Accessibility of web-based health information for women in midlife from culturally and linguistically diverse backgrounds or with low health literacy

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Abstract

Objective: To measure the accessibility of Australian web-based health information for midlife women including those from culturally and linguistically diverse (CALD) backgrounds or with low health literacy.

Methods: Search terms relating to midlife health were entered into Google Australia to identify health information websites. The content of the first two results pages was assessed using the European Commission's quality criteria for health websites. Readability was assessed using the Flesch Readability Ease Score with Grade 8 accepted as the average Australian reading level.

Results: Sixteen websites were evaluated. Accessibility scores ranged between 0 and 8. The Victorian Government's health website Better Health Channel and the Jean Hailes for Women's Health website contained the most accessible information, each scoring 8, but were both 'difficult to read' on the readability test. Four websites included written resources in languages other than English and two had information in audio-visual format in languages other than English.

Conclusions: There is a gap in accessible online health information for Australian women from CALD backgrounds or those with low health literacy.

Implications for public health: Healthy behaviour changes in midlife may lead to better health in older age. More accessible health information resources are needed for women in midlife from CALD backgrounds and those with low health literacy.

Key words: culturally and linguistically diverse women, midlife health information, health literacy, accessibility, internet and health websites

The internet is increasingly becoming a source of health information for people of all ages. In Australia in 2016–17, 87% of adults were internet users and 46% had searched the internet for health-related information.[1] Cheng and Dunn (2015)[2] reported that around 16 million Australian adults regularly accessed the internet, 80% of whom were seeking health information. In Australia, the most commonly used search engine for health information is Google Australia[3] (https://rapidapi.com/blog/best-search-engines/).

Studies assessing text-based health information on websites have reported readability to be above the average Australian reading level, which is around Grade 8.[2,4,5] Readability plays an integral part in information accessibility.[4] Other domains of accessibility of online health information include findability – how easy it is to seek and find information online; searchability – how easy it is to search using simple terms within a website; and usability – how easy it is to appraise information and apply it to self-manage health.[6-8]

Growing numbers of Australian women access the internet for information about menopause, heart health, blood pressure, diabetes, cancers and bone health.[9] Menopause usually occurs at around the age of 51 years.[10] The risk of non-communicable diseases (NCDs) such as cardiovascular disease, arthritis and osteoporosis increases after menopause. These health conditions can potentially be prevented, delayed or minimised by reducing risky health behaviours such as tobacco smoking, harmful alcohol consumption, poor diet and lack of exercise.[11-13] Increasing physical activity, eating fresh fruit and vegetables, and screening for and treating risk factors for NCDs are effective approaches to NCD prevention in older age.[12]

Access to clear and usable information on midlife health is an essential part of successful public health promotion. There is a strong association between social determinants of health, such as limited education, low socioeconomic position, being from a culturally and linguistically diverse (CALD) background and low health literacy.[14-16] Health literacy has been defined by Sorensen and colleagues (2012)[17] as the capacity to access, understand, evaluate and use health-related information to make well-informed decisions about health and healthcare. This includes the broader definition of being able

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to self-manage health. The healthcare system requires patients to navigate the various structures and services, make informed decisions and take appropriate action.[18] This can be challenging even for people with above-average health literacy, but for people from CALD backgrounds, or those with limited education, occupying a low socioeconomic position or living in rural/ remote locations, this can be overwhelming and discouraging.

The internet is a powerful tool in delivering health information, but the complexity of health information makes it inaccessible for people with low literacy and low health literacy, and for vulnerable and marginalised groups.[4,19] Most online health information is provided in a written format and is above the average reading ability of adults.[20] According to McInnes and Haglund 2011, "Readability plays an integral part in determining a website's accessibility".[4] Therefore, health information provided in a hard-to-read format will remain inaccessible for the majority of the people, thus broadening the health inequality chasm. In addition, finding trustworthy information can be challenging as the internet is unregulated and people may find and trust misleading health information.

According to the Census of Population and Housing 2016, more than one-quarter (26%) of Australia's population was born overseas. Of the overseas-born population, nearly one in five (18%) had arrived since the start of 2012. More than one-fifth (21%) spoke a language other than English at home; of those, around 17% reported speaking English poorly or not at all.[21] Therefore, to reduce health inequalities and improve long-term health, women from CALD backgrounds and women with low health literacy need accessible online health information that meets the recommended quality criteria.[4,8]

Little is known about the healthcare and health information needs of Australian women in midlife from CALD backgrounds[22] or those with low health literacy. Australian policy documents have identified Midlife health as a priority.[23-25] We aimed to assess the accessibility of midlife health information on Australian-hosted health websites for women from CALD backgrounds and those with low health literacy.

Methods

Design

Health and health promotion information and resources relating to women's midlife health available on Australian-hosted websites were reviewed systematically.[8]

Data source

The Google Australia search engine was used to identify Australian-hosted health websites providing information on women's midlife health including health promotion and disease prevention. The Google search engine was used because most Australians use this to search the Internet for health-related information.[3] Multiple searches were completed using a combination of keywords, MeSH-terms (Medical Subject Headings) and in-text words related to the key questions. The combination of search terms is listed in Table 1. MB and KS independently conducted searches and recorded the websites that were listed on the first two results pages. They then compared their results pages, and websites that appeared consistently in the first two results pages of both their searches were included in the study.

Table 1: Search topics and terms.

Search topics	Search term combinations
Healthy ageing	Women and healthy ageing and Australia
Midlife health	Women and midlife health and Australia
	Midlife health and wellbeing and Australia
	Multicultural women and heart health in midlife and Australia
	Culturally and linguistically diverse women and heart health in midlife and Australia
Menopause	Menopause and Australia
	Menopause and midlife health and Australia
Ageing	Multicultural women and ageing and Australia
	Culturally and linguistically diverse women and ageing and Australia
Bone health/ Osteoporosis	Women and bone health and Australia
	Osteoporosis and women and Australia
Heart health	Women and culturally and linguistically diverse and heart health and Australia
Exercise and nutrition and weight	Physical activity and women and midlife and Australia
	Exercise, women and midlife and Australia
	Diet, nutrition, women and midlife and Australia
	Multicultural women, health and weight and Australia
	Culturally and linguistically diverse women, weight and health and Australia

Inclusion and exclusion criteria

Only Australian health websites appearing on the first two pages of the Google Australia search results with at least five full sentences of midlife health information were included. Websites were reviewed if midlife health information was easily identified in the introductory section (within the first paragraph) or within three clicks on the site. Midlife health information provided in any formats, such as video and audio links, fact sheets, flyers and posters, was included. Internationally hosted health websites and Australian midlife health blogs, online forums, journal articles or policy discussions were excluded.

Quality criteria and procedure

The quality criteria set by the European Commission's code of conduct for health websites were used to assess the accessibility of the available information.[8] This accessibility measure includes four domains: findability, searchability, usability and readability. We added acceptability and availability in languages other than English to make a study-specific quality criteria scale (see Table 2). The quality of cultural appropriateness and translation (in Bangla and Hindi) was reviewed by an expert team of multilingual, multicultural researchers fluent in those languages. The readability of selected web pages was assessed using the Flesch Reading Ease Score[26] because it is a recommended reading level assessment tool for web writers.[27,28] This tool measures readability based on sentence length and the average number of syllables per word. It produces a reading score of 0 to 100, where 0 is the hardest-to-read and 100 is the easiest to read (Table 3). The Automatic Readability Checker available online was used to calculate the Flesch Reading Ease Score by MB.[29] MB and KS individually scored the websites and then compared the scoring of all the included websites. Any disagreement in scoring was dealt with by re-reviewing the website together and discussing the scores against the scoring criteria and the readability tool. When scoring usability and acceptability, a number of factors were considered including Flesch Reading Ease Score of 70+; use of culturally relatable pictorials, posters, videos,

and infographics; use of short sentences with bullet points; small topical grouping of information in two or less sentences; and relevant information provided in one paragraph on the home page with links.

Data management and analysis

MB conducted the search on 4 February 2021, documenting the websites that came up consistently, irrespective of how the search term combinations were used. This search was duplicated on 11 February 2021 by KS using the same search terms and combinations. The searches and results were then compared, and agreement was reached on the websites to review. As websites are updated regularly and content may change, this review is based on the content available 4–11 February 2021. The domains of accessibility of the information provided on the selected websites were scored as 2=Yes; 1=Partial; 0=No based on the criteria shown in Table 2. A total score was calculated by adding the scores for each domain. The possible range of total scores is 0 to 12.

Results

The search identified 18 websites. Of these, two were excluded: one because it only had information on the treatment of menopause symptoms (menopausecentre.com.au) and one because it only provided information on ageing and well-being (lmcf.org.au). Of the 16 remaining websites, one was hosted by the Federal Government, two by state governments, seven by non-government organisations (NGOs), four by professional associations, one was commercial, and one was a hospital website. The results of the accessibility assessment are shown in Table 4. Accessibility scores ranged between 0 and 8. No website achieved the maximum score of 12. The highest score of 8 was achieved by the Victorian Government's health website Better Health Channel (https://www.betterhealth.vic.gov.au) and the Jean Hailes for Women's Health website (https://www.jeanhailes.org.au). No website met the Flesch Reading Ease Score for 'easy' or 'fairly easy' to read (scores of 70 or more).

Findability

Of the 16 websites, six scored 2 on findability. The five easiest to find websites were: Australian Menopause Society, Jean Hailes for Women's Health, Health Direct, Melbourne's Royal Women's Hospital, and the Better Health Channel.

Table 2: Scoring Criteria for accessibility of information on Australian health websites.

Accessibility domains	2 = Yes	1 = Partial	0 = No
Findability	The website is listed in the top 8 items of the first page	The website is listed in the top 9-16 items of the first two pages	The website is not listed in the top 16 items of the first two pages
Searchability	*Midlife health information is found on the homepage or within three clicks on the site.	*Midlife health information is found within four-six clicks on the site and/or links are provided to information on other websites.	*Midlife health information is not found on the homepage or within six clicks on the site and/or no links are provided to information on other websites.
Readability	Flesch Reading Ease Score ≥80	Flesch Reading Ease Score 61-79	Flesch Reading Ease score ≤60
Useability	Information easy to read and understand, and apply to improve health self-management	Information moderately easy to read and understand, and apply to improve health self-management	Information difficult to read and understand, and apply to improve health self-management
Acceptability	Information is culturally relatable, and is provided in various formats	Information is somewhat culturally relatable and appropriate, and is provided in one-two formats	Information is not culturally relatable and appropriate, and is only provided in written format
Resource/information in languages other than English	Yes, in multiple languages and in more than one format	Yes, in a few languages but only in written format	No information provided in any language other than English

Notes:

**Midlife health information including cardiovascular health (heart health, blood pressure, BMI, healthy eating, physical activity, weight), bone health and osteoporosis, and menopause and menopause symptom management.*

Table 3: Flesch reading ease: higher scores indicate material is easier to read; lower scores indicate materials more difficult to read.

Score	School level (AUS)	Notes
100.00–90.00	5th grade	Very easy to read. Easily understood by an average 11-year-old student.
90.0–80.0	6th grade	Easy to read. Conversational English for consumers.
80.0–70.0	7th grade	Fairly easy to read.
70.0–60.0	8th & 9th grade	Plain English. Easily understood by 13- to 15-year-old students.
60.0–50.0	10th to 12th grade	Fairly difficult to read.
50.0–30.0	Grade 13 (university entry level)	Difficult to read.
30.0–10.0	College graduate	Very difficult to read. Best understood by university graduates.
10.0–0.0	Professional	Extremely difficult to read. Best understood by university graduates.

Searchability

Only four websites scored 2 on searchability (information available on the homepage or within three clicks on the website). Of the remainder, six scored 0, indicating that the information was not found within four to six clicks on the website and/or there were no links to information on other websites.

Readability

None of the websites met the recommended Grade 8 reading level.[5] Four websites scored 'fairly difficult to read' meaning the information is only accessible for people with at least 10 to 12 years of formal education and two scored as 'very difficult to read' meaning that the information is only accessible to people with a university degree.

Usability

No website scored 2 on the usability criterion. Five websites scored 1, indicating that the information may be moderately comprehensible for self-management. The other 11 websites scored 0, indicating that the information was difficult to comprehend for health self-management.

Acceptability

Acceptability refers to information that is culturally relatable and is provided in various formats (audio, video, written, infographics). Acceptability and usability are interlinked, therefore the same five websites that partially fulfilled the usability criteria also partially met the acceptability criteria. Jean Hailes for Women's Health, Better Health Channel, Multicultural Centre for Ethnicity and Health sites each had midlife health information in

formats such as audio or video, infographics and posters. The government websites – Health Direct and the Better Health Channel – are audio-described in English. Diet, nutrition and exercise videos that were available on a few websites were between four and 15 minutes long and featured 'Western' lifestyle and images depicting White women. Most websites did not use ethnically diverse images or acknowledge cultural differences in beliefs and practices and provided information in written format.

Resources in languages other than English

Only five websites had resources in languages other than English; most were text-based factsheets, and they were difficult to find within three clicks on the website.

Discussion

We assessed the accessibility of midlife health information on Australian-hosted health websites for women from CALD backgrounds and those with low health literacy. We found that although there is substantial text-based information on midlife health, it is mostly written in high-level English, readable only by people with post-secondary education and high health literacy, and it requires skill in navigating the internet. There is a paucity of midlife health information in formats other than text. Little information is available in audio-visual formats, or available in community languages. The images accompanying the information mostly depict White women's narratives promoting a 'Western' lifestyle in disease prevention.

To our knowledge, this is the first study to evaluate online health information for midlife women from CALD backgrounds or with low health literacy using a replicable set of quality criteria for accessibility. Data are current up to 11 February 2021, but we recognise that websites may be updated, and we did not 'capture and store' the websites included in this study.

To date, studies of internet-based health information have largely focused on readability.[2,4,30,31] Although readability is an integral part of accessibility, other domains are also important,[8] including usability and acceptability.[32] Usability (health information in accessible formats) is an important component of accessibility and is not limited to readability. The reading level of most online health information materials we evaluated in this study was above the average Australian adult's reading ability.[33] Health Information is unlikely to translate into better health outcomes unless women can easily access, understand and use the information to self-manage their health.

Social media and the internet are powerful tools to deliver evidence-based quality health information. Ease of searching and finding relevant health information is particularly important for individuals from CALD backgrounds and those with low health literacy. Health website developers should aim to provide information on their home page through icons, for example, country flags with the country name in that language as a top running banner, so that people are able to access health information in their own preferred language by clicking on their country name/flag icon. Further, considering the potential for online misinformation, we believe that GPs and other primary health professionals have an important role to play in referring women to websites with evidence-based, trustworthy information. We recommend only referring patients to health websites that have been certified by

Table 4: Accessibility of midlife health content on Australian health websites.

Websites	Findability	Searchability	Readability (English)	Usability	Acceptability	Information in languages other than English	Total score
Health Direct www.health.gov.au	2	1	0	0	0	2	5
Better Health Channel www.betterhealth.vic.gov.au	2	2	0	1	1	2	8
Jean Hailes www.jeanhailes.org.au	2	2	0	1	1	2	8
Multicultural Centre for Women's Health www.mcwh.com.au	0	0	0	0	0	2	2
Australian Women's Health Network www.awhn.org.au	0	0	0	0	0	0	0
Centre for Culture, Ethnicity & Health www.ceh.org.au	1	2	0	0	0	2	5
Australasian Menopause Society www.menopause.org.au	2	0	0	0	0	0	2
The Royal Women's Hospital www.thewomens.org.au	2	0	0	1	1	0	4
RACGP www1.racgp.org.au	1	0	0	0	0	0	1
Australian Menopause Centre www.menopausecentre.com.au	1	1	0	0	0	0	2
My Dr www.mydr.com.au	2	1	0	0	0	0	3
Heart Foundation www.heartfoundation.org.au	1	1	0	1	1	0	4
Diabetes Australia www.diabetesaustralia.com.au	1	0	0	0	0	0	1
Osteoporosis Australia www.osteoporosis.org.au	1	1	0	1	1	0	4
The Bone Health Foundation www.bonehealth.org.au	1	1	0	0	0	0	2
Queensland Health www.health.qld.gov.au	1	2	1	0	0	0	4

Health On the Net (HON) as this ensures high-quality information that is not influenced by commercial interests.[34]

Hochstotter and Koch (2009),[35] in their study of internet searching behaviours, reported that more than half of users only read the first page of results, and only 10% went beyond the third page of any search results.[36] We therefore included only the first two pages of Google search engine results. We found that midlife health information was rarely on the homepage/landing page of a website. If health information is three or more clicks away, CALD women are unlikely to access this, particularly those with low health literacy.[4,37]

Health information cannot be understood by most of the target audience as it is largely provided in text-based format and language that is difficult to read.[38] This could potentially contribute to adverse health outcomes.[39] Information provision methods and formats can make it easy/difficult for people to navigate, understand and use the information to self-manage their health.[40] The World Health Organization[41] emphasises the importance of information provision methods to achieve positive health outcomes and build a better, healthier future for people. A review of patient-focused interventions[42] reported that formats such as audio-visual materials and infographics improved health knowledge, understanding and recall, comprehension and adherence, resulting in higher user satisfaction.[43,44]

In a recent study, Wagner and colleagues[18] assessed health literacy requirements for users of postpartum educational materials from the North Texas hospital system in the US. They examined the readability, understandability, actionability and cultural sensitivity of the postnatal care educational materials and found the materials performed poorly on measures of health literacy including readability and understandability and cultural sensitivity, corroborating our findings.

Since almost 18% of the Australian population were born in countries referred to as predominantly non-English speaking,[21] our findings suggest that there is a gap in relevant and usable health information for many midlife women in Australia. Based on our findings, we recommend the development of culturally appropriate, comprehensive health education videos for women with low health literacy and CALD groups. These videos can be used as a 'takeaway information tool' and stored on mobile phones and social media platforms, so they can be watched repeatedly for maximum impact.

Conclusion

We found that midlife health information available on Australian hosted websites was difficult to find, search, read, and use. On the whole, midlife health information scored low on usability because most information was in written factsheets with content above the average adult reading ability. The factsheets were commonly long, complex and text-dense and may not be culturally appropriate. The few available videos were lengthy and predominantly targeted English-speaking Australians. Accessing, understanding and applying health information to self-manage health is often challenging, but for those with low health literacy and for women from CALD backgrounds, this challenge could be overwhelming.

Implications for public health

Healthy behaviour changes in midlife lead to better health outcomes in older age. More comprehensive and accessible health resources are needed for midlife women from CALD backgrounds and those with low health literacy, as these women experience significantly more adverse health outcomes in older ages compared to other groups.[45] Videos have been effective in providing culturally sensitive health education to ethnic minority groups[46,47] in various settings, leading to improved knowledge and attitudes affecting health and self-management. More alternative presentation formats should be effectively used through partnerships in health promotion and disease prevention education. As very little work has been undertaken in this area, future research should focus on how digital exclusion of people from CALD and low health literacy backgrounds can be lessened and how issues relating to accessibility, searchability and usability could be culturally aligned to address digital equity issues.

Strengths and limitations

To the best of our knowledge, this is the first study to evaluate online health information for midlife women from CALD backgrounds or with low health literacy. It provides a comprehensive overview of the available online information about menopause health for people in Australia from CALD backgrounds and people with low health literacy and identifies ways it can be improved. However, we acknowledge some limitations including that readability and usability was only assessed for material written in English. Although we had three multilingual researchers in the team, one researcher who speaks Bangla and Hindi was able to assess the information available in those languages. Information was not available in the languages the other multilingual researchers speak. We acknowledge the role of social media in influencing health behaviours and in disseminating health information, however, we did not assess any of these platforms.

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