett IM, Chen J, Soroui JS, White S. The contribution of health literacy to disparities in self-rated health status and preventive health behaviors in older adults. *Ann Fam Med* 2009;7:204–211.
11. Kothari R, Sauerbeck L, Jauch E, et al. Patients' awareness of stroke signs, symptoms, and risk factors. *Stroke* 1997;28:1871–1875.
12. Willey JZ, Williams O, Boden-Albala B. Stroke literacy in central Harlem: a high-risk stroke population. *Neurology* 2009;73:1950–1956.
13. Kleindorfer D, Khoury J, Broderick JP, et al. Temporal trends in public awareness of stroke: warning signs, risk factors, and treatment. *Stroke* 2009;40:2502–2506.
14. Mott J, Shellhaas RA, Joshi SM. Knowledge of epilepsy and preferred sources of information among elementary school teachers. *J Child Neurol* 2013;28:740–744.
15. Werner P. Knowledge about symptoms of Alzheimer's disease: correlates and relationship to help-seeking behavior. *Int J Geriatr Psychiatry* 2003;18:1029–1036.
16. Bautista RE, Glen ET, Shetty NK, Wludyka P. The association between health literacy and outcomes of care among epilepsy patients. *Seizure* 2009;18:400–404.
17. Wallace LS, Rogers ES, Roskos SE, Holiday DB, Weiss BD. Brief report: screening items to identify patients with limited health literacy skills. *J Gen Intern Med* 2006;21:874–877.
18. Morris NS, MacLean CD, Chew LD, Littenberg B. The single item literacy screener: evaluation of a brief instrument to identify limited reading ability. *BMC Fam Pract* 2006;7:21.
19. Chew LD, Griffin JM, Partin MR, et al. Validation of screening questions for limited health literacy in a large VA outpatient population. *J Gen Intern Med* 2008;23:561–566.
20. Baker DW, Williams MV, Parker RM, Gazmararian JA, Nurss J. Development of a brief test to measure functional health literacy. *Patient Educ Couns* 1999;38:33–42.

ACKNOWLEDGMENT

The authors thank Dr. Lee A. Lindquist for input during the conception and design of this study and Dr. Xilma Ortiz-Gonzalez for translation of the informed consent document and questionnaire into Spanish.

STUDY FUNDING

No targeted funding reported.

DISCLOSURES

J.E. Fleisher receives an unrestricted educational grant from Medtronic and is supported by NIH T32-NS-061779. R. Bhatia reports no disclosures. C. Margus received compensated support of the Bill & Melinda Gates Foundation's Beijing Representative Office. A. Pruitt has received speaker honoraria from the American Academy of Neurology and serves as a Section Editor for *Current Treatment Options in Neurology*. N. Dahodwala has received funding for travel from the Movement Disorders Society and the National Parkinson Foundation; receives an investigator-initiated grant from Teva Pharmaceuticals; and receives research support from the NIH (NIA and National Institute of Neurological Disorders and Stroke), Parkinson Council, and National Parkinson Foundation. Full disclosure form information provided by the authors is available with the **full text of this article at Neurology.org/cp**.

Related articles from other AAN physician and patient resources

Neurology® ● www.neurology.org

Long-term learning of stroke knowledge among children in a high-risk community

August 21, 2012;79:802-806.

Invited Article: Improving safety for the neurologic patient: Evaluating medications, literacy, and abuse

August 24, 2010;75:742-746.

Continuum® ● www.ContinuumJournal.com

The diagnostic evaluation of a patient with dementia

April 2013;397-410.

Neurology Now® ● www.neurologynow.com

New website aims to improve patient-doctor dialogue

August/September 2013;9:14.

Five questions to ask your neurologist

June/July 2013;9:20-26.

Neurology Today® ● www.neurotodayonline.com

For Medicaid patients, particularly children, the neurologist may not be in

July 21, 2011;11:1,24,25.

News from the AAN Annual Meeting: Presentation format makes the difference in patient decisions on carotid stenosis

May 5, 2011;11:38,39.