The Readability of Hearing Aid Brochures

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Illiteracy is a hidden communication impairment that potentially may complicate the provision of quality services to hearing aid users. The purpose of the current investigation was to assess the readability of user instructional and informational brochures currently provided with amplification systems. Readability analysis of 109 documents obtained from 23 hearing aid manufacturers indicated that 58% of hearing aid literature required a college-age reading level for understanding. This suggests that many patients, even some considered to be functionally literate, may not fully understand the materials they have been given for hearing aid counseling purposes.

Illiteracy is a hidden communication impairment affecting millions of Americans. Although there is no universally accepted definition of illiteracy, a fifth-grade reading level is generally considered necessary for performing day-to-day activities (Fingeret, 1983). It is estimated that 25 million individuals over the age of 17 are functionally illiterate (McGraw, 1987), with the highest concentration believed to occur among the elderly (Heisel & Larson, 1984). Estimates of illiteracy in adults over the age of 60 range from 10% to 50% (Lumsden, 1979). These statistics suggest that many audiologists may be unknowingly providing rehabilitative services to illiterate adults.

The ramifications of illiteracy for service delivery to this population are considerable. Printed materials prepared without reference to reading level may present a barrier to accurate acquisition and dissemination of information in speech and hearing clinics. Areas potentially affected include (a) accuracy and efficiency of the initial intake process (Kelly & Kahn, 1992); (b) restricted benefits from communication technology such as telecommunications devices, fax ma-

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chines, computers, and closed captioning; and (c) limited usefulness of instructional and informational materials prepared for hearing loss management (Kahn & Kelly, 1991). Kelly and Kahn (1992) used readability formulas to analyze documents routinely used for intake purposes at facilities offering audiology and speech-language pathology services. Results revealed that 42% of the forms and informational materials were rated as college-level reading material. The same potential for client confusion exists when using the printed materials distributed to hearing aid users with new amplification systems.

The purpose of the current investigation was to assess the readability of user instructional and informational brochures currently provided with amplification systems. Readability ratings might prove useful for identifying a potential source of confusion to hearing aid users with limited reading skills.

METHODS

Materials

Letters requesting copies of instructional materials routinely provided to hearing aid consumers were sent to hearing aid companies. The letter described the nature of the study and requested permission to reproduce the text from the materials as needed for analysis. Twenty-three companies responded by sending a total of 181 documents. The documents were divided into two categories, user instructional brochures and informational brochures. User instructional brochures were defined as materials prepared in accordance with section 801.420 of the Food and Drug Administration (1977) regulations for hearing aid devices. Informational brochures were defined as materials providing consumers with general information on hearing loss or hearing aids. User instructional brochures that differed only in hearing aid model number were excluded from analysis, reducing the total number of documents to 109 (55 user instructional brochures and 54 informational brochures).

Analysis of Documents

Text from the brochures was scanned or typed into a Macintosh computer and stored on disk. Analysis of the documents was performed using the software *Thunder* (Gross, 1986), designed for use with Apple Macintosh as a spelling checker. Summary statistics generated by this software included number of words, syllables, words with at least 3 syllables, sentences, paragraphs, and level of readability. Estimates of readability were made using three formulas: The FOG Index (Gunning, 1968), Flesch's Index (Flesch, 1948), and Fry's Index (Fry, 1977). Gunning's FOG and Fry's indices result in a number representing the approximate grade of schooling required to understand material. Flesch's Index results in a range of values used to place the material in one of eight grade categories. Gunning's FOG and Flesch's indices were calculated by *Thunder.*

Readability formulas differ in the language variables sampled and the constants used in their calculation. For example, both The FOG Index and Flesch's Index begin by dividing the total number of words by the total number of sentences in the document; however, Flesch multiplies this figure by 1.015. In addition, The FOG Index counts the number of words with more than three syllables, whereas Flesch counts the number of syllables present in the first 100 words and multiplies by 0.846. It is therefore possible for different formulas to result in slightly different readability ratings. The discrepancies that occurred were always between The FOG Index and the other two indices. Any discrepancy in classification in this study was resolved using Fry's Index. Fry's Index is considered to be more accurate than Flesch's Index for predicting reading levels associated with higher grade levels (Grundner, 1978). Fry's Index was calculated by the examiner using the summary statistics generated by *Thunder.* In all cases of discrepancy, classification according to Fry's Index was consistent with Flesch's Index. Therefore, in order to simplify reporting, only results determined with Flesch's Index are presented here. Reporting was further simplified by collapsing Flesch's eight grade levels into four categories: college, high school, junior high school, and grade school.

RESULTS

Readability estimates for all materials and for both categories (instructional and informational) are illustrated in Table 1. Sixty-three (58%) of all documents were classified as college level, 22 (20%) as high school, 17 (16%) as junior high school, and 7 (6%) as grade school reading level. This trend was seen for both categories of document types, with 40 (73%) of the user instructional brochures and 23 (43%) of the informational brochures classified as having a college readability level.

Table 1

Number *(n)* and Estimated Percentage (%) of Documents Which Fall Within Each Readability Level When Grouped According to Brochure Type.

	Brochure type					
	All documents		User instructional brochures		Informational brochures	
Readability level	***n***	**%**	***n***	**%**	***n***	**%**
College	63	58	40	73	23	43
High school	22	20	11	20	11	20
Junior high school	17	16	4	7	13	24
Grade school	7	6	0	0	7	13

DISCUSSION

When interpreting readability data it is important to view the results as broad estimates of the degree of education required to understand a document completely. Partial understanding may be possible with reading skills at levels lower than those indicated by a readability rating. Factors influencing understanding include (a) reader familiarity with the topic; (b) use of technical terms; (c) whether uncommon terms are defined in the text; (d) whether the print is in an individual's first or second language; and (e) the use of simple, well-designed illustrations. It is not possible to know the full extent to which hearing aid brochures present a barrier to quality service provision without specific figures on (a) the number of illiterate persons using hearing aids, (b) the frequency with which clients use these materials, and (c) the reason the materials are being consulted (e.g., troubleshooting, general operation, warranty). However, the readability estimates presented here suggest many patients, even some considered to be functionally literate, may not fully understand materials they have been given for hearing aid counseling purposes. Highly educated adults also may find these materials confusing because of the use of technical terminology specific to amplification systems. The long-accepted definition of functional literacy as a fifth-grade reading level does not take into consideration that many tasks today require some technical knowledge. Chall (as cited in Burton, 1991) suggests that a 12th-grade reading level may be a more realistic estimate of the reading level required to function in our society. The higher readability ratings seen for instructional brochures compared to general informational brochures may illustrate the effect of complex multisyllabic professional terms on readability estimates. Individuals who are unable to access written materials for information may require more frequent appointments to solve problems or may be unable to use their amplification to full advantage, thus contributing to lower levels of consumer satisfaction with amplification.

When coping with "need to know" reading situations, illiterate adults often develop sophisticated strategies and reciprocal working relationships with readers (Fingeret, 1983). However, professionals should not assume that all clients with poor reading skills have assistance readily available or that a reader can effectively communicate the content of instructional or informational materials to a non-reader. It is therefore recommended that instructional materials be prepared for a variety of reading levels. Clinicians who rely on their own understanding of text as an indication of readability level risk underestimating the level of reading difficulty. Technical terms and hearing aid operations that are familiar to professionals are often confusing to clients. Ideally materials should be tested using inexperienced hearing aid users. If this cannot be done they should at least be evaluated for readability level. Many computer word processing programs now contain readability analysis options. It is a simple process to check the reading level of patient materials as part of routine spelling and grammar checks. Short-

ening a sentence or using a simpler term may be all that is necessary to improve the readability of the text. Appendix A provides an example of text at the college level similar to that found in some hearing aid brochures. The text has been rewritten to accommodate a fifth-grade reading level.

When modifying the readability of text, attention also should be paid to simplifying the accompanying illustrations. The same principles for simplification of language should be used when preparing scripts for taped (audio and VHS) media. It also is recommended that legal documents such as warranty and service agreements be presented orally and in the presence of a witness to help maximize client understanding and to verify presentation. However, simply reading materials with high readability ratings does not ensure understanding. The clinician may find it useful to prepare and evaluate scripts with alternative wording for legal information before client counseling takes place. Appendix B contains a list of suggestions which can be used when preparing informational and instructional materials for clients.

Further study is needed in order to verify or refute the supposition that illiteracy impacts significantly on provision of quality services to hearing aid users or the level of user satisfaction with amplification systems. However, it is clear from the data presented here that there is a need for improvement of the written materials used to educate clients about hearing aids. The primary goal for these documents should be to provide simple, clear information to all hearing aid users regardless of their reading ability.

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APPENDIX A

Example 1: Hearing aid information with a readability rating at the college level.

Your new hearing instrument has a wide variety of exceptional features designed to improve its performance in unusual, complex, or difficult listening environments. These control options are available on most models of our hearing instruments and can be modified by your hearing instrument specialist to match your personal listening preferences. It is highly recommended you do not attempt to make these modifications yourself, but rely on a trained professional to make the appropriate changes to the optional control screws of your hearing instrument.

Example 2: Hearing aid information rewritten to a readability level of less than the fifth grade.

Your hearing aid has three special controls. These controls can be used to change the quality of the sound you hear. Changing the special controls may make your hearing aid more comfortable. Your hearing aid specialist will adjust the controls for you.

APPENDIX B

SUGGESTIONS FOR IMPROVING READABILITY

Vocabulary

1. Avoid long or infrequent words.
2. To select high frequency words consult the *American Heritage Word Frequency Book* (Carroll, Davies, & Richman, 1971) or *3,000 Instant Words* (Sakiey & Fry, 1979).
3. For information on words understood at different grade levels consult *Living Word Vocabulary* (Dale & O'Rourke, 1976).
4. Avoid words with Latin or Greek prefixes and roots.
5. Avoid jargon and technical terms.
6. If technical terms must be used, define the terms and/or use them first in context.

Sentences

7. Keep sentences short; for adults keep average sentence length below 15 words.
8. Avoid splitting sentence kernel (embedding).
9. Keep verb active (avoid nominalizations).
10. Many commas may indicate the need for two sentences.
11. Semicolons and colons may indicate the need for a new sentence.

Paragraphs

12. Keep the majority of paragraphs short.
13. One sentence paragraphs are permissible at times.
14. Indent and line up lists.

Organization

15. Organization should reflect the topic and purpose of the document.
16. Consider a format of statement, example, and restatement.
17. Use subheads and summaries.

Cohesion

18. Increase links between sentences and paragraphs; that is, do not make abrupt topic changes.
19. Avoid too many different ideas in a short passage.

Clarity of message

20. Use more concrete words.
21. Avoid using low imagery words.
22. Use vivid examples.
23. Use simple graphs whenever appropriate.

Referents

24. Avoid too many referents.
25. Replace some referents with original noun or verb.
26. Avoid distance between noun and referent.
27. Do not use referents that could refer to two or more nouns or verbs.

Motivation

28. Select interesting examples.
29. Write at a level a little below your audience.
30. Consider your reader's background knowledge.

Test written materials

31. Do not rely on your own estimate of readability.
32. Try out materials on inexperienced clients.
33. Check client comprehension of material.
34. Revise if necessary.

Illustrations and visual aids

35. Keep illustrations simple and uncluttered.
36. Focus on one or two messages.
37. Place material on the page to promote focus and visual flow.
38. Use sufficient white space.
39. Use arrows, underlines, circles, or other devices to highlight critical message components.
40. Use realistic drawings when depicting human figures.
41. Do not use cartoons.
42. Make sure all terms are adequately defined and/or used in context in accompanying text.
43. Make sure the size of print and illustrations is adequate for older readers.

Note. Adapted from *Teaching Patients with Low Literacy Skills* by C.C. Doak, L.G. Doak, and J.H. Root, 1985, Philadelphia: J.B. Lippincott Co. Copyright 1985 by J.B. Lippincott Co. Also adapted from "Writeability: The Principles of Writing for Increased Comprehension" by E. Fry, 1988, in B.L. Zakaluk and S.J. Samuels (Eds.), *Readability: Its Past Present and Future,* Newark, NJ: International Reading Association. Copyright 1988 by International Reading Association.