

Health Literacy Skills Instrument

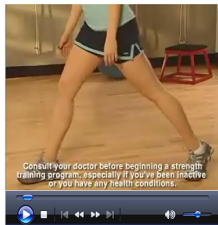
10- Item Short Form (HLSI-SF)

User Guide

Drug Facts	
Active ingredient (in each tablet)	Purpose
Chlorpheniramine maleate 2 mg	Antihistamine
Uses temporarily relieves those symptoms due to hay fever or other upper respiratory allergens: ■ sneezing ■ runny nose ■ itchy, watery eyes ■ itchy throat	
Warnings Ask a doctor before use if you have: ■ glaucoma ■ a breathing problem such as emphysema or chronic bronchitis ■ trouble urinating due to an enlarged prostate gland Ask a doctor or pharmacist before use if you are taking tranquilizers or sedatives	
When using this product ■ drowsiness may occur ■ avoid alcoholic drinks ■ alcohol, sedatives, and tranquilizers may increase drowsiness ■ be careful when driving a motor vehicle or operating machinery ■ drowsiness may occur, especially in children If pregnant or breast-feeding, ask a health professional before use. Keep out of reach of children. In case of overdose, get medical help or contact a Poison Control Center right away.	
Directions adults and children 12 years and over take 2 tablets every 4 to 6 hours, not more than 12 tablets in 24 hours children 6 years to under 12 years take 1 tablet every 4 to 6 hours, not more than 6 tablets in 24 hours children under 6 years ask a doctor	



: video below before proceeding to the next screen.



Signs of a Stroke

My mother is alive today because a police officer knew the signs of a stroke. You can save a life, too, if you learn these signs.

Mom was on her way to the doctor when a police officer noticed she was driving erratically and wanted to follow her. She spun on the highway. When the officer blindingly headed, she told him she had a bleeding headache. But she said she had a confused. And she said she had a weird feeling. The officer also noticed that mom just wasn't acting right. Some of the speech was slurred. And she was a little dizzy.

Mom said she felt fine, but that didn't stop her. She said she quickly called 911. She said she knew the signs of a stroke could help you save a life. Remember, some people have all of these signs, but my mom only had a few.

If you see someone like her even a few of these signs, get help fast!

Five Signs of a Stroke

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or trouble understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, or loss of balance
- Sudden, severe headache

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User Registration Form and Agreement

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Administration note:

The developers recommend using all 10 items in the instrument. Reliability and validity information applies to the 10-item version as a whole.

Background

Over the last 20 years, the field of health literacy has grown tremendously. A number of instruments have been used to measure health literacy such as the rapid estimate of adult Literacy in Medicine (REALM) (Davis et al., 1991) and the Test of Functional Health Literacy in Adults (TOFHLA) (Parker, Baker, Williams & Nurss, 1995). These instruments are limited in that they measure reading ability or print literacy, or in the case of the TOFHLA, numeracy; they do not reflect a comprehensive assessment of health literacy (Berkman et al., 2004; IOM, 2009). Instruments also exist that attempt to screen patient health-literacy level in clinical settings (e.g., the Newest Vital Sign; Weiss et al., 2005), measure provider-level facilitation of health literacy (e.g., Consumer Assessment of Health Providers and Systems [CAHPS] Item Set for Addressing Health Literacy; Agency for Healthcare Research and Quality, and assess health literacy using sociodemographic and geographic data elements (Paasche-Orlow, Schillinger, Greene, & Wagner, 2006).

The Department of Education's 2003 National Assessment of Adult Literacy (NAAL) Survey is the only national assessment of literacy that includes some health literacy tasks (Kutner, Greenberg, Jin, & Paulsen, 2006). Of the 28 health literacy tasks on the NAAL, 3 represented a *clinical* domain, 14 represented a *prevention* domain, and 11 items represented *navigation of the health care system*. The NAAL yields estimates of the distribution of levels of health literacy for various population groups. Though it overcomes some of the limitations of other measures, including a focus on assessing skills other than reading, the NAAL has been criticized for its lack of availability, lack of transparency, and challenges in using it (Weiss, 2009).

Based on the IOM's call to action in the report *Health Literacy: A Prescription to End Confusion* (Nielson-Bohlman, Panzer & Kindig, 2004), RTI International developed a comprehensive, publically available health literacy instrument¹. This instrument, titled the Health Literacy Skills Instrument (HLSI) and a 10-item short form (HLSI-SF) measures print literacy, oral literacy, and Internet-based information seeking skills. The 10-item short form, called the HLSI-SF is the focus of this user guide.

Overview

The instrument was developed to assess 4 domains of health literacy skills: print literacy (reading and writing), numeracy skills, oral literacy skills (listening), and information seeking (navigation of internet and facilities). It uses print literacy as well as non-print stimuli and examines oral and Internet-based information seeking skills. Stimuli represent health related treatment, and health system and health information navigation.

RTI first developed the 25-item instrument and piloted using KnowledgePanel® created by Knowledge Networks (<http://www.knowledgenetworks.com/>), an online Non-Volunteer Access Panel. Once the reliability and validity of the 25-item HLSI was established, we developed the HLSI-SF. Data was used from the pilot test of the 25-item (see McCormack et al., 2010 for a full discussion of the methods,

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sample, and results) and based on the results of the psychometric analyses, 10 of the best performing items were selected for inclusion on the brief measure.

Suggested Uses

The HLSI-SF and the HLSI both were designed to be used for national and regional surveillance of health literacy skills and to be used to assess interventions designed to increase individuals' health literacy skills.

Administration

The 10-item HLSI-SF (and the 25-item HLSI) was designed to be administered using a computer via either in-person or web-based survey data collection. Developers recommend using all 10 items in the instrument. Reliability and validity information applies to the 10-item version as a whole.

Some questionnaire items that reference print-based stimuli may be able to be administered on a paper-pencil survey or a telephone survey (if stimuli were mailed in advance), but the instrument was not validated using that methodology. Conducting the survey via web allows for the additional assessment of computer-based health information seeking skills which is difficult to measure in a mode other than via the computer.

Developers recommend using all 10 items in the instrument. Reliability and validity information applies to the 10-item version as a whole.

Stimuli

Expert Panel Members (see Appendix A) provided helpful input regarding the definition of health literacy to use, the conceptual underpinnings, and the measurement process. Stimuli selection and type for the HLSI were vetted through a subset of the expert panel members. We requested their input regarding the appropriateness of the proposed stimuli, the health literacy skills each stimuli addressed, and if the collection of stimuli adequately addressed each health domain (e.g., health promotion and disease prevention, health care maintenance and treatment). Panel members also rated the difficulty of the draft survey items, the health literacy skills domain each item assessed, and the overall quality of each item. Items that experts did not feel assessed one or more of the skills domains of health literacy or contributed to a measure of health literacy were eliminated. This review process supported face validity of the stimuli and items selected for the instrument.

The majority of the stimuli in the instrument are print based. One questionnaire item that assesses oral literacy (listening skills) use an audio stimuli. The web link to this audio content is provided in the Questionnaire and is housed on a server at RTI International. Items which assess Internet-based information seeking skills were developed by Healthwise Incorporated (Healthwise). RTI International has a license agreement with Healthwise to allow access to these web-based stimuli for the sole purpose of conducting a health literacy survey. Users cannot use the stimuli for purposes other than conducting

a health literacy survey. This content is hosted on Healthwise servers for the duration of the licensing agreement. Links to these stimuli are also provided in the HLSI Questionnaire.

Two stimuli (Lunge and Portion Control) are used with permission from the Mayo Foundation. A fourth stimuli, Food Nutrition Label has also been used with permission, but from a private consultant. The sources and acknowledgement text included with these stimuli must be included when the instrument is used and referenced appropriately.

Survey participants should be cautioned that the educational content within the stimuli should not be substituted for medical advice, and could, in fact be out of date and/or inaccurate.

Items

Ten items were selected from 25 item HLSI for the health literacy short form, covering the following domains from the long form: print-prose (N=2), print-document (N=3), print-quantitative (N=2), internet (N=1), and oral (N=2).

PRINT-PROSE	
Cholesterol	Which set of low density lipoprotein (LDL) and high density lipoprotein (HDL) levels is <u>best</u> ?
Stroke	Which of the following is <u>not</u> a sign of a stroke?
PRINT-DOCUMENT	
Hospital map	Which of the following entrance is closest to the elevator?
Medicine record	In the example listed in the first row of the table, when should the medicine be taken?
Portion control	A person is cooking dinner for himself and he wants to include one serving from the meat and beans group. What should he choose?
PRINT-QUANTITATIVE	
Nutrition label	If a person is on a 2,500 calorie diet, what percent of the daily value of saturated fat would he get from one serving?
Prostate cancer graph	More men die from prostate cancer than from other causes. Based on the chart above, would you say this is true, false, or are you not sure?
ORAL	
Telephone recording	If a person was worried about his cough, what number should he press?
INTERNET	
Calories	Kate weighs 150 pounds. Which activity would burn the most calories?
Lunges	What part of the body do lunge exercises work?

Items Selected for HLSI-SF

The above items are representative of the 10 best performing items of the 25 item HLSI and were selected using the following a priori criteria: (1) Items should have high factor loadings and IRT slopes, indicating good discrimination; (2) To avoid potential floor and ceiling effects, items should not have percentages correct close to 0 or 100%; (3) To ensure the measure encompasses a wide range of ability levels, the items on the scale should have a variety of IRT thresholds and percentage of correct responses, (4) Items with high rates of missing data and/or don't know responses may be confusing and/or irrelevant and will be excluded; and (5) Items should not demonstrate slope-related DIF. In addition to the statistical results, the scale development team also reviewed item wording and selected items to ensure the content validity of the short form by including items that captured each of the 5 components of health literacy (print-prose, print-document, print-quantitative, oral, and internet), as well as other critical health literacy skills while remaining within the 10-item limit.

After identifying the final set of 10 items for the short form, we repeated the confirmatory factor analyses and IRT analyses used to develop the full 25-item HLSI, but used only the items on the short form. We also computed Cronbach's alpha to assess the internal consistency reliability of the short form. Construct validity was evaluated by conducting analyses of variance to compare mean health literacy short form scores by demographic characteristics and self-reported skills. For comparison purposes, similar analyses were also conducted with the long form scores. Based on earlier results from the long form (McCormack et al., 2010), we hypothesized that participants with higher education levels and those who reported less difficulty with skills related to health literacy would have higher scores on the short form and that the short form would be moderately correlated with the s-TOFHLA.

Internal Consistency of HLSI-SF

Factor loadings for all items, except item 6 were higher than 0.4. Similarly, all items except item 6 had IRT slopes near or above 1.0, indicating good discrimination. None of the items except item 6 (percentage of saturated fat) demonstrated significant slope or threshold-related DIF by gender, age, race, or education. Item 6 (percentage of saturated fat) was kept because it differentiated those with a high school education or less when compared to those with more than a high school education (i.e. some college or more) and also between white and non-white respondents (see McCormack et al, 2010).

The scale demonstrated acceptable internal consistency reliability with Cronbach's alpha of 0.70. The short form correlated highly with the long form ($r=0.90$), suggesting minimal loss of information with the use of the short form. The psychometric properties of the HLSI-SF can be found in Appendix B.

Validity of HLSI-SF

Comparisons of health literacy short and long form scores by demographic characteristics are shown in Appendix C. Consistent across both measures, higher health literacy scores were found among those who had higher education and were married and lower scores among those who were black (vs. white) and retired or disabled (vs. employed). Those who were Hispanic or Other race or unemployed had significantly lower scores on the long form, but not the short form.

As shown in Appendix E, participants with poorer self-reported abilities on a range of health literacy skills had significantly lower scores on both forms of the scale ($p < .001$). The magnitudes of difference are similar between the two scales as shown by the regression coefficients (B). These skills encompass each of the domains covered by the scale, including print-prose (remembering and understanding information I read), print-document (finding health information I need), print-quantitative (good at math), internet (locating health information on the internet), and oral (remembering and understanding information I hear, explaining a health issue to a doctor) with the strong relationship between the short form and these measures, supporting the construct validity of the short form.

Similar to the 25-item HLSI, the 10-item HLSI (HLSI-SF) had a small to moderate correlation with the s-TOFHLA ($r=0.36$) as anticipated.

Scoring, Cut Points, and Classifications

The percentage of correct responses for each of the 10 items ranged from 24% of the total sample for item 6 (percentage of saturated fat) to 90% for item 2 (sign of stroke). On average, participants answered 67% (7/10 items) of the items on the short form correctly ($SD=23\%$) compared to 70% (18/25 items) on the long form ($SD=22\%$).

We investigated possible cut-points for classifying participants into three categories based on their health literacy levels: proficient, basic, and below basic, using a similar approach as we used for the long form. We conducted a series of receiver operating characteristic (ROC) analyses to determine which cut-points optimally distinguish participants based on their self-reported difficulty with understanding information they read and their highest level of educational achievement. Using three categories lacked precision, so suggest a cut points to differentiate two categories we have labeled “adequate” and “inadequate” health literacy skills.

Bases on these analyses, we have identified the following cut points: adequate literacy (score 70% and above correct) and inadequate literacy (score of 60% or below correct).

Health Literacy Level	Raw Score	Percent Correct	Percent of Pilot Sample
Adequate	7-10	70-100	63
Inadequate	0-6	<60	37

Suggested Analyses

The instrument can be used as an independent variable as well as a dependent variable. Some suggested analyses include:

- examining the variation in socio-demographics, prior knowledge, capabilities, and resources according to the HLSI
- assessing the relationship between health literacy skills and domain-specific and/or general health knowledge.
- conducting path analyses to determine the relationship between health literacy skills and health outcomes, and whether variables such as self-efficacy, attitudes toward specific health behaviors, and skills in making health-related decisions mediate that relationship.

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Appendix A: Expert Panel Members

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Appendix B. Psychometric Properties of 10-Item HLSI-SF

Item	% correct	Factor loading	IRT parameters	
			Slope	Threshold
PRINT-PROSE				
1b) Which set of low density lipoprotein (LDL) and high density lipoprotein (HDL) levels is <u>best</u> ?	66	0.57	1.20	-0.88
13a) Which of the following is <u>not</u> a sign of a stroke?	90	0.71	1.84	-1.88
PRINT-DOCUMENT				
8b) Which of the following entrance is closest to the elevator?	80	0.63	1.40	-1.36
9a) In the example listed in the first row of the table, when should the medicine be taken?	59	0.56	1.15	-0.47
14b) A person is cooking dinner for himself and he wants to include one serving from the meat and beans group. What should he choose?	75	0.68	1.59	-1.09
PRINT-QUANTITATIVE				
18c) If a person is on a 2,500 calorie diet, what percent of the daily value of saturated fat would he get from one serving?	24	0.36	0.67	2.06
19a) More men die from prostate cancer than from other causes. Based on the chart above, would you say this is true, false, or are you not sure?	80	0.64	1.62	-1.42
INTERNET				
11b) Kate weighs 150 pounds. Which activity would burn the most calories?	54	0.61	1.36	-0.24
ORAL				
7a) If a person was worried about his cough, what number should he press?	58	0.49	0.91	-0.43
16a) What part of the body do lunge exercises work?	89	0.86	2.46	-1.77

Appendix C. Mean Scores on Long and Short Forms of the HLSI by Demographic Characteristics

Characteristic	N	%	Health Literacy – Long Form			Health Literacy – Short Form		
			Mean (95% CI)	B (SE)	p	Mean (95% CI)	B (SE)	p
Gender								
Male	458	48	70 (68-73)	1.57 (2.18)	.469	67 (64-70)	0.77 (2.26)	.734
Female	431	52	69 (66-72)	REF		67 (63-70)	REF	
Age								
18–29	180	22	69 (65-73)	1.54 (3.08)	.617	67 (62-72)	3.60 (3.32)	.279
30–44	205	25	71 (66-76)	3.53 (3.21)	.271	69 (64-73)	5.14 (3.10)	.098
45–59	255	27	71 (68-75)	4.11 (2.80)	.143	69 (65-72)	5.25 (2.82)	.063
60+	249	26	67 (64-70)	REF		63 (60-66)	REF	
Education								
More than high school	316	36	80 (78-83)	21.49 (2.49)	<.001	78 (75-80)	20.75 (2.63)	<.001
High school graduate	295	33	68 (65-72)	12.13 (2.21)	<.001	65 (61-69)	12.83 (2.38)	<.001
Less than high school	278	31	59 (55-62)	REF		57 (53-61)	REF	
Race								
White	664	64	74 (72-76)	REF		70 (68-73)	REF	
Black	83	13	56 (50-62)	-17.97 (3.47)	<.001	53 (46-60)	-17.37 (3.74)	<.001

Hispanic	80	17	65 (59-71)	-8.73 (3.51)	.013	64 (59-70)	-6.07 (3.42)	.076
Other	62	6	65 (57-72)	-9.06 (4.37)	.038	66 (58-73)	-4.74 (4.40)	.281
Marital status								
Married	489	46	73 (71-76)	7.34 (2.12)	< .001	71 (68-73)	6.81 (2.17)	.002
Not married	400	54	66 (63-69)	REF		64 (60-67)	REF	
Employment status								
Employed	470	51	74 (71-77)	REF		70 (67-74)	REF	
Retired	161	15	68 (64-71)	-6.00 (2.54)	.018	64 (61-66)	-6.90 (2.64)	.009
Disabled	81	11	55 (50-59)	-19.23 (4.03)	< .001	52 (47-56)	-18.86 (4.15)	< .001
Unemployed	177	23	68 (64-72)	-5.40 (2.73)	.048	69 (65-72)	-1.79 (2.64)	.499
Geographic region								
Northeast	161	18	67 (62-72)	-3.79 (3.38)	.263	66 (61-70)	-3.43 (3.36)	.308
Midwest	206	22	70 (64-75)	-1.13 (3.44)	.742	66 (60-71)	-3.29 (3.65)	.368
South	338	38	70 (67-73)	-0.57 (2.80)	.838	67 (64-71)	-1.75 (2.87)	.542
West	184	22	71 (66-75)	REF		69 (64-73)	REF	

REF=reference category