

READABILITY OF EDUCATIONAL MATERIALS TARGETING CVD RISK FACTORS IN AFRICAN AMERICANS AND WOMEN

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Abstract: The purpose of this study was to analyze the readability level of current CVD educational materials on diet, PA, or both to determine whether the materials were written at a level appropriate for the general public, women, and African Americans. Similar to readability assessments of other health education materials, the authors hypothesized that health education materials on diet and PA as CVD risk factors targeted for African Americans and women are written at reading levels higher than the average level for the adult population.

Diet and physical activity (PA) are key targets of cardiovascular disease (CVD) risk factor reduction. Both are associated with other coronary heart disease (CHD) risk factors, namely hypertension, high serum cholesterol, obesity, and diabetes mellitus (Agurs-Collins, Kumanyika, Ten Have, Adams-Campbell, 1997; Kumanyika & Charleston, 1992; Mayer-Davis et al., 1998). Women, particularly African American women in the Southeastern United States, have the highest death rates from stroke, coronary heart disease, and overall CVD in the country (American Heart Association, 2000).

In terms of CVD prevention, only one in four African American women meet the Centers for Disease Control and Prevention, American College of Sports Medicine or the Surgeon General's PA recommendations (Pate et al., 1995; US Department of Health and Human Services, 2000; Jones et al., 1998). For example, 43.6% of African American women report having no regular "leisure-time" PA (Hahn, Teutsch, Franks, Chang, & Lloyd, 1998). Another area of concern is that African Americans consume a diet that may increase the risk for heart disease, that is, a diet that consists of more than 10% of kilocalories from saturated fat (USDHHS, 2000). In 1994-1996,

the percentage of kilocalories from saturated fat for African Americans women exceeded the current recommendation of 10% (U.S. Department of Agriculture, 1997).

Despite these statistics, few ethnically and culturally relevant educational materials for use with African Americans and other underrepresented populations focus on PA and dietary factors. Moreover, health educational materials for cancer patients with similar diet and PA risk factors as those of African Americans and other under-represented populations are typically written at reading levels higher than the average American adult's reading ability. (Guidry, Fagan, & Walker, 1998).

Patient education is the process of helping people acquire and use new information to change their behaviors and subsequently produce positive health outcomes (Merritt, Gates, & Skiba, 1993). A widely used method for providing patient education is the use of written materials to educate patients about their particular health conditions. Researchers have identified discrepancies, however, between the reading level of written educational materials and the reading level of most patients (Fisher, 1999; Estey, Musseau, & Kehn, 1994).

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READING LEVELS AND LITERACY

Results from the Department of Education's 1992 National Adult Literacy Survey (NALS) found that approximately 44 million adult Americans fell into the lowest of five categories of literacy skills (NALS Level 1), were functionally illiterate, and read below a fifth-grade level (Doak, Doak, & Root, 1996). Respondents demonstrated skills in the lowest level of prose, document, and quantitative literacy proficiencies. They could total an entry on a deposit slip, locate the time and place of a meeting on a form, and identify a specific piece of information in a brief news article but could not calculate total costs of a purchase from an order form or locate an intersection on a street map (Doak et al., 1996).

Certain populations of adults were disproportionately more likely to meet the tasks of Level 1 prose, with basic reading and writing skills at the lowest proficiency level (Creighton & Hudson, 2002). Disproportionately high percentages of the respondents in Level 1 were Blacks, Hispanics or Asians/Pacific Islanders (Creighton & Hudson, 2002). According to the 1992 NALS, 38% of Black adults and 36% of Asian/Pacific Islander adults had reading proficiencies at level 1 prose (Creighton & Hudson, 2002). Among Hispanic Mexican, Cuban, and Puerto Rican adults, 54%, 53%, and 47%, respectively had reading proficiencies at Level 1 prose, (Creighton & Hudson, 2002).

READABILITY OF HEALTH EDUCATION MATERIALS

Although the average reading level of adults in the United States is between the eighth and ninth grades, most health care instructions are written at or above the ninth-grade reading level (Doak et al., 1996). Several researchers have found that the reading levels of educational materials and the intended readers' literacy levels seldom match (Estey et al., 1994; Overland, Hoskins, McGill, & Yue, 1993).

In a 1992 study of the Arthritis Foundation's educational pamphlets, only one pamphlet was written at the eighth-grade level; the remaining 14 pamphlets were written at the tenth-grade level or higher. Overall, 31% of the client population read below the seventh-grade level and thus, would not be able to utilize any of the Arthritis Foundation's health education pamphlets (Larson & Schumacher, 1992).

Cooley and colleagues (1995) reviewed 30 cancer-related educational handouts that were written at reading levels ranging from the sixth to sixteenth-grade. For whom the cancer educational materials had been developed, 27% of the patients read at or below the sixth-grade level, 17% read at the sixth to eighth grade levels, 29% read at the ninth to twelfth grade levels,

and 27% read above the twelfth-grade level. Consequently, only 27% of the clients would be able to understand all 30 of the cancer educational materials (Cooley et al., 1995).

A study of 136 HIV/AIDS-related handouts revealed that more than 50% of the materials were between the tenth to twelfth grade levels, and 13% fell between the thirteenth and sixteenth grade levels. Fewer than 10% of these materials fell within the third to sixth-grade levels, and only 26% fell within the seventh to ninth grade levels. The mean grade level of the educational materials was eleventh grade (Wells, 1994).

Physicians, nurses, and other health care professionals often use print educational materials to increase awareness and promote the adoption of positive behaviors among their patients. Patients with lower literacy levels may have difficulty following health care advice that may seem basic to those who read at higher literacy levels. For example, Mayeaux and colleagues (1996) found that some patients (58%) were unable to read a basic diet plan to lower their sugar, fat, or sodium intake or to understand that a low-fat diet does not mean eliminating all fat from their diet (Mayeaux et al., 1996).

STUDY PURPOSE

Despite the public health importance of CVD risk reduction in women and racial/ethnic minorities, to our knowledge an evaluation, of the reading levels of diet and PA print educational materials has not been reported. Thus, the purpose of this study was to analyze the readability level of current CVD educational materials on diet, PA, or both to determine whether the materials were written at a level appropriate for the general public, women, and African Americans. Similar to readability assessments of other health education materials, the authors hypothesized that health education materials on diet and PA as CVD risk factors targeted for African Americans and women are written at reading levels higher than the average level for the adult population.

METHODS

Two approaches were used to identify written education materials on diet and PA. In the first approach, a literature review was conducted to identify PA and dietary counseling interventions for CVD risk reduction delivered in health care settings with demonstrated effectiveness among women, particularly women of color. The methods used and the results of the review were published elsewhere (Wilcox, Parra-Medina, Thompson-Robinson, Will, 2001). We contacted the corresponding authors for the studies and requested copies of each of the study's materials for

inclusion in our inventory. Only a few of the authors submitted their tools; other authors stated that their materials were still in the development stage or no longer existed. Many of the solicited authors, however, did not respond.

The second approach involved gathering print educational materials from nationally recognized health information resources, including the American Heart Association; American Diabetes Association; National Heart, Lung, and Blood Institute; U.S. Department of Agriculture; National Cancer Institute; ETR & Associates; National Institute of Digestive Disorders and Kidney Diseases; American Dietetics Association; Cooper Institute; and Centers for Disease Control and Prevention. A total of 180 print educational materials addressing diet, PA, or both risk factors for CVD were obtained from governmental, for-profit, and non-profit sources from October 1999 to January 2000. Of the total materials included in the inventory, 6 were excluded from this analysis due to missing information.

The educational materials were catalogued in a Microsoft Access database according to whether they focused on diet, PA, or both. The inventory included 42 PA, 52 diet, and 80 combined PA and diet educational materials (n = 174). The staff of the Heart Healthy and Ethnically Relevant (HHER) Tools Project developed an Educational Materials Inventory form to extract from the materials any relevant information such as title, source, target behavior (i.e., diet or PA), CVD risk factor (e.g., hypertension,

hypercholesterolemia, obesity, and diabetes), target audience, cost and availability. In addition, all the educational materials were assessed for reading level using the SMOG grade formula method (McLaughlin, 1969).

The SMOG grade formula method (McLaughlin, 1969) estimated reading difficulties by counting the number of polysyllabic words in a sentence (see Table 1). A research assistant was specifically trained to calculate the SMOG grade levels and the grade score for each print material was calculated three times for reliability. The SMOG grade formula method was used because of its accuracy and its ability to correlate highly with other readability formulas (FOG, .99; Fry, .93) (Meade & Smith, 1991). The SMOG method has been widely used in health literacy studies for its convenience and simplicity (Meade & Howser 1992; Merritt et al., 1993; Overland et al., 1993; Contreras, Garcia-Alonso, Echenique, Daye-Contreras, 1999).

RESULTS

We examined 174 printed educational materials: 42 (24%) PA, 52 (30%) diet, and 80 (46%) both risk factors. African Americans were the target audience for 7 (4%) of the materials and women were the target audience for 16 (10%) of these materials.

The SMOG readability test results for the educational materials, broken down by behavior type indicated an overall mean reading grade level of 8.95 for all educational materials tested (see Table 2). Diet

Table 1. SMOG Conversion Table

<u>Total Polysyllabic Word Counts</u>	<u>Approximate Grade Level (+1.5 grades)</u>
0-2	4
3-6	5
7-12	6
13-20	7
21-30	8
31-42	9
43-56	10
57-72	11
73-90	12
91-110	13
111-132	14
133-156	15
157-182	16
183-210	17
240-240	18

For use with material containing at least 30 sentences.

Table 2. Mean reading levels, standard deviations, and ranges for all materials by behavior type.

	Mean Reading Level (Grade)	Standard Deviation	Grade Level Range
Physical Activity (N=42)	9.64*	2.21	6-17
Diet (N=52)	8.40*	2.27	4-12
Both (PA & Diet) (N=80)	9.06	1.96	4-17
Overall for All Materials (N=174)	8.95	2.19	4-17

*Means are statistically different at $p \leq .05$ level ($p = .011$).

Table 3. Mean reading levels, standard deviations, and ranges for materials targeting African Americans and women.

	Percentage of Materials	Mean Reading Level	Standard Deviation	Grade Level Range
African Americans (N=7)	4%	8.43	1.40	6-10
Women (N=16)	10%	9.38	1.54	8-13

materials had a mean reading grade level of 8.40 and PA materials had a mean grade level of 9.64. The mean reading grade level for materials that focused on both diet and PA was 9.06. Reading levels were higher for PA-only materials than for diet-only materials.

The SMOG readability test results for the educational materials targeting African Americans and women appear in Table 3. The educational materials specifically targeting African Americans had a mean reading grade level of 8.43 which was slightly higher than the mean grade level reported in other studies of educational materials targeting African Americans focused on different health behaviors (Guidry et al., 1998). The materials targeting women had a mean reading grade level of 9.38. The overall mean reading grade level was too high for most populations. The average reading level for African Americans who responded to the NALS demonstrated skills in proficiency level 2 (Kirsch, Jungblut, Jenkins, & Kolstad, 1993). Only one material was identified that specifically targeted African American women, and it was written at the tenth grade reading level.

The frequency levels for all materials by grade level and behavior type appear in Table 4. Overall, few materials were at the recommended less than fifth grade reading level, although some of the materials did meet the acceptable range of between the fifth and ninth grade reading levels. None of the PA materials were at less than a fifth grade reading level. Twenty-one (50%) of the PA materials were in the acceptable range between the fifth and ninth grade reading levels. The remaining 21 materials, however, were outside of this range being at either tenth grade reading level or higher. For materials on diet, 32 (62%) met the acceptable range between fifth and ninth grade reading levels. Of the educational materials that focused on both diet and PA 49 (61%) did meet the range for the accepted reading level for most reading Americans. Overall, of the 174 educational materials, 102 (59%) were considered between the fifth and ninth grade reading levels, whereas only 3 (2%) of the materials were less than a fifth grade level, and 69 (40%) were at a tenth grade level or higher.

Table 4. Frequency levels for all materials by grade level and behavior type.

	< 5 th Grade N (%)	5 th - 9 th Grade N (%)	10 th Grade or Higher N (%)
Physical Activity (N=42)	0 (0%)	21 (50%)	21 (50%)
Diet (N=52)	2 (3%)	32 (62%)	18 (35%)
Both Physical Activity and Diet (N=80)	1 (1%)	49 (61%)	30 (38%)
Overall for All Materials (N=174)	3 (2%)	102 (59%)	69 (40%)

DISCUSSION

Print health educational materials for the general public, such as pamphlets, brochures, booklets, and fact sheets, ideally should be written at or below the fifth grade reading level, although between the fifth and ninth grade levels are considered acceptable to ensure that the materials can be read by most Americans (Rudd, Moeykens, & Colton, 1999). We found that the readability scores for educational materials on diet, PA, and both were lower than the readability scores reported by previous studies of materials on other health behaviors. Although some of these materials were written at a grade level within the acceptable range (from fifth to ninth grade levels), most were in the higher end of the range and may not be appropriate for low literate women with reading levels lower than the fifth grade who are at high risk for CVD. Overall, only 2% of the materials were relevant to our population at the recommended reading level of less than fifth grade.

Our findings are consistent with the body of literature that has examined literacy levels of print materials for other health behaviors and health conditions. These studies have found most educational materials to be at a reading level too high for people with low literacy skills and discrepant with the reading abilities of the general population. After evaluating the readability of cancer educational materials for African Americans, Guidry and colleagues (1998) concluded that the average scores for reading levels of written materials are too high for most populations. In their study of smoking education materials, Meade and Byrd (1989) concluded that disparities existed between the reading levels of written health materials and the reading skills of target populations. More recent literature also supports these findings with evaluations of publications about heart disease and stroke (Merritt et al., 1993; Glanz & Rudd, 1990; Estrada, Hryniewicz, Barnes Higgs, Collins, & Byrd, 2000), asthma (Smith, Gooding, Brown, & Frew, 1998), diabetes (Albright et al., 1996), cancer (Meade & Smith, 1991), HIV (Singh, 2000), and nutrition (Dollahite, Thompson, & McNew, 1996).

Limitations exist in regard to readability formulas (Dollahite et al., 1996). For example, they do not account for creative thinking patterns nor complex ideas. Although reading formulas rate short words on a lower reading level than that of polysyllabic words, some short words are more abstract and difficult to understand than the latter (Dollahite et al., 1996). Despite these limitations, readability formulas provide valid and useful tools for screening educational materials for use with a target audience (Meade & Smith, 1991). Other cultural factors of the target audience,

however, must also be considered in order to provide a useful educational tool. If developers of the educational brochures and pamphlets consider these elements, the materials are more likely to be effective in communicating the intended health related message.

Although readability formulas vary, the various methods correlate highly. The SMOG readability grade formula was used for this study and is recommended for its convenience and efficiency. Readability formulas, however, should only be interpreted as estimates of reading levels. The SMOG formula, as well as other well known readability formulas such as the Dale-Chall, Fry, FOG and Flesch has been used in the creation and development of health literature, and can also be used for analysis (Albright et al., 1996; Meade & Smith, 1991; Mumford, 1997). The resulting reading level estimate should be viewed as criteria incorporated during the process of selecting more reader friendly health literature for the patient population.

IMPLICATIONS FOR PRACTICE

It is critical that health education materials be written at levels that are congruent with patients' reading levels, as well as their cultural and experiential backgrounds. Materials that are written above the reading levels of patients are of limited utility to both the patients and the health care professionals serving them. Therefore, it is imperative that health education materials be developed at the reading levels intended for the readers.

The brochures evaluated in our study do not constitute all diet and PA educational materials currently in circulation. We intentionally included a broad range of written materials from the major sources of health education information materials on PA and diet. We not only examined the readability of the materials, but we also reported the percentage of materials that were developed specifically for African Americans and for women. According to this study, 102 of the 174 (59%) we evaluated were in the acceptable reading level range of fifth to ninth grade literacy, which would be appropriate for most Americans who are capable of reading to understand the content message. Although many of the materials we evaluated for this study can be easily read and understood by many Americans, our study indicated a lack of easily read, culturally relevant diet and PA print materials available from non-profit, for profit, and governmental sources for many Americans with limited literacy skills.

People with limited reading skills need culturally relevant print materials that are written at lower reading levels than the norm to help emphasize the important relationships between diet, PA and CVD risk reduction. Health care professionals should take a lead-

ership role in advocating the importance of and need for culturally appropriate and reader friendly materials that address the health concerns of all populations.

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HEALTH EDUCATION RESPONSIBILITY AND COMPETENCY ADDRESSED

- Responsibility I - Assessing Individual and Community Needs for Health Education**
Competency C - Infer needs for health education on the basis of obtained data.
Subcompetency 1 - Analyze needs assessment data.

