Readability and Inter-Rater Reliability of Cochlear Implant Print Materials

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This study examined readability and inter-rater reliability of informational booklets, pamphlets, and client/parent workbooks distributed by companies that produce cochlear implant devices. Readability was determined using the Simple Measure of Gobbledygook (SMOG) Formula, the Simple Measure of Gobbledygook Conversion (SMOG-C) Formula, Flesch-Kincaid method, and Flesch Reading Ease method. Five raters with graduate-level education and experience in linguistics conducted an independent analysis of each document. Intra-class correlation coefficients (ICCs) were calculated to determine consistency among ratings. Results indicated mean readability level was grade 13.53 using the SMOG/SMOG-C formula (range: 11.0 to 17.0 [i.e., college level]) and grade 11.26 using the Flesch-Kincaid formula (range: 9.0 to 12.0). Flesch Reading Ease levels were *very difficult* to *fairly difficult* across all documents and high levels of consistency (ICC ≥ 0.7, with 95% confidence) occurred among group readability ratings. These findings are discussed.

Through re/habilitative activities, individuals are frequently provided with written information for managing their health care and for making informed decisions, which can bring about positive health outcomes. Written information usually exists in many different formats, with literacy often determined from hard-copy documents such as medical appointment cards, instructions for prescribed and over-the-counter medications, health and medical brochures, pamphlets, informed consent documents, and pre- and post-surgical directives (Institute of

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Medicine, 2004). In order for written materials to be useful, however, patients must be able to adequately read and understand the documents themselves.

According to a national survey on Health Literacy (1999), approximately one out of five adults in the United States is functionally illiterate, meaning they are unable to read above a fourth or fifth grade equivalency level. Literacy statistics in this regard have also shed light on a common trend; individuals from the general United States population have sixth to eighth grade reading equivalency skills (French & Larabee, 1999; Monsivais & Reynolds, 2003). Patient literacy for medical and health care purposes involves the ability to read, understand, and take actions based on printed health care information. A readability level and/or literacy score for print-based documents is typically interpreted by ease of reading typology (e.g., very difficult, difficult, easy, very easy) or by U.S. grade level equivalence. Established methods to determine literacy level include the Simple Measure of Gobbledygook (SMOG) formula (McLaughlin, 1969), the Simple Measure of Gobbledygook Conversion (SMOG-C) formula for shorter sentence passages (McGraw, n.d.), Flesch-Kincaid method (Kincaid, Fishburne, Roberts, & Chissom, 1975), and Flesch Reading Ease method (Flesch, 1948).

The SMOG and SMOG-C are hand-calculated formulae that provide readability estimates from 3rd grade to 19th grade (beyond college undergraduate level). The SMOG measure is based on a minimum of 30 sentence passages, with 10 sentences each taken from the beginning, middle, and end of a written document. The SMOG formula evaluates readability level in terms of the average number of words in a sentence and the average number of syllables in a word. The text is then converted into a readability level in terms of a U.S. grade equivalency, which reflects the level at which the materials are understandable (McLaughlin, 1969). For documents with sentence passages between 10 and 30 sentences in length, the SMOG-C is used in place of the SMOG (McGraw, n.d.). The Flesch-Kincaid method similar to the SMOG/SMOG-C approach, but readability levels range from 3rd grade to 12th grade. Finally, the Flesch Reading Ease method uses a rating scale from 0 to 100, with lower scores indicating greater reading difficulty (McLaughlin, 1974). When using the Flesch Reading Ease method, D'Alessandro, Kingsley, and Johnson-West (2001) and Finn (1985) have interpreted scores according to the reading ease of documents found in the media (see Table 1).

Researchers across several disciplines have implemented SMOG/SMOG-C, Flesch-Kincaid, or Flesch Reading Ease scales to evaluate readability. Cooley et al. (1995) used the Flesch-Kincaid method to determine reading level of 14 booklets developed by the American Cancer Society and 16 booklets developed by the National Cancer Institute. Results indicated that 80% of the booklets were written between 9th and 12th grade level. Dollahite, Thompson, and McNew (1996) examined the role of nutrition education materials used in patient education to determine which might be useful with low literacy clients. Readability of 209 pamphlets from professional health organizations, commercial organizations, govern-

ment agencies, and educational institutions was assessed using the Flesch-Kincaid method. Results indicated 68% (142) of the publications were written at 9th grade level or higher. Eleven percent (24) of the publications was scored at 6th grade or below and only 2 publications were written at the 3rd grade level. Slaten, Parrott, and Steiner (1999) used the SMOG formula to determine readability of 8 skin cancer brochures targeted toward parents of young children. Readability levels of the brochures were between the 8th and 12th grade. Freda (2005) used Flesch-Kincaid and SMOG formulae to evaluate readability of 74 American Academy of Pediatrics patient education brochures. Results indicated mean readability for all 74 brochures was grade 7.94 using the Flesch-Kincaid formula, and grade 10.1 with SMOG formula. Moreover, only 41 of the 74 brochures had acceptable readability levels (i.e., less than or equal to 8th grade). Finally, Hendrickson, Huebner, and Riedy (2006) utilized the Flesch-Kincaid, Flesch Reading Ease, and SMOG formulae to examine readability of 27 pediatric oral health education materials obtained from commercial, government, industry, and private nonprofit sources. Readability of the written text ranged from 2nd to 9th grade across documents. The average Flesch-Kincaid grade level for government publications was equivalent to grade 4.73 reading level (range, 2.4-6.6), grade levels for commercial publications averaged 8.1 (range, 6.9-8.9), and industry published materials read at an average Flesch-Kincaid grade level of 7.4 (range, 4.7-9.3).

Trends in the literature have shown the ease of readability is often synonymous with written documents that have low numbers of words per sentence, characters

Table 1

Scale Used to Interpret Flesch Reading Ease Scores

Flesch Reading Ease score (100 = easiest)	Reading difficulty	Example of reading document
0-30	Very difficult	Legal contract
31-50	Difficult	Corporate annual report
51-60	Fairly difficult	*The Ambassadors* (by Henry James)
61-70	Standard	*New York Times*
71-80	Fairly easy	*US News and World Report*
81-90	Easy	*Time Magazine*
91-100	Very easy	*Reader's Digest*

Note. Adapted from "The Readability of Pediatric Patient Education Materials on the Worldwide Web" by D.M. D'Alessandro, P. Kingsley, and J. Johnson-West, 2001, *Archives of Pediatric Adolescent Medicine, 155,* pp. 807-812 and from "Unpredictability as a Correlate of Reader Enjoyment of News Articles" by S. Finn, 1985, *Journalism Quarterly, 62,* pp. 334-339, 345.

per word, syllables per word, and percentage of passive versus active sentences (Doak, Doak, & Root, 1996; Rankin & Stallings, 1996). Calculating equivalent literacy level mirrors this pattern, which customarily involves tabulating syllable counts, word counts, and sentence structure to estimate the difficulty in processing written text. Prior research efforts utilizing SMOG/SMOG-C, Flesch-Kincaid, or Flesch Reading Ease measures provide reasonably accurate estimates (±1 grade level with 68% confidence) and are extremely common among studies involving patient literacy in health and medical care. Despite this widely accepted approach, calculating grade equivalents and difficulty levels of written documents without considering other components such as graphics and color illustrations continues to make readability subject to debate.

If we turn our attention to the audiology literature, limited data exists on readability levels of material related to hearing loss. Boston, Ruwe, Hilbert, Choo, and Greinwald (2004) surveyed parents of potential cochlear implant recipients regarding their understanding of internet-based information. Several internet websites were assessed for readability and results determined information on all websites reviewed was 12th grade equivalency level or above. In a related study, Kelly and Kahn (1991) examined documents routinely disseminated from speech and hearing facilities used in management of hearing loss. Results indicated 41% of the written materials required at least a college equivalent reading level, 17% of the documents required at least a high school equivalent reading level, and 42% of the documents were estimated to require either a grade school or a junior high school education to read and understand the written word.

There are currently three manufacturers who produce cochlear implant devices worldwide: Advanced Bionics Corporation, Cochlear Corporation, and Medical Electronics Corporation (Med-El). Most professionals involved in the cochlear implant process are aware of each company and are familiar to a certain extent with some of the print-based materials each company provides, but they also should have some knowledge about the readability levels of these documents as well. A trend that has also become rather common to cochlear implantation has been patients who often seek out information on their own to make an informed choice. With an increased emphasis on creating a partnership between patients, their families, and hearing healthcare professionals, which may ultimately lead to increased compliance (Pugh, 2007), it is critical to understand where breakdowns may occur. As such, it is relatively unknown whether or not print-based cochlear implant material is a potential obstacle in the process. This circumstance serves as the rationale for the present study. Our intent of this investigation was to: (a) determine the equivalent levels required to read written materials provided by cochlear implant manufacturers, (b) compare readability levels obtained from this study to other investigations that have evaluated readability of print materials used in our profession, and (c) consider the re/habilitative implications when providing these materials to potential cochlear implant recipients and their family members.

METHOD

Written and verbal requests were made to Advanced Bionics Corporation, Cochlear Corporation, and Med-El Corporation with the intent to obtain print-based materials (e.g., informational booklets, pamphlets, brochures, education guides) most commonly utilized as part of their general information and patient education process. Our interest was based on obtaining documents from each manufacturer that: (a) are similarly distributed directly to potential implant recipients, families, educators, or implant centers; (b) are written with a minimum of 10 sentence passages on each printed source which allows for readability analysis; and (c) have a print format in the English language. Based on our request, between 5 to 10 different types of leaflets, print brochures, reading booklets, or pamphlets were received from each cochlear implant manufacturer. From the materials received, a total of 18 different types of useable materials (6 from each manufacturer) met the inclusion criteria and represented the documents for review.

A random sample of five raters was selected to participate in the study. All raters reported graduate-level college education and experience in linguistics focusing on grammatical structures, formulation of words and sentences, and the sound system of language. Each rater was recruited based on their participation in a pilot study to independently review and evaluate the readability of written materials obtained from other medical and health disciplines. All pilot materials were assessed using the SMOG/SMOG-C, Flesch Reading Ease, and Flesch-Kincaid readability formulae. Following the pilot experience, each rater conducted an independent review of each cochlear implant document by applying the readability formulae. All measures were determined via hand and computer calculation, all raters were blind to the ratings provided by the other raters, and intraclass correlation coefficients (ICCs) were analyzed to determine the level of agreement between ratings. ICCs are designed to assess consistency or conformity between two or more measurements and are frequently utilized when two or more raters are involved in the analysis. For interpretive purposes, an ICC from 0.40 to 0.59 is moderate inter-rater reliability, an ICC from 0.60 to 0.79 is substantial reliability, an ICC from 0.80 to 0.99 is outstanding reliability, and an ICC of 1.00 reflects complete agreement (Landis & Koch, 1977). All data were analyzed using Statistical Analysis Software (SAS; 2001).

RESULTS

Readability scores on the sample of cochlear implant print materials can be found in Table 2. These findings show SMOG/SMOG-C scores for the entire sample of documents ranged from 11th to 17th grade (i.e., college) level. The Flesch-Kincaid reading level across all documents ranged from 9th to 12th grade. Mean readability level across documents was grade 13.53 using the SMOG/

Table 2

Mean (±1 Standard Deviation) Readability Levels of Cochlear Implant Documents

Source document	SMOG/ SMOG-C[a] (grade level)	Flesch-Kincaid (grade level)	Flesch Reading Ease (100 = easiest)
ADVANCED BIONICS CORPORATION			
Making the Connection	14.60 (0.55)	12.00 (0.05)	46.70 (1.12)
HiResolution Bionic Ear System (booklet)	11.00 (0.08)	9.20 (0.34)	55.78 (2.24)
HiResolution Bionic Ear System (brochure)	12.80 (0.45)[a]	10.76 (0.47)	40.42 (2.91)
Telephone Tips for the Platinum or CII BTE Sound Processor	15.00 (0.71)[a]	12.00 (0.04)	36.08 (2.09)
Telephone Tips for the Platinum Series Processor or S-Series Processor	14.40 (0.55)[a]	12.00 (0.08)	34.72 (2.51)
Guide to Cochlear Implants for Parents and Educators	13.80 (0.45)	12.00 (0.09)	39.34 (7.01)
COCHLEAR CORPORATION			
Exploring a World of Sound	12.40 (0.89)	10.64 (0.39)	48.26 (2.91)
Nucleus Freedom – With SmartSound	13.00 (1.22)	11.68 (0.19)	42.24 (2.53)
Introducing Nucleus Freedom – With SmartSound	12.80 (0.45)	11.28 (0.25)	46.60 (1.92)
Making an Informed Decision: Reliability Matters	13.80 (0.45)	12.00 (0.04)	40.78 (1.45)
Designed to Mirror Natural Hearing	12.80 (0.42)[a]	10.04 (0.22)	49.88 (1.42)
Bilateral Cochlear Implantation: Questions and Answers	15.60 (0.55)	12.00 (0.07)	27.88 (1.28)

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Table 2 *continued from page 38*

Source document	SMOG/ SMOG-C[a] (grade level)	Flesch-Kincaid (grade level)	Flesch Reading Ease (100 = easiest)
MEDICAL ELECTRONICS (MED-EL) CORPORATION			
Symphony of Technology	17.00 (0.71)	12.00 (1.79)	18.10 (1.90)
Understanding Cochlear Implants	11.80 (0.45)	9.32 (0.49)	51.94 (3.49)
Communication Options and Educational Placements	12.00 (0.06)	10.52 (0.18)	50.90 (1.42)
MED-EL TEMPO+ Speech Processor	14.60 (0.89)	12.00 (0.40)	36.84 (1.86)
Beyond Hearing Aids	13.00 (0.71)	11.18 (0.20)	46.50 (1.32)
Hearing You on a Personal Level	13.20 (0.84)[a]	11.10 (0.35)	47.02 (1.39)

Note. SMOG = Simple Measure of Gobbledygook. SMOG-C = Simple Measure of Gobbledygook Conversion. BTE = Behind-the-ear.
[a]Determined with the SMOG-C formula. The SMOG name was used by McLaughlin (1974) in tribute to Gunning's Fog Index (the first person to count the number of polysyllabic words to determine semantic difficulty) and in reference to his birthplace, London.

SMOG-C formula and grade 11.26 using the Flesch-Kincaid formula. Finally, Flesch Reading Ease scores ranged from 18.10 (Very Difficult) to 55.78 (Fairly Difficult).

Table 2 also provides readability ratings of cochlear implant print materials by manufacturer. The SMOG/SMOG-C scores ranged from 11th to 15th grade level for Advanced Bionics documents, 12th to 15th grade level for Cochlear Corporation documents, and 11th to 17th grade level for Med-El documents. Flesch-Kincaid readability levels ranged from 9th to 12th grade level for Advanced Bionics documents, 10th to 12th grade level for Cochlear Corporation documents, and 9th to 12th grade level for Med-El documents. Readability scores on the Flesch Reading Ease ranged from 34.72 (Difficult) to 55.78 (Fairly Difficult) for Advanced Bionics documents, from 27.88 (Very Difficult) to 49.88 (Difficult) for Cochlear Corporation documents, and from 18.10 (Very Difficult) to 51.94 (Fairly Difficult) for Med-El documents.

Inter-rater reliability analyses including single and group ICCs calculated with a 95% confidence interval are displayed in Table 3. A single ICC reflects consistency in a set of ratings provided by a sole individual and group ICCs reflect consistency of all ratings combined. The ICC for Advanced Bionics Corporation documents ranged from 0.53 to 0.99 for single measures and 0.84 to 0.99 for group measures. For Cochlear Corporation documents, single ICC ranged from 0.33 to 0.99 and group ICC ranged from 0.70 to 0.99. For Med-El documents, single ICC ranged from 0.36 to 0.99 and group ICC ranged from 0.73 to 0.99. Collectively, the results obtained from group ICCs show substantially high levels of consistency (ICC $\geq$ 0.7) among group readability ratings across all documents.

DISCUSSION

This study examined the readability and inter-rater reliability of informational booklets, pamphlets, and client/parent workbooks distributed by companies that produce cochlear implant devices. Results from this study indicate mean readability level across documents was grade 13.53 using SMOG/SMOG-C formulae and grade 11.26 using the Flesch-Kincaid formula, which are substantially higher than 6th to 8th grade equivalency level recommended by Doak et al. (1996) for documents used in medical and health care. None of the documents had Flesch Reading Ease scores between 61-70 points which qualify as a Standard reading level, and none of the documents were scored above 71 points which is consistent with a Fairly Easy reading level. The group ICCs provide further insight on the relation among literacy scores, based on readability ratings obtained via blind review, on the same items. The group ICCs in our study ranged from 0.70 to 0.99, which indicates substantial to outstanding levels of consistency among group readability ratings.

It is important to point out that SMOG/SMOG-C and Flesch-Kincaid methods resulted in similar readability levels, but lower mean levels were obtained with

Table 3

Intra-Class Correlation Coefficients for Readability Measures by Manufacturer

	Intra-Class correlation coefficient	95% Confidence interval		
		Lower bound		Upper bound
ADVANCED BIONICS CORPORATION				
SMOG/SMOG-C				
Single	0.897	0.698	to	0.983
Group	0.978	0.920	to	0.996
Flesch-Kincaid				
Single	0.959	0.878	to	0.993
Group	0.992	0.973	to	0.999
Flesch Reading Ease				
Single	0.830	0.532	to	0.970
Group	0.961	0.849	to	0.994
COCHLEAR CORPORATION				
SMOG/SMOG-C				
Single	0.714	0.332	to	0.945
Group	0.926	0.707	to	0.989
Flesch-Kincaid				
Single	0.926	0.760	to	0.988
Group	0.984	0.940	to	0.998
Flesch Reading Ease				
Single	0.940	0.726	to	0.991
Group	0.988	0.930	to	0.998
MEDICAL ELECTRONICS (MED-EL) CORPORATION				
SMOG/SMOG-C				
Single	0.892	0.691	to	0.982
Group	0.976	0.918	to	0.996
Flesch-Kincaid				
Single	0.687	0.361	to	0.936
Group	0.916	0.738	to	0.987
Flesch Reading Ease				
Single	0.975	0.896	to	0.996
Group	0.995	0.977	to	0.999

Note. SMOG = Simple Measure of Gobbledygook. SMOG-C = Simple Measure of Gobbledygook Conversion.

the Flesch-Kincaid formula. A logical explanation is offered to clarify this grade level difference. Recall the Flesch-Kincaid formula is identical to the SMOG and SMOG-C formulae. However, the SMOG/SMOG-C ratings range from 3rd grade to 19th grade (beyond undergraduate college level), but Flesch-Kincaid readability levels range from 3rd grade to 12th grade. This difference creates a Flesch-Kincaid ceiling effect, which occurs when the readability level of any printed source is at or beyond 12th grade. This ceiling effect occurred in our study and is extremely consistent with other studies in the literature that have also used SMOG/SMOG-C and Flesch-Kincaid formulae (e.g., Estrada, Hryniewicz, Higgs, Collins, & Byrd, 2000; Freda, 2005; Hendrickson et al., 2006) as their method of analysis. Furthermore, the SMOG/SMOG-C, Flesch Reading Ease, and Flesch-Kincaid formulae are considered by Rankin and Stallings (1996) as acceptable evaluative methods for determining literacy, yet those familiar with tabulating literacy estimates are aware that calculating grade equivalents and difficulty levels for each formula is strictly tied to words per sentence, characters per word, and number of syllables per word contained in the documents themselves. In addition to word choice and sentence structure, Doak et al. (1996) and Singh (2003) emphasize that literacy levels rely on a combination of factors such as format, layout, organization, font size, use of graphics, and color illustrations that allow for improved (easier) reading. It should be noted that several cochlear implant documents evaluated in this study contained a number of these aforementioned components (e.g., large font size, use of color graphics, etc.), but none of the readability formulae make allowances for these components.

Our findings compare favorably with prior research on readability levels of print-based documents used in medical and health care as well as with findings from the limited number of investigations that have explored readability of written material on hearing loss. Our results follow the pattern of numerous print-based documents across the medical and health care spectrum, which require at least a 9th grade reading level (e.g., Cooley et al., 1995; Dollahite et al., 1996; Hendrickson et al, 2006; Kennen et al., 2005; Mazor & Billings-Gagliardi, 2003). Data provided by Boston et al. (2004) determined readability of cochlear implant information on internet websites was 12th grade equivalency level or above while Kelly and Kahn (1991) determined that 58% of the documents in their study on hearing loss required at least a high school reading level. The three cochlear implant companies (Advanced Bionics Corporation, Cochlear Corporation, and Med-El Corporation) have numerous patient education documents beyond those evaluated in our study and equally have the materials evaluated in this study available in VHS, DVD, or Internet formats, which may facilitate improved understanding of the technology involved. However, when considering the substantial to outstanding levels of consistency ($0.70 \leq ICC \leq 0.99$, with 95% confidence) in ratings among the documents shown in Table 2, the logical pattern of substantial to outstanding levels of consistency in elevated readability levels are

also likely to occur when evaluating other types of written materials provided by cochlear implant manufacturers.

The imbalances that exist between elevated readability levels of the print materials and their relation to literacy trends of the general U.S. population support the notion that the cochlear implant materials may not be written at levels that facilitate ease of understanding. As a consequence of an elevated readability level, the data indicate the printed source may exist as a potential obstacle in the cochlear implant process. The implications of this circumstance can ultimately serve as a guide to the manufacturing sector. Professionals in cochlear implant manufacturing that develop and market patient education materials can minimize this effect by improving the readability of their documents and publishing the literacy levels on each piece of patient education. Not only will this information enhance their consumer appeal, it could possibly aid in reducing negative health outcomes such as increased medical costs and decreased compliance patterns that have been routinely associated with low patient literacy levels (Howard, Gazmararian, & Parker, 2005). This is especially the case as implant technology evolves, which often requires the need for the manufacturing sector to develop newer informational booklets, pamphlets, brochures, and instruction manuals.

The implications of the data also highlight the need for increased emphasis on informational and patient-centered counseling on behalf of all personnel involved in the provision of cochlear implants. The medical industry has always been consumer driven and providing patients with written materials has become a readily accepted component of clinical practice. It is along these lines where informational counseling provides potential cochlear implant patients and their families with knowledge that allows them to have a better understanding of the technology involved (Ito, 1994). Ultimately, participation and compliance in audiologic re/habilitation occurs when there is a good fit between specific needs of each client and abilities of their compliance partners (i.e., Primary Care Professionals, Hearing Health Care Professionals, and Families). This case is clearly evident when a person with substantial hearing loss is considering a cochlear implant or for those individuals who would like to know more about the implant itself. An alternative to strictly-based informational counseling is patient-centered counseling (Luterman, 2001). This humanistic approach emphasizes the need for the hearing health care professional and the client to develop a relationship in which the client can communicate freely. As the relationship develops and grows, the client becomes more willing to offer statements and observations. The professional can facilitate this process by not always responding with content (i.e., print) based information. Instead, the process encourages offering varying amounts of information when patients are poised to handle it, which could actually facilitate the education and re/habilitation process more efficiently. This is due to the service system for individuals with disabilities such as hearing loss changing from an institutional-based medical model to more of a collaborative

re/habilitation model, and attention should be given to every component in the process.

As the number of patients receiving cochlear implants grows, professionals at cochlear implant centers should be more attentive to the written structure of the documents each company provides. These dedicated efforts can play a pivotal role in re/habilitative intervention because patients with limited reading skills who may not understand the written document(s) run the risk of improper use and care of their (or their child's) cochlear implant. Patients who lack sufficient literacy levels or have limited comprehension skills due to concomitant vision or cognitive deficits, coupled with a written document that has an elevated written structure, may further complicate successful adjustment to amplification. A careful mix of information and patient-centered counseling serves as an optimal means of patient education and can guide families in their decision-making process (Aldridge, 2004; Hilts & Krylik, 1991; Mayeaux et al., 1996; Rankin & Stallings, 1996). This re/habilitative method seems plausible; however, it remains uncertain whether or not this event occurs as a standard part of clinical practice when educating patients about cochlear implants.

This study evaluated different types of cochlear implant documents, yet these findings are limited as the design of the present study does not allow for direct comparisons between readability levels of the documents shown in Table 2 and the reported highest level of completed education of potential implant recipients or relevant family members. Future directions for research to address this condition may include using the Rapid Estimate of Adult Literacy in Medicine (REALM; Davis, Long, & Jackson, 1993) or the Test of Functional Health Literacy in Adults (TOFHLA; Parker, Baker, Williams, & Nurss, 1995) to assess patients'/parents' actual health literacy skills. Clinically, results obtained from these tests may provide information on selecting the most appropriate implant document(s) that carefully matches patient reading levels and possibly increase our understanding of the connection between health literacy, education materials, and appropriate counseling methods. Further research is also needed to determine the effect of different education approaches such as use of printed material, video (VHS/DVD), Internet, or any combination thereof as the medium of choice to inform patients about cochlear implants. Due to the transitory nature of websites, careful attention should be given to evaluating information from the Internet (Boston, Ruwe, Duggins, & Willging, 2005). An additional obstacle of Internet-based reviews is the extended availability of information located on uniform resource locators (URLs) is not guaranteed. This type of translational research involving the effect of different information delivery mediums on learner outcomes is fairly common in health care, although not with the specific intent on hearing loss. These new data would be beneficial in developing a better understanding on the effect of education materials on the entire process of providing cochlear implants.

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