

CLINICAL SCHOLARSHIP

Evaluation of Printed Health Education Materials for Use by Low-Education Families

Lesa Ryan, BS¹, M. Cynthia Logsdon, PhD, WHNP-BC, FAAN², Sarah McGill, BS³, Reetta Stikes, MSN, RNC-NIC, CLC⁴, Barbara Senior, BSN, MBA, RN⁵, Bridget Helinger, MSN, ARNP, ACNP-BC, CCRN⁶, Beth Small, BSN, RN, OCN⁷, & Deborah Winders Davis, PhD⁸

1 Medical Student, University of Louisville, School of Medicine, Department of Pediatrics, Louisville, KY

2 Professor, University of Louisville, School of Nursing, and Associate Chief of Nursing for Research, University of Louisville Hospital/James Graham Brown Cancer Center, Louisville, KY

3 Medical Student, University of Louisville, School of Medicine, Louisville, KY

4 Advanced Practice Educator, Center for Women and Infants, University of Louisville Hospital/James Graham Brown Cancer Center, Louisville, KY

5 Clinical Nurse Manager, Stroke ICU, University of Louisville Hospital/James Graham Brown Cancer Center, Louisville, KY

6 Advanced Practice RN, Stroke Services, University of Louisville Hospital/James Graham Brown Cancer Center, Louisville, KY

7 Registered Nurse Clinician, University of Louisville Hospital/James Graham Brown Cancer Center, Louisville, KY

8 Professor, University of Louisville, School of Medicine, Department of Pediatrics, Louisville, KY

Key words

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Correspondence

Dr. Deborah Winders Davis, 571 S. Floyd Street, Suite 412, University of Louisville, Department of Pediatrics, Child Development Unit, Louisville, KY 40202. E-mail: deborah.davis@louisville.edu

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Abstract

Purpose: Millions of adults lack adequate reading skills and many written patient education materials do not reflect national guidelines for readability and suitability of materials, resulting in barriers to patients being partners in their own health care. The purpose of this study was to evaluate commonly used printed health materials for readability and suitability for patients with limited general or health literacy skills, while providing easy recommendations to health care providers for how to improve the materials.

Methods: Materials ($N = 97$) from three clinical areas that represented excellence in nursing care in our organization (stroke, cancer, and maternal-child) were reviewed for a composite reading grade level and a Suitability Assessment of Materials (SAM) score.

Results: Twenty-eight percent of the materials were at a 9th grade or higher reading level, and only 23% were 5th grade or below. The SAM ratings for not suitable, adequate, and superior were 11%, 58%, and 31%, respectively. Few materials were superior on both scales. The SAM scale was easy to use and required little training of reviewers to achieve interrater reliability.

Conclusions: Improving outcomes and reducing health disparities are increasingly important, and patients must be partners in their care for this to occur. One step to increasing patient understanding of written instructions is improving the quality of the materials in the instruction for all patients and their families, especially those with limited literacy skills.

Clinical Relevance: Using materials that are written in a manner that facilitates the uptake and use of patient education content has great potential to improve the ability of patients and families to be partners in care and to improve outcomes, especially for those patients and families with limited general literacy or health literacy skills.

According to the National Adult Literacy Study, over 40 million adults are functionally illiterate and another 50 million have insufficient reading skills (Kirsch, Jungeblut, Jenkins, & Kolstad, 2002). In addition to poor gen-

eral literacy skills, others have shown that 22% of adults have only basic health literacy skills and 14% are below basic levels of health literacy (Kutner, Greenberg, Jin, & Paulsen, 2006). Poor health literacy skills have

been associated with less positive health decision making (James, Boyle, Bennett, & Bennett, 2012; Weiss, 1999), adverse health outcomes (DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004; Edwards, Wood, Davies, & Edwards, 2012), increased emergency care utilization (Omachi, Sarkar, Yelin, Blanc, & Katz, 2013), greater risk for hospitalization (Baker, Parker, Williams, & Clark, 1998), higher annual healthcare costs (Baker et al., 1998; Weiss, 1999, 2007), and lack of adherence to instructions (Smith, Brice, & Lee, 2012). Individuals with chronic health conditions who have limited health literacy have greater severity in symptoms, have poorer health-related quality of life, and feel more helpless than their more literate counterparts, even after controlling for income and education (Omachi et al., 2013). Additionally, patients with inadequate literacy and/or health literacy skills have difficulty comprehending medical forms, insurance information, and prescription labels (Williams, Baker, Honig, Lee, & Nowlan, 1998). The adverse outcomes, in part, may be the result of patients misunderstanding or rejecting health instructions due to their lack of literacy skills (Doak, Doak, & Root, 1996).

To compound the primary problem of low health literacy skills, individuals who lack literacy skills feel shame and embarrassment, which has been shown to be an additional barrier in accessing health information because they are not willing to admit that they have a problem or are fearful in seeking help for their healthcare needs (Parikh, Parker, Nurss, Baker, & Williams, 1996). Patients who admitted to experiencing shame and having difficulty reading have often not told their spouses, children, and/or healthcare providers for fear of being negatively judged (Parikh et al., 1996). Research has also shown that self-reported education level may not accurately reflect the reading level of the patient (Davis et al., 1994; Mayeaux et al., 1995). In one study, participants had, on average, an 11th grade education, but were reading at the 7th to 8th grade reading level (Davis et al., 1994). Care must be taken not to assume reading level is the same as educational attainment because educational standards may differ from state to state and country to country.

In addition to the impact of health literacy on one's own health and healthcare utilization, there is evidence to suggest that parent health literacy is associated with child outcomes as well. For example, it has been shown that children with asthma who have parents with low literacy were more likely to visit the emergency room, be hospitalized, and miss school more frequently than children whose parents had higher levels of literacy (DeWalt, Dilling, Rosenthal, & Pignone, 2007), and parents with higher health literacy have healthier children and are more likely to breastfeed (Kaufman, Skipper, Small, Terry, & McGrew, 2001).

Although there is a growing body of literature suggesting that health literacy is an important factor in the provision of healthcare services, healthcare professionals and organizations have been slow to adapt materials to ensure greater readability for all users. The average reading level for most Americans is at the 8th or 9th grade level, with one out of five adults reading at or below the 5th grade level. Additionally, two out of five adults 65 or older and inner-city minorities read at or below the 5th grade level (Doak et al., 1996). Previous studies have reported that as many as 53% to 90% of patient education materials are written at a 9th grade reading level or higher (Freda, 2005; Hoffmann & McKenna, 2006; Shieh & Hosei, 2008; Weintraub, Maliski, Fink, Choe, & Litwin, 2004). Other factors, in addition to reading level, contribute to the suitability of materials for those with limited education or literacy skills, including health literacy (Doak et al., 1996).

Before interventions can be developed to improve health outcomes for both children and adults and before patients and families can be partners in their health care, commonly distributed patient education materials must be evaluated for appropriateness for low-education families. While there is a growing body of literature on health literacy and reading level of materials, there is much variability in the findings. Contributing to the variability is the way the materials are evaluated. Some researchers present a single readability score, and others have used both the Suitability of Materials (SAM) score and a readability score. The purpose of this study was to evaluate commonly used printed health materials for readability and suitability for patients with limited general or health literacy skills, while providing easy recommendations to healthcare providers for how to improve the materials. Both the SAM score (Doak et al., 1996) and a reading score that is a composite of seven commonly used tests for readability were used as more comprehensive ways to evaluate the materials. Having a more comprehensive evaluation of the materials will provide needed information to support specific revisions of the materials for improved comprehension by a wider range of patient ability levels and allows healthcare providers to develop materials that more specifically match the needs of their population.

Methods

Printed materials were evaluated from an academic health sciences center in the southern United States. The hospital is a tertiary center for the southwestern half of the state. As a referral center, three areas that are considered to be areas of excellence include cancer,

stroke, and maternal-infant care. The medical center serves a high percentage of minorities and underserved clients. Approximately 19% of patients are indigent, 29% receive Medicaid, over 40% are of a minority population, and 19% do not speak English. All printed materials for each of these units (total = 97) were included in the evaluation as follows: 28 items from the Stroke Center, 27 items from the Cancer Center, and 42 items from the Mother-Baby Unit. The sources of the materials varied from those obtained from national organizations such as the American Heart Association, the American Cancer Society, the U.S. Department of Health and Human Services, or the World Health Organization to institution-developed materials or those that failed to identify the source of the information.

Suitability of Materials

Each material was evaluated for suitability using the SAM scale (Doak et al., 1996). The SAM scale was developed as a rigorous and quantifiable measure of attributes of printed materials that go beyond the assessment of reading level, but that influence readability (Doak et al., 1996). Although originally developed for use with printed materials, it has been successfully used with other media (Doak et al., 1996). The authors developed the tool and validated it with input from health-care professionals from several cultures and from faculty and students from two prestigious universities (one school of public health and one school of medicine; Doak et al., 1996). The tool has become the most cited method for assessing patient education materials beyond reading level (Kang, Fields, Cornett, & Beck, 2005; Shieh & Hosei, 2008; Wallace, Rogers, Turner, Keenum, & Weiss, 2006; Wallace, Turner, Ballard, Keenum, & Weiss, 2005; Weintraub et al., 2004), and it is suggested for use by the Food and Drug Administration, the National Institutes of Health, and the National Library of Medicine. Suitability is based on ratings on 22 items that comprise six factors, which include content, literacy demand, graphics, layout and type, learning stimulation and motivation, and cultural appropriateness (**Table 1**). Each item is scored 0 (*not suitable*), 1 (*adequate*), or 2 (*superior*), and a raw score is calculated by adding the score for each item, when appropriate, and dividing by the total number of items scored out of a possible of 44. If an item is not applicable, no score is assigned and the denominator is adjusted as needed. The resulting percentages are classified as follows: *not suitable* (0–39%); *adequate* (40%–69%); or *superior* (70%–100%).

A total of 97 materials were reviewed. A random sample of 35 materials was scored simultaneously and independently by two reviewers, and then scores were

compared to establish interrater reliability. The reviewers were a post-baccalaureate research assistant and a second-year medical student. Any inconsistencies in scoring were discussed for clarification of the rules, and then the materials were reevaluated. Reviewers had 100% agreement on SAM overall classifications, with occasional differences on individual item scores that did not impact overall classifications. Interrater reliability for item-by-item analysis for the two raters was $K = .78$ ($p < .001$; 95% confidence interval [0.74–0.82]). Two reviewers evaluated the materials. The SAM tool was easy to use, and interrater reliability was acceptable.

Readability

Readability was evaluated using the Text Readability Consensus Calculator, a readability software tool (available free at <http://www.readabilityformulas.com/free-readability-formula-tests.php>). The program calculates the number of sentences, words, syllables, and characters in the text provided (**Table 2**). From those data, the readability assessment tool calculated readability using seven different commonly used (Charbonneau, 2012; Colaco, Svider, Agarwal, Eloy, & Jackson, 2013; Ellimoottil, Polcari, Kadlec, & Gupta, 2012; Lam, Roter, & Cohen, 2013; Langbecker & Janda, 2012; Stossel, Segar, Gliatto, Fallar, & Karani, 2012) formulas (Flesch Reading Ease formula, Flesch-Kincaid Grade Level, FOG Scale [Gunning FOG Formula], SMOG Index, Coleman-Liau Index, Automated Readability Index, and Linsear Write Formula), which resulted in seven readability scores and a composite grade level. Each of the seven readability measures is based on the English language and U.S. grade levels. Variability exists between the various measures as they use different criteria to compute the readability (e.g., some use sentence length while others use number of words or number of syllables). All seven measures have been widely used in the literature. The consensus calculator provides each of the seven outputs as well as a composite score across all seven methods. The sample text for smaller materials was 200 words, and for larger materials a sample of 500 words was used in the calculation. A random selection of materials was also retested using a different sample of text for reliability. The readability formula tool analyzed the text for the number of sentences, average sentence length and number of words, average number of syllables, and average number of characters per word in the sample for a composite grade level. The composite grade levels were then classified as superior (5th grade), adequate (6th, 7th, and 8th grade), or not suitable (9th grade and above; Doak et al., 1996). The readability scores were also used in the calculation of the

Table 1. Summary of Frequency of Suitability Assessment of Materials (SAM) Scores by Item for All Patient Material (N = 97)

SAM evaluation factors	Not suitable Score of 0 n (%)	Adequate Score of 1 n (%)	Superior Score of 2 n (%)
Content			
Purpose is evident	8 (8.2%)	19 (19.6%)	70 (72.2%)
Content about behaviors	22 (22.7%)	43 (43.3%)	32 (33.0%)
Scope is limited	15 (15.5%)	39 (40.2%)	43 (44.3%)
Summary or review included	90 (92.8%)	5 (5.2%)	2 (2.1%)
Literacy demand			
Reading grade level	27 (27.8%)	48 (49.5%)	22 (22.7%)
Writing style, active voice	11 (11.3%)	39 (40.2%)	47 (48.5%)
Vocabulary	23 (23.7%)	49 (50.5%)	25 (25.8%)
Context is given first	4 (4.1%)	28 (28.9%)	65 (67.0%)
Advance organizers	2 (2.1%)	20 (20.6%)	75 (77.3%)
Graphics			
Cover graphic shows purpose	16 (16.5%)	51 (52.6%)	10 (10.3%)
Type of graphic	5 (5.2%)	52 (53.6%)	22 (22.7%)
Relevance of illustrations	26 (26.8%)	53 (54.6%)	18 (18.6%)
Lists and tables explained	4 (4.1%)	52 (53.6%)	41 (42.3%)
Captions used for graphics	51 (52.6%)	17 (17.5%)	11 (11.3%)
Layout and typography			
Layout factors	2 (2.1%)	31 (32.0%)	64 (66.0%)
Typography	2 (2.1%)	26 (26.8%)	69 (71.1%)
Subheadings ('chunking') used	7 (7.2%)	39 (40.2%)	51 (52.6%)
Learning, stimulation, and motivation			
Interaction used	56 (57.7%)	35 (31.6%)	6 (6.2%)
Behaviors are modeled and specific	14 (14.4%)	44 (45.4%)	39 (40.2%)
Motivation/self-efficacy	5 (5.2%)	48 (49.5%)	44 (45.4%)
Cultural appropriateness			
Match in logic, language, experience	1 (1.0%)	55 (56.7%)	41 (42.3%)
Cultural images and examples	2 (2.1%)	64 (66.0%)	31 (32.0%)

Note. Twenty materials did not include cover graphic and 18 did not contain graphics; percentages adjusted for nonapplicable factors.

SAM score since readability constitutes one criterion of suitability (Doak et al., 1996).

Results

Overall Suitability of Materials

Table 1 summarizes the findings for the SAM evaluation by item across all three types of materials (stroke, cancer, and maternal-infant). Overall, of the 97 materials evaluated using the SAM instrument, 11.3% were not suitable, 57.7% were adequate, and 30.9% were superior. The readability composite score rating indicated that 27.8% were not suitable, 50.5% were adequate, and 21.6% were superior (Tables 3, 4, and 5).

Of the 97 patient materials evaluated, 93% of the materials were rated as not suitable with respect to including a summary or review, which can help patients retain the information and understand the content given in the materials. Fifty-eight percent of the materials were rated as not suitable with respect to including patient interaction, which can help to stimulate and motivate patients in changing their health-related behaviors or to comply with healthcare recommendations.

Overall Readability

Twenty-three percent (22 of 97) of the materials were written at the 5th grade reading level or below (*superior*). Forty-eight percent (47 of 97) were written for 6th to 8th grade level (*adequate*), and 29% (28 of 97) were written at or above the 9th grade level (*not suitable*).

Suitability and Readability by Topic Area (Stroke, Cancer, Maternal-Child)

Stroke. Suitability assessment for the Stroke Center materials were as follows: 10.7% were rated as not suitable, 71.4% were rated as adequate, and 17.9% were rated as superior. Readability assessments for the Stroke Center materials were as follows: 32.1% were rated as not suitable, 60.7% were rated as adequate, and 7.1% were rated as superior (see Table 3).

Cancer. Suitability assessment for the Cancer Center materials were as follows: 25.9% rated as not suitable, 14.8% rated as adequate, and 59.3% rated as superior. Readability assessment for the Cancer Center materials

Table 2. Text Readability Consensus Calculator

Readability test	Criteria	Output example
Flesch Reading Ease score	Average sentence length Average no. of syllables per word	Score form 0—100 90–100 = 5 th grade reading level 60–70 = 8 th –9 th grade reading level 0–30 = college graduate reading level
Gunning FOG Formula	Average sentence length Percentage of “hard words” (3+ syllables)	5 = readable 10 = hard 20 = very difficult
Flesch-Kincaid grade level	Average sentence length Average no. of syllables per word	Average student of the grade can read the text. Outputs a U.S. school grade level 12.2 = 12 th grade
Coleman-Liau Index	Average no. of characters per word No. of words	Average student of the grade can read the text. Outputs a U.S. school grade level 10.6 = 10 th or 11 th grade
SMOG Index	No. of sentences No. of polysyllable words	Average student of the grade can read the text. Outputs a U.S. school grade level 7.4 = 7 th grade
Automated Readability Index	Average number of letters per word Average no. of words per sentence	Average student of the grade can read the text. Outputs a U.S. school grade level 3 = 3 rd grade
Linsear Write Formula	No. of sentences No. of polysyllable words No. of 1- to 2-syllable words	Average student of the grade can read the text. Outputs a U.S. school grade level 14.6 = college
Readability consensus	Based on measures above	Grade level: 11 = 11 th grade Reading level: 11 = average Age level: 15–17 years

Note. FOG = Gunning’s Fog Index or FOG; SMOG = McLaughlin’s SMOG Readability Formula.

were as follows: 25.9% rated as not suitable, 14.8% rated as adequate, and 59.3% rated as superior (see **Table 4**).

Maternal-child. Suitability assessment for the Mother-Baby Unit materials were as follows: 2.4% were rated as not suitable, 76.2% were rated as adequate, and 21.4% were rated as superior. Readability assessment for the Mother-Baby Unit materials were as follows: 26.2% were rated as not suitable, 64.3% were rated as adequate, and 9.5% were rated as superior (see **Table 5**).

Discussion

Even though a significant number of adults in the United States have inadequate general and health literacy skills (Abrams, Klass, & Dreyer, 2009; Kirsch et al., 2002; Kutner et al., 2006), healthcare systems continue to develop and use educational materials that are not appropriate for many of the patients and families that they serve. While this has been widely reported in the literature, changes have not been implemented to reflect the current state of the science and recommendations from agencies such as the National Institutes of Health and the Agency for Healthcare Research and Quality (AHRQ). Current models of care such as the patient- and

family-centered medical home model suggest that the provider and the patient or family are integral partners and that the family is actively involved in the decision-making process (Yin et al., 2012). However, that concept assumes that patients or their representatives are equally equipped to access, process, and understand complex health information, which is not the case. It is important for healthcare providers and educators to take responsibility for ensuring that important information is presented in a clear and consistent manner so that it is accessible to most patients. In one recent study about the provision of health information related to anticipatory guidance on 19 different common topics by pediatricians, 12% to 40% of parents, the majority of which had a high school equivalent education, said that they either did not receive wanted information on the topics or that they did not understand the information provided compared to 0 to 26% of the parents with higher levels of education (Davis, Jones, Logsdon, Ryan, & Wilkerson-McMahon, 2013).

The current study examined 97 materials from three areas of an urban academic health sciences center that serves as the tertiary referral center. The areas from which these materials were retrieved represent areas of excellence for patients throughout the city, region, and state needing those services. Yet, we found that only 7% of the stroke materials, 59% of the cancer materials, and

Table 3. Evaluation of Suitability and Readability of Stroke Patient Materials

Education material title	SAM score	SAM classification	Grade level	Grade classification
How Can I Quit Smoking	80	superior	5	superior
Heart Healthy Eating	75	superior	7	adequate
Let's Talk About High Blood Pressure and Stroke	73	superior	7	adequate
Let's Talk About Living at Home After Stroke	71	superior	8	adequate
Let's Talk About Lifestyle Changes to Prevent Stroke	70	superior	7	adequate
You Can Quit Smoking	68	adequate	6	adequate
Let's Talk About Driving After Stroke	68	adequate	7	adequate
Let's Talk About the Stroke Family Caregiver	66	adequate	8	adequate
Let's Talk About Ischemic Strokes and Their Causes	61	adequate	8	adequate
Let's Talk About Carotid Endarterectomy	59	adequate	7	adequate
What Are High Blood Cholesterol and Triglycerides?	57	adequate	7	adequate
Let's Talk About Stroke, TIA and Warning Signs	57	adequate	7	adequate
Let's Talk About Feeling Tired After Stroke	57	adequate	8	adequate
Let's Talk About a Stroke Diagnosis	57	adequate	9	not suitable
Let's Talk About Complications After Stroke	57	adequate	10	not suitable
Let's Talk About Risk Factors for Stroke	55	adequate	7	adequate
Let's Talk About Changes Caused by Stroke	55	adequate	10	not suitable
Let's Talk About Stroke and Rehabilitation	52	adequate	11	not suitable
What Do My Cholesterol Levels Mean?	50	adequate	8	adequate
Let's Talk About Children and Stroke	50	adequate	8	adequate
Keys for Quitting	48	adequate	5	superior
Let's Talk About Anticoagulants and Antiplatelet Agents	48	adequate	9	not suitable
Patient's Clinical Path	45	adequate	9	not suitable
Understanding Atrial Fibrillation	43	adequate	8	adequate
With Stroke Time Saved is Brain Saved	41	adequate	9	not suitable
Tissue Plasminogen Activator	39	not suitable	8	adequate
Explaining Stroke Pamphlet	39	not suitable	10	not suitable
Stroke Smart Magazine	36	not suitable	9	not suitable

Note. Evaluation was based on the SAM instrument and readability consensus calculator ($n = 28$). SAM = Suitability Assessment of Materials; TIA = transient ischemic attack.

10% of the maternal-child materials were rated at or below a 5th grade reading level, which is considered the most appropriate level. Of all of the materials ($N = 97$) evaluated, 28% were deemed as not suitable or at a 9th grade reading level or higher. Importantly, many materials from the American Cancer Society were written at a lower reading level, which explains the higher percentage of cancer materials that were found to be written at the 5th grade reading level as compared to the other specialty areas. However, there was variability among the materials from the same organization and across organizations.

When considering both the SAM scale and readability together, 2% of the maternal-child, 4% of the stroke, and 56% of the cancer materials were rated as superior on both scores. This is not acceptable and may be one factor that contributes to health disparities for poor and underserved families. While many social determinants of health are complex and difficult to resolve, improving health education and health communication is more easily modified and may improve patients' partnership with health-care providers to create care plans, shared decision mak-

ing, and satisfaction with care. These factors, and others, may lead to improved outcomes.

The SAM instrument identifies additional criteria upon which to evaluate materials (content, literacy demand, graphics, layout and typography, learning stimulation and motivation, and cultural appropriateness). The instrument can easily be used by healthcare providers to improve written materials. For example, the purpose of the handout should be clear. Ask yourself, will the patient know why he/she should read and understand this material? Is it focused on one topic? Literacy demand includes more than word and sentence length and complexity. Consideration should be given to using active voice and in the organization of the information. Are there subheadings? Do the subheadings clearly guide the patient by organizing thoughts, ideas, and tasks in the appropriate order? Additionally, key points should be summarized at the end to reinforce the information.

Overall, 93% of the materials in our study were not suitable with respect to including a summary or

Table 4. Evaluation of Suitability and Readability of Cancer Patient Materials

Education material title	SAM score	SAM classification	Grade level	Grade classification
Managing Chemotherapy Side Effects				
Hair loss	82	superior	3	superior
Anemia	82	superior	4	superior
Appetite changes	82	superior	4	superior
Memory changes	82	superior	4	superior
Mouth and throat changes	82	superior	4	superior
Nausea and vomiting	82	superior	4	superior
Constipation	80	superior	3	superior
Bleeding problems	80	superior	4	superior
Pain	80	superior	4	superior
Fatigue	77	superior	3	superior
Nerve changes	77	superior	3	superior
Swelling	77	superior	4	superior
Urination changes	77	superior	4	superior
Diarrhea	75	superior	4	superior
Sexual and fertility changes in men	75	superior	4	superior
Sexual and fertility changes in women	75	superior	5	superior
Eating Hints	66	adequate	7	adequate
Chemotherapy and You	64	adequate	8	adequate
Pain Control	61	adequate	7	adequate
Fondaparinux Injection Fact Sheet	42	adequate	8	adequate
Carboplatin and Etoposide Fact Sheet	39	not suitable	9	not suitable
Bevacizumab Injection Fact Sheet	39	not suitable	10	not suitable
Pegfilgrastim Injection Fact Sheet	34	not suitable	11	not suitable
Zofan Fact Sheet	31	not suitable	10	not suitable
Resource Center	30	not suitable	10	not suitable
Carboplatin and Gemcitabine Fact Sheet	29	not suitable	9	not suitable
Erlotinib Tablet Fact Sheet	26	not suitable	9	not suitable

Note. Evaluation was based on the SAM instrument and readability consensus calculator ($n = 27$). SAM = Suitability Assessment of Materials.

review. Summarizing is important as it points out the most critical information and the repetition reinforces learning. Graphics should be used to enhance the text, but not to make it more complicated. Ask yourself if the graphic adds to the material or distracts the reader from the content. Is the information “nice to know” or critical to one’s understanding of the material? Does the graphic “show” the patient what to do? As healthcare professionals, we may be desensitized to the complexity of some graphics that may be used in health information because these types of diagrams are frequently used in the scientific literature. However, patients, especially those with limited education, may find that the diagrams add to their confusion rather than helping them to understand it. For example, one of the materials we reviewed showed a picture of a brain with much more detail than what the patient needed. If a patient wants more in-depth information, we can refer them to additional resources; but we should consider plain language and simple graphics as a general rule. It has also been shown that even those with higher levels of education and reading abilities prefer materials that are written in more simple language with ap-

propriate graphics over more complex and densely written materials (Davis et al., 1996). Plain language materials may be welcome by all patients.

Another key element for written materials is stimulation and motivation (Davis et al., 1996; Doak et al., 1996). Do we tell the patient why it is important for them to know the material? Do we tell them exactly what we want them to do? Do we give them information that will motivate them to take action? For example, “Cleaning your wound two times every day will prevent infection.” Lastly, but importantly, are the materials culturally relevant? This requires a good grasp of the demographics of the population you serve and knowledge of the similarities and differences in the health and dietary practices, values, and beliefs of different individuals and groups. In addition to making the materials culturally appropriate, one-on-one conversations should include such questions as, “Do you see things on this diet that you might eat in your home?” It is important to individualize the materials to meet the needs of a diverse population.

Reading level is critically important, but there are other factors to consider in designing or selecting appropriate

Table 5. Evaluation of Suitability and Readability of Maternal Patient Materials

Education material title	SAM score	SAM classification	Grade level	Grade classification
Safe Sleep for Your Baby	84	superior	7	adequate
Hearing	77	superior	5	superior
RSV is the No.1 Cause of Hospitalization in Babies Under One Year of Age	77	superior	6	adequate
Holding Your Baby Skin-to-Skin	73	superior	6	adequate
Preparing Formula in Care Settings	73	superior	6	adequate
Hold Them Hug Them Love Them But Never Shake a Baby	73	superior	6	adequate
Breastfeeding for African American Women	73	superior	8	adequate
Infant Feeding Cues	71	superior	6	adequate
Crying/Colic: Hints for Soothing Your Baby	70	superior	8	adequate
Quiet Time Is Family Bonding Time	68	adequate	5	superior
Breastfeeding the Preterm Baby	68	adequate	5	superior
The Edinburgh Postpartum Depression Scale	68	adequate	7	adequate
Fetal Movement Monitoring Kick Count	68	adequate	8	adequate
A New Beginning: Your Personal Guide to Postpartum Care	68	adequate	10	not suitable
Visitation Information	66	adequate	7	adequate
Perineal Care	66	adequate	7	adequate
Car Safety for Your Baby	66	adequate	8	adequate
Exercise Sheet	64	adequate	6	adequate
Unmarried Parents Make the Best Choice for Your Child	64	adequate	9	not suitable
Welcome to the WHAS Crusade NICU	63	adequate	8	adequate
Bathing Your Baby	63	adequate	8	adequate
Breastmilk is Best Pumping Log	61	adequate	7	adequate
What Parents of Near-Term Infants Need to Know	61	adequate	10	not suitable
Postpartum Exercise: Tips for Cesarean Recovery	61	adequate	11	not suitable
Providing Breastmilk to Your Baby	61	adequate	12	not suitable
Breastfeeding Information Bosnian	59	adequate	6	adequate
The Little While: For Parents Experiencing the Death of a Very Small Infant	59	adequate	8	adequate
Colostrum Breastmilk Feedings in the NICU	59	adequate	10	not suitable
Welcoming Our New Arrival: The Lactation Center	57	adequate	7	adequate
Prevent Shaken Baby Syndrome	55	adequate	5	superior
Jaundice and the Newborn Infant	55	adequate	8	adequate
Shots for Tots	55	adequate	8	adequate
Kentucky Early Hearing Detection & Intervention Program	50	adequate	6	adequate
Kentucky Newborn Screening Program	50	adequate	9	not suitable
To the Parents of Our NICU Infants: About Pain	47	adequate	7	adequate
Attention Unmarried Parents	47	adequate	11	adequate
Postpartum Discharge Instructions	45	adequate	10	not suitable
Miscarriage	43	adequate	6	adequate
Ectopic Pregnancy	43	adequate	10	not suitable
2012 Classes for Expectant and New Parents	42	adequate	7	adequate
Hepatitis B Vaccine	42	adequate	9	not suitable
Which Birth Control Method Is Right for Me	34	not suitable	10	not suitable

Note. Evaluation was based on the SAM instrument and readability consensus calculator ($n = 42$). SAM = Suitability Assessment of Materials; RSV = Respiratory syncytial virus; WHAS-TV; NICU = neonatal intensive care unit.

materials. Even for patients with higher levels of education, there are still concerns regarding the presentation of information. A number of other factors may contribute to their absorption and subsequent ability to use the information for improved health outcomes and informed decision making. For example, concerns regarding a new health diagnosis, ability to pay for needed treatment, transportation for needed services, and dependent care during illness could all impact the ability to con-

centrate on the health information. Distraction on top of limited literacy skills compounds the problem of reading, understanding, and using health information that is too complex or written at a level that is difficult to understand. Lastly, other factors beyond reading influence one's ability to understand and use health information.

Like most studies, there are limitations to the current study. Only three units in the hospital were included and materials were from only one hospital, which is an

academic medical center in the southern United States. However, many of the materials came from national professional organizations, which are likely used by other hospitals across the country. Other materials were developed locally and may, or may not, be relevant to other organization.

Implications

As we have demonstrated, the SAM tool is a simple method that can be used by healthcare providers across the globe to improve written health education materials. Improving outcomes and reducing health disparities is increasingly important, especially for those families with limited literacy skills and resources. One step to increasing compliance to written instructions is improving the quality of the materials by decreasing the reading level and increasing the suitability for all patients and their families. Regardless of whether a patient has higher or lower literacy skills, patients prefer health information that is communicated in clear, concise, and plain language and incorporates simple design features (Davis et al., 1996; Stableford & Mettger, 2007). Additional steps are needed to ensure that healthcare providers and organizations adopt an overarching policy to be a “health literate organization” (Brach et al., 2012). A health literate organization includes, in part, leadership that sets the standard and provides appropriate resources to support health literacy initiatives; ongoing evaluation of organizational policies and practices, patient and staff needs, and the impact of change on health outcomes; and involvement of diverse audiences in the development and testing of educational messages and delivery methods (Brach et al., 2012). Patient- and family-centered care and medical home models cannot be achieved without attention being paid to health literacy.

In the academic center where the study was conducted, steps have been taken to improve health information, based on our findings. For example, a multi-disciplinary Patient Education Oversight Committee has been established, which meets regularly. Several units have adopted improved patient education as an evidence-based project, and an initial “Nurse as Teacher” conference was hosted this year. These initiatives have led to an increased focus on patient preparation for discharge as well as collaboration with community organizations to improve health information. Feedback from patients and families has been collected to allow revisions and redirections. Preliminary steps have begun to develop and test new methods of delivering health information using currently available electronic media as a substitute or supplement to written materials. Comparative effectiveness studies are needed to

identify the optimal delivery method for various populations. Hopefully, these steps will lead to a system of patient education that respects the skills and needs of individuals and families. All health care professional have a responsibility to evaluate the materials being used with our patients and to provide them with information that can be easily used to be active participants in their health and well-being.

Clinical Resources

- Health literacy universal precautions toolkit: <http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/index.html>
- Teaching patients with low literacy skills; <http://www.hsph.harvard.edu/healthliteracy/resources/teaching-patients-with-low-literacy-skills/>

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