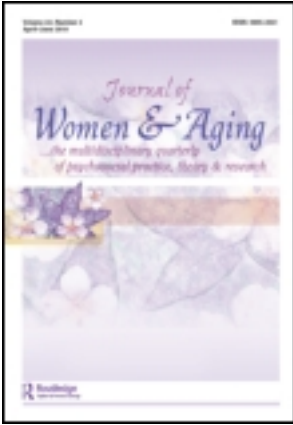


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Publisher: Routledge

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## Journal of Women & Aging

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/wjwa20>

### Readability of Menopause Web Sites: A Cross-Sectional Study

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Version of record first published: 25 Oct 2012.

To cite this article: Deborah H. Charbonneau (2012): Readability of Menopause Web Sites: A Cross-Sectional Study, *Journal of Women & Aging*, 24:4, 280-291

To link to this article: <http://dx.doi.org/10.1080/08952841.2012.708574>

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## Readability of Menopause Web Sites: A Cross-Sectional Study

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*More women are frequently referring to the Internet for health information, yet the readability of information about menopause on the Internet has not been widely studied. To address this gap, this study examined the readability of information about menopause on 25 Internet Web sites. Findings included that information on the Web sites had a reading level higher than the recommended sixth-grade level, and culturally appropriate health information was lacking. Health educators and practitioners are in a pivotal role to help women understand information useful for healthcare decisions. Several criteria are discussed to help practitioners evaluate Web sites.*

**KEYWORDS** *health education, health literacy, menopause, readability, Web/Internet resources*

### INTRODUCTION

The Internet is a major source of information for health issues for the general public. According to the Pew Research Center Internet and American Life Project (2011), of the 74% of people who use the Internet, 80% have looked online for health information. As healthcare consumers are more frequently searching the Internet for information about health issues, the readability of these educational materials becomes increasingly important. Furthermore, women are seeking information about menopause and possible treatments from a wide array of sources, including media stories and the Internet (Wathen, 2006). Yet information about menopause provided to healthcare consumers on popular Web sites has not been widely studied.

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Given that 60% of patients surveyed reported that information obtained online had an impact on their healthcare decisions, it is important for practitioners and educators to be able to provide recommendations to women for Web sites that have relevant health education materials (Fox & Jones, 2009). Also given the Internet's popularity, healthcare providers have taken advantage of using Web sites for the dissemination of information for patient education efforts (Aliu & Chung, 2010). However, if online health information is to be useful to women and their families, the readability of health information about menopause has to be ensured.

## BACKGROUND

Many health educators and practitioners have expressed concern about the quality of health education materials (Oermann & Wilson, 2000; Shieh & Hosei, 2008; Weber, Derrico, Yoon, & Sherwill-Navarro, 2010). Indeed, health educators and researchers have long been concerned with patients' ability to comprehend health education materials (Pichert & Elam, 1985). More specifically, research has shown that increased knowledge enables informed, shared decision making between the consumer and the health provider (Pinkerton et al., 2006).

Regarding online health information, a few studies have assessed the content of menopause-related information on the World Wide Web (Oermann, DiBartolomeo, & Mahfet, 2006; Pérez-López, 2004; Reed & Anderson, 2002). Reed and Anderson (2002) evaluated 25 Web sites providing information about menopause and found inadequate evidence of the currency, revision, or authorship of the health content. Further, Reed and Anderson concluded that spelling mistakes found on several Web sites indicated a "lack of proof-reading and low concern for quality" (p. 144). In another study, Pérez-López (2004) examined 92 Web sites and also found that information about the currency, authorship of the content, and references to the scientific literature were either lacking altogether or inconsistent. These studies highlighted that Web sites often fail in stating the currency or authorship of the content, and these factors have been cited as important in ensuring the quality of health information (Eysenbach, Powell, Kuss, & Eun-Ryoung, 2002).

One study examined the reading level of 40 Web sites providing information about hormone replacement theory and concluded that the reading level was "too high for the general public to understand and comprehend" (Oermann et al., 2006, p. 530). Although this study provides useful findings about the readability of information regarding hormone replacement theory, more research is needed to assist women in locating online information about menopause in general, possible symptoms, and potential treatments, including nonpharmaceutical options. Thus, the existing research has not

fully examined the readability of health information about menopause in general provided on Web sites.

Current data indicate that 2 out of every 5 adult Americans have difficulty obtaining and understanding basic health information needed to make appropriate health care decisions (Kutner, Greenberg, Jin, & Paulson, 2006). While results from the National Adult Literacy Survey (U.S. Department of Education, 1992) also showed that one in four adults in the United States reads at or below the third-grade reading level, the readability of online health information about menopause remains relatively unexplored. To address this gap, the specific aim of this study was to evaluate the readability of information about menopause on 25 Web sites. Specifically, the readability of information about menopause found on a sample of Web sites was investigated to assess their usefulness as a source for health information for women.

## METHODS

### Study Design and Identification of Web Sites

Twenty-five Web sites providing health information about menopause were selected for analysis (see Table 1). The Web sites for the study sample were chosen because of their high ranking and visibility in popular search engines such as Google® and Yahoo® using the search term *menopause*. Unlike previous research that used the search terms *hormone replacement theory* to identify Web sites, the present research study employed a different search strategy (Oermann et al., 2006). This approach expanded the range of possible Web sites, thereby providing a different set of Web sites for analysis. Thus, the 25 English-language Web sites were selected because of their wide availability on the World Wide Web. Other inclusion criteria included the accessibility of these Web sites to the researcher and target consumer audience.

### Characteristics of Web Sites

Out of the 25 Web sites included in this study, 44% were commercial in nature ( $n = 11$ ), 24% were provided by the United States government ( $n = 6$ ), 20% were from a foundation or nonprofit organization ( $n = 5$ ), and 12% were sponsored by a professional society of health providers ( $n = 3$ ). Taken together, these represented a sample of commercial, nonprofit, government, and professionally sponsored Web sites. Thus, these 25 easily accessible popular Web sites provided a range of information to women about menopause, possible symptoms, and potential treatments.

**TABLE 1** Menopause Web Sites Included in the Study

Web Sites
1. 34 Menopause Symptoms <a href="http://www.34-menopause-symptoms.com">http://www.34-menopause-symptoms.com</a>
2. BetterMedicine.com <a href="http://www.betiermedicine.com/topic/menopause">http://www.betiermedicine.com/topic/menopause</a>
3. BodyLogicMD.com <a href="http://www.bodylogicmd.com/for-women/menopause">http://www.bodylogicmd.com/for-women/menopause</a>
4. Centers for Disease Control and Prevention (CDC) <a href="http://www.cdc.gov/reproductivehealth/womensrb/menopause.htm">http://www.cdc.gov/reproductivehealth/womensrb/menopause.htm</a>
5. Cleveland Clinic (Cleveland Clinic Foundation) <a href="http://my.clevelandclinic.org/disorders/Menopause">http://my.clevelandclinic.org/disorders/Menopause</a>
6. Dr. Susan Love Research Foundation <a href="http://www.dslrf.org/mwb/content.asp?L2=1&amp;SID=237">http://www.dslrf.org/mwb/content.asp?L2=1&amp;SID=237</a>
7. EarlyMenopause.com <a href="http://www.earlymenopause.com">http://www.earlymenopause.com</a>
8. eMedicineHealth.net <a href="http://www.emedicinehealth.com/menopause/article_em.htm">http://www.emedicinehealth.com/menopause/article_em.htm</a>
9. everydayhealth.com <a href="http://www.everydayhealth.com/womens-health/menopause">http://www.everydayhealth.com/womens-health/menopause</a>
10. FamilyDoctor.org <a href="http://familydoctor.org/online/famdocen/home/women/reproductive/menopause/125.html">http://familydoctor.org/online/famdocen/home/women/reproductive/menopause/125.html</a>
11. Food and Drug Administration (FDA) <a href="http://www.fda.gov/ForConsumers/ByAudience/ForWomen/ucm118627.htm">http://www.fda.gov/ForConsumers/ByAudience/ForWomen/ucm118627.htm</a>
12. health.com <a href="http://www.health.com/health/library/topic/0,bw228763_bw228796,00.html">http://www.health.com/health/library/topic/0,bw228763_bw228796,00.html</a>
13. Hormone Foundation <a href="http://www.hormone.org/Menopause/overview.cfm">http://www.hormone.org/Menopause/overview.cfm</a>
14. MayoClinic.com (Mayo Foundation for Medical Education and Research) <a href="http://www.mayoclinic.com/health/menopause/DS00119">http://www.mayoclinic.com/health/menopause/DS00119</a>
15. MedicineNet.com <a href="http://www.medicinenet.com/menopause/article.htm">http://www.medicinenet.com/menopause/article.htm</a>
16. MedlinePlus.gov <a href="http://www.nlm.nih.gov/medlineplus/ency/article/000894.htm">http://www.nlm.nih.gov/medlineplus/ency/article/000894.htm</a>
17. menopause.org (North American Menopause Society) <a href="http://www.menopause.org/Portals/0/Content/PDF/MG1.pdf">http://www.menopause.org/Portals/0/Content/PDF/MG1.pdf</a>
18. National Institute of Child Health and Human Development <a href="http://www.nichd.nih.gov/health/topics/menopause.cfm">http://www.nichd.nih.gov/health/topics/menopause.cfm</a>
19. National Institute on Aging <a href="http://www.nia.nih.gov/healthinformation/publications/menopause.htm">http://www.nia.nih.gov/healthinformation/publications/menopause.htm</a>
20. Planned Parenthood <a href="http://www.plannedparenthood.org/health-topics/womens-health/menopause-4807.htm">http://www.plannedparenthood.org/health-topics/womens-health/menopause-4807.htm</a>
21. Red Hot Mamas <a href="http://www.redhotmamas.org/facts-and-figures-menopause">http://www.redhotmamas.org/facts-and-figures-menopause</a>
22. ThirdAge.com <a href="http://www.thirdage.com/menopause/menopause">http://www.thirdage.com/menopause/menopause</a>
23. UpToDate <a href="http://www.uptodate.com/contents/patient-information-menopause">http://www.uptodate.com/contents/patient-information-menopause</a>
24. WebMD.com <a href="http://www.webmd.com/menopause/guide/menopause-basics">http://www.webmd.com/menopause/guide/menopause-basics</a>
25. womenshealth.gov <a href="http://www.womenshealth.gov/menopause/menopause-basics">http://www.womenshealth.gov/menopause/menopause-basics</a>

## Assessing Readability

Readability testing can provide some indication of how understandable written text is, and reading levels can be assessed with a variety of formulas (Doak, Doak, & Root, 1996; Redman, 2007). Using previously reported techniques, readability was assessed using the Flesch Reading Ease and Flesch-Kincaid Grade Level formulae (Aliu & Chung, 2010; Sheehan, 2006; Walsh & Volsko, 2008). These were selected because they are two of the most common formulas used to assess readability (Kars, Baker, & Wilson, 2008).

The Flesch Reading Ease analysis provides a score between 0 and 100, indicating the ease of reading (Aliu & Chung, 2010). A lower score indicates that the information is presumably more difficult to read and comprehend.

Likewise, a higher score estimates that information is easier to read. Using the Flesch-Kincaid Grade Level formula, scores are translated into a grade level. For example, a score of 7.0 indicates the grade level of seven and estimates that a seventh grader should be able to understand the text. According to the National Institutes of Health and the American Medical Association, health education materials for the general public should be written no higher than a sixth-grade reading level (Cotugna, Vickery, & Carpenter-Haefele, 2005). In this study, this recommendation was adopted and used to assess the information about menopause found on the 25 Web sites.

### Analysis Plan

To estimate readability, text from each of the Web sites related to menopause, symptoms, and treatments was entered into a word processing program. Next, a computer-based analysis tool included in Microsoft Office Word software was applied to the text to estimate Flesch Reading Ease scores and Flesch-Kincaid grade levels. For the Flesch-Kincaid Grade Level formula, it provided reading grade level scores between fifth- and 12th-grade levels. The Flesch Reading Ease scores were mapped to a reading ease index of 0 to 100, with scores closer to 100 generally being considered easier to understand.

## RESULTS

### Characteristics of Web Sites

Regardless of the commercial or noncommercial sponsorship of the Web sites ( $N = 25$ ), all but one of the Web sites evaluated in this study exceeded the recommended grade 6 reading level. As seen in Table 2, the Flesch-Kincaid grade level for information about menopause on the Web sites ranged from grade 6 to grade 12, with an average grade level of 10. Seven of the Web sites ( $n = 7$ , 28%) provided a glossary of terms with brief definitions. Eight of the Web sites in the study sample ( $n = 8$ , 32%) provided online health information in languages other than English. Eight of the Web sites ( $n = 8$ , 32%) listed both the names of specific authors of the online health content and their credentials. Further, five Web sites ( $n = 5$ , 20%) provided full references to the scientific literature, and audio versions of the text were supplied on only one Web site ( $n = 1$ , 4%).

### Reading Difficulty

The results of the readability analysis are presented in Table 2. Information about menopause on the Web sites had a readability index between 33.3 and 69.3, with a mean of 49.27 on the Flesch Reading Ease. The Flesch-Kincaid

**TABLE 2** Readability Analysis of Menopause Web Sites

Web Site	Flesch Reading Ease	Flesch-Kincaid Grade Level
1. 34 Menopause Symptoms	51.4	9.6
2. BetterMedicine.com	50.2	9.4
3. BodyLogicMD.com	46.6	11.5
4. Centers for Disease Control and Prevention (CDC)	51.8	11.6
5. Cleveland Clinic	47.1	9.7
6. Dr. Susan Love Research Foundation	46.5	10.8
7. EarlyMenopause.com	44.1	12.3
8. eMedicineHealth.net	43.5	11.2
9. everydayhealth.com	46.0	12.6
10. FamilyDoctor.org	61.2	7.7
11. Food and Drug Administration (FDA)	61.7	8.0
12. health.com	40.9	9.9
13. Hormone Foundation	46.0	10.7
14. MayoClinic.com	33.3	12.6
15. MedicineNet.com	50.7	9.9
16. MedlinePlus.gov	49.6	9.7
17. menopause.org (NAMS)	40.7	8.5
18. National Institute of Child Health and Human Development	48.5	10.0
19. National Institute on Aging	69.3	6.6
20. Planned Parenthood	52.3	9.3
21. Red Hot Mamas	44.2	11.3
22. ThirdAge.com	42.1	11.2
23. UpToDate	51.9	9.9
24. WebMD.com	49.1	9.6
25. womenshealth.gov	63.2	7.5
<b>Mean</b>	<b>49.27</b>	<b>10.04</b>

grade level was also estimated. As noted, the Flesch-Kincaid Grade Level formula estimates the grade a person will have to reach to be able to understand the text. The Flesch-Kincaid grade level was found to be between 6.6 to 12.6, with an average grade level of 10. Thus, only one of the Web sites in the study sample ( $n = 1$ ) met recommendations for a reading grade of sixth-grade level.

Information about menopause provided on the National Institute on Aging had the lowest reading level of the 25 Web sites, requiring a sixth-grade reading level. On the other hand, three Web sites ( $n = 3$ ) required a 12th-grade reading level, five Web sites ( $n = 5$ ) required an 11th-grade reading level, and three Web sites ( $n = 3$ ) required a 10th-grade reading level. Needless to say, these findings estimate that 44% of the Web sites in the study sample ( $n = 11$ ) would require healthcare consumers to have a reading level of the 10th grade or beyond to understand the information. Nevertheless, these findings suggest that improving the readability of the health content about menopause for women on these Web sites is warranted.

## DISCUSSION

An important finding of this study was that only one of the Web sites providing information about menopause met the recommended reading level of a sixth-grade level (Cotugna et al., 2005). The Joint Commission on Accreditation of Healthcare Organizations has expressed concern regarding the “mismatch between patients’ literacy skills and written information for patients” (Wallace et al., 2008, p. 423). The ability of women to obtain and understand relevant information about menopause is an important consideration in patient safety and quality care because it directly affects the ability of women to make informed decisions (Aliu & Chung, 2010).

While it was encouraging that the National Institute on Aging Web site had the lowest reading level, overall the reading scores were too high across the majority of Web sites in the study sample. Indeed, only one of the Web sites met recommendations for a reading level of sixth grade. Considering that it is estimated that one in four adults in the United States read at or below the third-grade reading level, these grade levels far surpassed the estimated reading level of the average adult in the United States (U.S. Department of Education, 1992). As a result, information about menopause provided on the majority of the Web sites in the study sample may be too challenging to be understood by a significant portion of the U.S. adult population. As a consequence, information about menopause, possible symptoms, and treatment options provided on the Web sites is not likely to be useful to healthcare consumers with limited literacy skills. These findings also parallel the results from previous research about hormone replacement therapy information being too high for the general public to understand (Oermann et al., 2006). Hence, online health information about menopause, possible symptoms, and viable treatment options that is written in a consumer-friendly and accessible way is still warranted.

Readability testing can be used as a tool to check the clarity of written information. In addition to readability, other factors such as organization and cultural factors have also been shown to facilitate understanding of health information (Lewis, 1999; Meade & Smith, 1991; Wilson, Racine, Tekieli, & Williams, 2003). Table 3 provides a comparison of noteworthy characteristics that were observed across the Web sites. Only five Web sites ( $n = 5$ ) provided full references to the scientific literature. Another troubling finding was that only eight of Web sites ( $n = 8$ ) listed both the names of the authors of the content and their credentials. This finding is in agreement with earlier studies where Web sites failed to state the authorship of online health content (Pérez-López, 2004; Reed & Anderson, 2002). As such, there remains a need for the names and credentials of those furnishing online health content about menopause to be disclosed along with full references to the scientific literature.



**TABLE 3** Comparison of Web Site Features

Web Site	Name of Author and Credentials	Citations to Scientific Literature	Glossary of Terms (i.e., brief definitions)	Audio Versions	Other Languages
1. 34 Menopause Symptoms	No	Yes	No	No	No
2. BetterMedicine.com	Yes	No	Yes	No	No
3. BodyLogicMD.com	No	No	No	No	Yes (Spanish)
4. Centers for Disease Control and Prevention (CDC)	No	No	No	No	No
5. Cleveland Clinic	No	Yes	No	No	No
6. Dr. Susan Love Research Foundation	No	No	No	No	No
7. EarlyMenopause.com	No	No	No	No	No
8. eMedicineHealth.net (note: owned by WebMD)	Yes	No	Yes	No	No
9. everydayhealth.com	No	No	No	No	No
10. FamilyDoctor.org	No	No	No	Yes	Yes (Spanish)
11. Food and Drug Administration (FDA)	No	No	No	No	Yes (Spanish)
12. health.com	Yes	No	Yes	No	No
13. Hormone Foundation	No	No	No	No	Yes (Spanish)
14. MayoClinic.com	No	Yes	No	No	No
15. MedicineNet.com	Yes	No	Yes	No	No
16. MedlinePlus.gov	Yes	Yes	No	No	Yes (Spanish)
17. menopause.org	No	No	Yes	No	No
18. National Institute of Child Health and Human Development	No	No	No	No	No
19. National Institute on Aging	No	No	No	No	Yes (Spanish)
20. Planned Parenthood	No	No	Yes	No	Yes (Spanish)
21. Red Hot Mamas	No	No	No	No	No
22. ThirdAge.com	Yes	No	No	No	Yes (Spanish)
23. UpToDate	Yes	Yes	No	No	No
24. WebMD	Yes	No	No	No	No
25. womenshealth.gov	No	No	Yes	No	No

Moreover, only one Web site in the study sample ( $n = 1$ ) provided audio versions of the text about menopause. Regarding cultural considerations, eight of the Web sites ( $n = 8$ ) furnished online information about menopause in other languages other than English. As noted by Wilson et al. (2003), having information available for diverse populations that reflects “the cultural values, beliefs and language” of target audiences can promote collaborative decision making and respect for individuals (p. 281). Web sites that provide audio versions and culturally meaningful health information about menopause would be nice enhancements.

## RELEVANCE TO HEALTH EDUCATORS AND PRACTITIONERS

Based on these results, information about menopause, symptoms, and possible treatments provided on a significant portion of the 25 Web sites is not likely to be useful to women with limited literacy skills. Further, while eight Web sites ( $n = 8$ ) provided information in Spanish, Web sites that provide more information about aging and menopause in culturally meaningful ways would also be useful. In addition, not all of the Web sites capitalized on strategies that are known to help facilitate understanding of information, such as incorporating glossaries, using illustrations, and providing audio versions of information about menopause (Choi, 2011; Houts, Doak, Doak, & Loscalzo, 2006; Lewis, 1999; Oermann & Wilson, 2000).

Overall, these results highlight the fact that Web sites that were highly ranked by popular search engines may not be the most useful when it comes to providing information about menopause. To be effective in helping women to better understand menopause, including possible symptoms and available treatments, information about menopause on the Internet must be written in a consumer friendly way and be understandable for target audiences. These findings offer specific recommendations to direct health education and health promotion efforts.

Health educators and practitioners are in a pivotal position to provide guidance to women in locating and selecting appropriate Web sites. Assessing the reading level of health content from Web sites for intended audiences remains an important consideration. In addition to assessing the reading level, Table 4 outlines several criteria to assist in the evaluation of online health content from Web sites.

Criteria for evaluating online health information, such as the accuracy and currency of information, have been discussed in the literature (Eysenbach et al., 2002). However, the criteria suggested in Table 4 build on the existing literature to incorporate additional guidelines to assist educators and practitioners in identifying Web site features that may help facilitate comprehension such as glossaries, illustrations, and audio versions of information about menopause.

**TABLE 4** Checklist for Evaluating Web Sites

- 
1. Are the credentials of those furnishing the Web-based health content stated?
  2. Are illustrations used on the Web site to help convey the health information?
  3. Is a glossary of terms provided to help healthcare consumers learn about complex concepts or medical terms?
  4. Are audio versions of the text provided?
  5. Is health information culturally appropriate for intended audiences?
  6. Is health information provided in multiple languages?
  7. Is a date provided indicating when the online health content was last updated?
  8. Is there a disclaimer stating that the information should be used for educational purposes only?
  9. Are references to the scientific literature provided to substantiate any claims?
  10. Is the Web site free of spelling and grammatical errors?
-

In particular, the credentials of those furnishing health content should be stated, references to the scientific literature must be provided to substantiate any claims, and the use of illustrations or audio on Web sites may further help to convey important health information. Moreover, accessible health information in multiple languages that is culturally meaningful is desirable. A glossary for complex concepts or medical terms and a date indicating when the health content was last updated are also critical. Whenever these elements are combined along with a more appropriate reading level for intended audiences, these features may further aid in enhancing Web-based health content for women and their families.

Whenever it is not possible to improve the reading level of existing Web-based health content that women may be accessing from Web sites, health educators may need to use verbal teaching or supplemental instruction with more visuals and graphics rather than relying on text alone. Given that only one of the Web sites in the current study met the recommended reading level, and many of the Web sites lacked features such as audio versions and glossaries, this presents a unique opportunity. Practitioners and educators can contribute their expertise by working with producers of Web-based content in developing health education materials about menopause that empower women to locate, understand, and apply information needed for optimal health. Healthcare providers can also supply women with previously assessed references to Web sites to better assist women in the selection of relevant and appropriate Web sites for menopause information.

### LIMITATIONS

This study had some limitations. First, the dataset was comprised of 25 Web sites that provided information about menopause to the general public. While the readability of the health information about menopause within the dataset was observed and analyzed, the study sample was small and consisted of 25 Web sites that were likely to be accessed by women and their families on the Internet given their prominence and high ranking in popular search engine results. Second, this study did not directly assess patient comprehension of the information about menopause provided on these Web sites. Future research that investigates various readability and other suitability characteristics of online health information in relation to understanding would be useful.

### CONCLUSION

As healthcare consumers are increasingly referring to the Internet for information about health topics, the readability and suitability of online health content becomes increasingly important. Health educators and practitioners play an important role in advising women about menopause, possible

symptoms, and potential treatment options. Popular Web sites provide information about menopause; however, the readability of information about menopause found on the Internet has not been widely studied. Hence, evaluating the readability of health information provided on Web sites is an important step in selecting proper materials for quality care and education efforts.

In this study, the readability of information about menopause on 25 Web sites was investigated to assess their usefulness as a source for information about menopause. For the Web sites reviewed, information found on all but one had readability scores that were higher than the recommended reading levels for health education materials. As a result, this information may be too difficult to be understood by a substantial portion of the U.S. adult population. Additionally, health educators and practitioners can further apply suggested criteria to assess features of Web sites. The availability of audio versions, online glossaries, and culturally appropriate health information would be useful enhancements and may aid in the understanding of important information, thereby helping to assure that women are receiving useful information for making healthcare decisions.

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