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Evaluating the Spanish readability of American Society for Metabolic and Bariatric Surgery (ASMBS) Centers of Excellence (COE) websites

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Abstract

Background Healthcare disparities continue to be an ongoing struggle in Bariatrics. Limited availability of Spanish online material may be a correctible barrier for accessibility to Hispanic patients. We sought to evaluate accredited Bariatric Centers of Excellence (COE) for Spanish readability via their websites to determine accessibility for Spanish speakers.

Methods This was an internet research study. 103 COE accredited by American Society for Metabolic and Bariatric Surgery (ASMBS) and the American College of Surgeons (ACS) were evaluated and assigned one of five Spanish Visibility Categories.

The United States was divided into 4 regions. Regional Spanish visibility was calculated by dividing each category count by the number of institutions in each region.

County Spanish-speaking populations were obtained from the US Census Bureau's 2009–2013 American Community Survey. Differences in their distributions across the Spanish Visibility Categories were investigated using the Mann–Whitney U test.

Results 25% of websites were translatable to Spanish, and a regional discrepancy was found with 61% translatable in the West, 19% in Northeast, 19% in Midwest, and 15% in South. Median Spanish-speaking population was higher in counties where websites were translatable to Spanish than where websites were not translatable.

Conclusion Healthcare disparities in Bariatrics continue to be an ongoing struggle. We suggest that Spanish readability for ASMBS ACS COE websites should be improved regardless of geographic differences in Spanish-speaking populations. We believe it would be valuable for these websites to have standards for readability of Spanish and other languages.

Keywords Spanish website readability · Bariatric surgery · American Society for Metabolic and Bariatric Surgery · ASMBS · American College of Surgeons · ACS

The prevalence of obesity among ethnic minorities in the United States is disproportionately large, particularly among those of Hispanic origin [1, 2]. According to Center for Disease Control and Prevention (CDC) data from 2016 to 2017, the prevalence of obesity among patients of Hispanic origin was 44.8% [2]. However, despite this population difference, utilization of bariatric surgery has been shown to be lower among Hispanic patients [3–5], with one 2021 study showing Hispanic patients are less likely than White patients to undergo bariatric surgery by a factor of 1.5 [5]. The reason behind the disparity in bariatric surgery rates among ethnic minorities has not been systemically analyzed but medical system mistrust has been widely shown to be increased in these populations possibly explaining this disparity [6–8]. Additionally, it has been shown that Hispanic patients have lower health literacy than any other racial or ethnic group in the United States and that this discrepancy is associated with worse health outcomes [9]. Readability is an important aspect of health literacy, and it has been well described that patients with lower health literacy have poorer health status than the rest of the population [10–12].

Patients are increasingly using online resources for self-education on health information, and accessibility of such materials has been shown to increase healthcare utilization and improve physician–patient communication [13–15]. In

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our opinion, increasing the Spanish readability of medical information on bariatric surgery will be a key step in increasing access to bariatric care in the Hispanic patient population. To characterize this need, we analyzed the availability of Spanish translation options and readability of American Society for Metabolic and Bariatric Surgery (ASMBS) Bariatric Centers of Excellence (COE) websites. To evaluate readability, we implemented a survey tool based on five categories of Spanish visibility that we assigned to each website. We hypothesized that there would be limited Spanish visibility overall, as well as regional differences among Bariatric COE websites.

Materials and methods

This was an internet research study and was exempt of Institutional Review Board approval. Between May 24th and August 18th of 2022, the websites of 103 COE accredited by ASMBS and ACS were evaluated and assigned one of the Spanish Visibility Categories shown in Table 1. This categorization was modified from Gallant et al. [16]. These websites were reviewed individually by a single reviewer. Any discrepancies were discussed with the other authors to reach a consensus on category. Websites in Category 1 had a built-in tool that allowed for Spanish mirroring of their entire site content, e.g., powered by Google Translate. Websites in Category 2 did not have such an option but had Spanish educational material available from their homepage. If websites only had legal statements (e.g., privacy policies) available in Spanish, they were not included in this category. Websites in Categories 3 and 4 did not have a translation option or easily findable Spanish material but had contact information for their institution's language services or interpreter programs available via one mouse click from the homepage. Category 3 websites had such a link in Spanish while Category 4 websites had it in English. Websites in Category 5 did not have any of the above-mentioned options available, and if they had language services on their website, it was not easily locatable from the homepage.

For websites in Category 2, 200-word samples of their Spanish material were randomly selected and evaluated for Spanish readability ease via the widely used Fernández Huerta formula [17]. It calculates readability based on syllable count and sentence length using the following formula:

$$\text{Difficulty} = 206.84 - (0.6 \times \text{Total Number of Syllables})$$
$$- 1.02 \times (\text{Total Number of Words})$$

The formula outputs a score between 1 and 100, with lower scores indicating a more difficult text (Table 2).

The United States was divided into 4 regions: West, Midwest, Northeast, and South; these regions were used based on previous research performed by the investigators (Fig. 1) [18]. Each of the 103 COE was assigned to its respective region, and the above translatability groups were mapped to these regions. A regional breakdown of Spanish visibility was calculated by dividing each category count by the number of institutions in each region (Fig. 2).

Data were obtained from the United States Census Bureau's 2009–2013 American Community Survey, which contains county-level information on household language use [19]. For each COE, county-level data were pulled from the Survey and appended to its corresponding institution. The population data included multiple groups: populations aged five and older, populations aged five and older who "speak Spanish at home," and populations aged five and older who "speak English less than very well." Differences in the distribution of these populations across the Spanish Visibility Categories were investigated using the Mann–Whitney U test.

Results

Twenty-six (25.2%) out of 103 ASMBS COE had websites that were translatable to Spanish (Table 3). The West had the highest percentage of translatable websites with 11 (61.1%) out of 18 having a translation option. The Midwest and Northeast followed, each having five (19.2%) out of 26

Table 1 Spanish Visibility Category classification

No. and name	Classification rules
1. Translatable	Full Spanish translation available
2. Partial	Spanish material available from the homepage
3. 1-click services, Spanish	1-click access to language services from the homepage via a Spanish link
4. 1-click services, English	1-click access to language services from the homepage via an English link
5. Difficult to locate	Language services were difficult to locate

Table 2 Fernández Huerta readability categories [17]

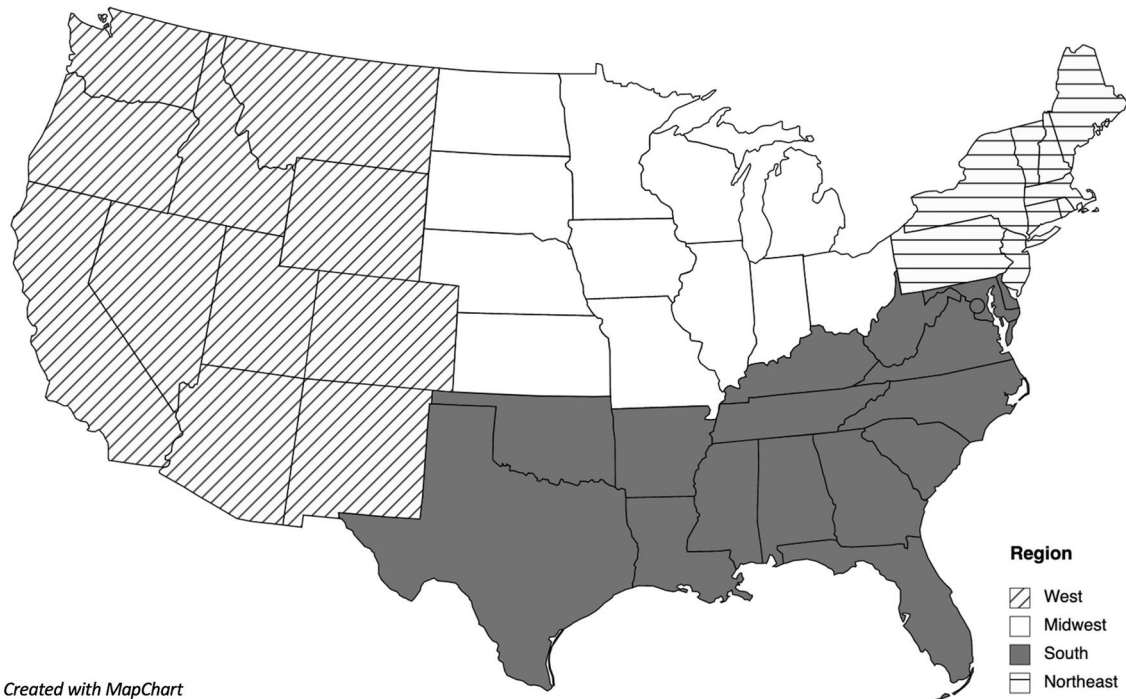| Fernández Huerta score	Level	Corresponding grade level
90 to 100	Very easy	5th grade
80 to 90	Easy	6th grade
70 to 80	Relatively easy	7th grade
60 to 70	Normal	8th to 9th grade
50 to 60	Relatively difficult	10th to 12th grade
30 to 50	Difficult	University level
0 to 30	Very difficult	Graduate/specialized level

Fig. 1 Regions of the United States were divided as shown for data analysis in this study [18]
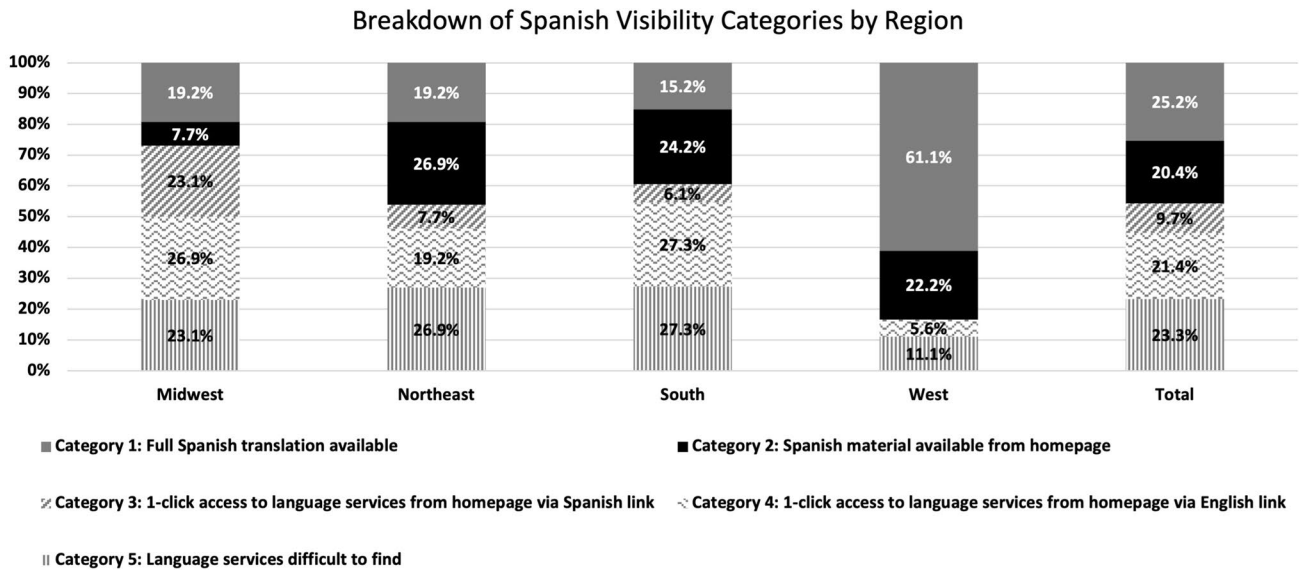

Fig. 2 Regional breakdown of website Spanish Visibility Categories. Shown are the percent of websites in each region that belong to each Visibility Category, as well as the total nation-wide percent

websites with a translation option. The South had the least percentage of translatable websites with five (15.2%) out of 33 websites translatable.

Of the untranslatable websites, 21 (20.4%) out of 103 had Spanish material available from their homepage, though this material was often limited to COVID-19 information or individual departmental information. Only six websites in this category had comprehensive Spanish material available (e.g., International Medicine page, Spanish chatbot assistance, etc.). Regionally, this category included seven (26.9%) out of 26 websites in

Table 3 Spanish Visibility Categories by region

Region/category	Translatable	Partial	1-click services, Spanish	1-click services, English	Difficult to locate
Midwest	19.2%	7.7%	23.1%	26.9%	23.1%
Northeast	19.2%	26.9%	7.7%	19.2%	26.9%
South	15.2%	24.2%	6.1%	27.3%	27.3%
West	61.1%	22.2%	0.0%	5.6%	11.1%
Total	25.2%	20.4%	9.7%	21.4%	23.3%

the Northeast, eight (24.2%) out of 33 in the South, four (22.2%) out of 18 in the West, and two (7.7%) out of 26 in the Midwest.

The Fernández Huerta score for a 200-word text sample from each of these websites showed an average score of 57.6 ($\sigma = 15$, range 28.7, 79.4). Scores between 50 and 60 are considered relatively difficult (Table 2) [17]. A breakdown of average Fernández Huerta score by region is shown in Fig. 3.

Thirty-two (31.1%) out of 103 had a link to contact information of their language services or interpreter programs available via one mouse click from the homepage. Ten (31.3%) out of 32 of these links were in Spanish, while the other 22 (68.8%) were in English. In 17 (53.1%) out of 32 cases, the link to this information was in small English text at the bottom of the homepage within the "Notice of Non-Discrimination" or "Privacy Statement," and led to a webpage listing a phone number for these services in several languages, including Spanish.

Twenty-four (23.3%) out of 103 websites' language services pages were not easily accessible from their homepage and could only be found via multiple mouse clicks or by using the websites' search bars. This category included nine (27.3%) out of 33 websites in the South, seven (26.9%) out of 26 in the Northeast, six (23.1%) out of 26 in the Midwest, and two (11.1%) out of 18 in the West.

According to US Census data, the median county population aged five and older who "speak Spanish at home" is higher where websites were translatable to Spanish (median 131575, range 37545, 3653910) compared to where websites were not translatable (median 108823, range 8825, 1313020) ($p = 0.039$). Similarly, the median county population aged five and older who "speak English less than very well" is higher where websites were translatable (median 64905, range 15905, 1677980) compared to where websites were not translatable (median 45843, range 2480, 656030) ($p = 0.029$). Data for 29 of the counties corresponding to websites in this study were not
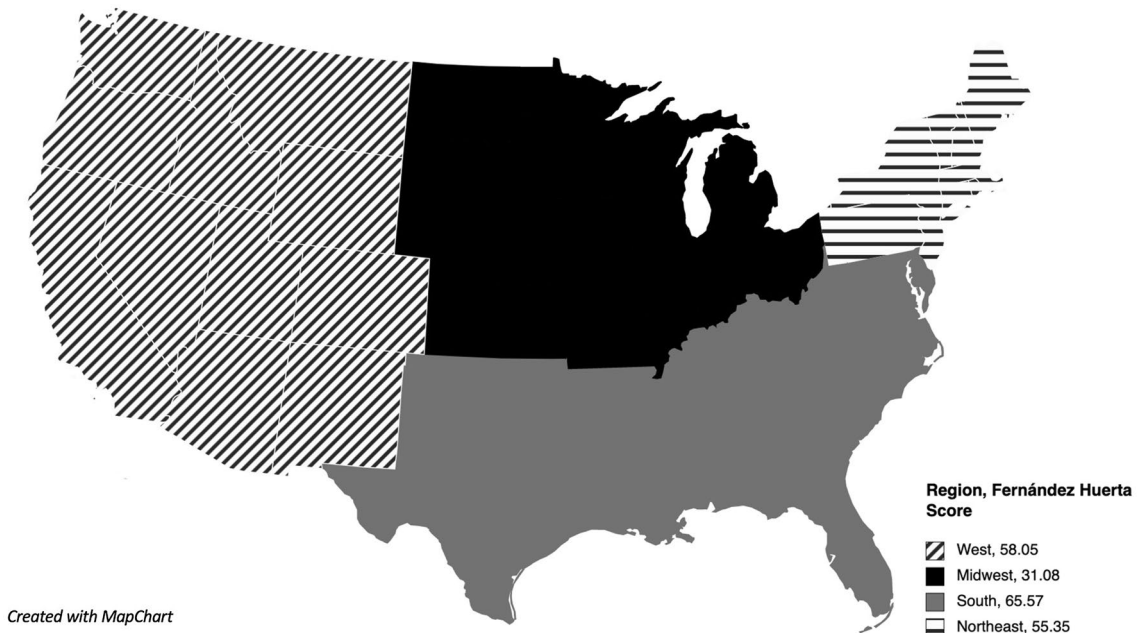

Created with MapChart

Region, Fernández Huerta Score

- West, 58.05
- Midwest, 31.08
- South, 65.57
- Northeast, 55.35

Fig. 3 Regional average Fernández Huerta Scores of Category 2 websites (untranslatable websites with Spanish material available from their homepage)

available in the US Census Survey and therefore excluded from this part of the analysis.

Discussion

A recent survey of Americans in 2019 revealed that approximately three out of four individuals accessed the internet in the past twelve months to conduct their own research on a medical condition [20]. With the increased utilization of the internet to obtain health care information, it is paramount that we understand the accessibility of information for patients. As previous literature has demonstrated, access to information on websites can be very limited as it is often presented at a much higher reading level than recommended by the National Institutes of Health (NIH) and American Medical Association (AMA) [21–24]. Our study demonstrates a similar finding of elevated reading levels on websites in addition to the burden of a language barrier. We found a clear disparity in access to Spanish health information on ASMBS COE websites across the United States, and the Spanish information that was available was found to be of a more difficult readability level than is currently recommended by the NIH and AMA which is equivalent to a sixth-grade reading level [22–24].

Improving Spanish readability of websites can be done in a variety of ways. As the purpose of this study is to highlight the need for Spanish readability on ASMBS COE websites, we urge implementation of these solutions specifically for bariatric information. Whole website Spanish readability would be beneficial to not only bariatric patients but also all Hispanic patients [22, 25–29]. We call upon these COE and other institutions to take steps toward improving Spanish readability on their websites.

Only about a fourth of examined websites in the United States had a Spanish translation option. However, this translation option is computer-generated and is known to contain inaccuracies; therefore, we recommend human-translated text by native speakers. This has been shown to be superior in other studies [30, 31]. According to one study that assessed the accuracy of Google Translate for translating Emergency Department discharge instructions to Spanish, 92% of sentences were accurately translated, and 28% of these inaccuracies had the potential for clinically significant harm [30]. We believe such a margin of error should not be ignored when in the context of conveying important health information to patients online. We believe that the translation of medical information by native speakers is a better standard to avoid potential clinically significant errors, but by the same token, computer-generated translations are better than no translation at all. Ideally standard information summarizing bariatric options, outcomes, benefits, and risks should be created

by the ASMBS for all COE websites to utilize. The deterrent of this solution is likely the cost and time required to implement human website translation. However, these may be reduced by using computer translations with human postediting, which has been shown to yield comparable accuracy to human translation [32].

If this is not feasible, we believe computer-generated translation should be widely implemented. Importantly, a disclaimer should be in place on such websites, warning of possible inaccuracies due to non-human translation. Options such as Google Translate can be easily embedded into any website at a low-cost relative to human postediting [33].

Another fourth of websites were untranslatable and had no easily located Spanish material or contact information for their institution's language services or interpreter program. There was a pronounced regional discrepancy among Spanish Visibility Scores, and a significantly greater proportion of translatable websites in counties where there was a higher population of individuals aged five and older who "speak Spanish at home" and "speak English less than very well." We believe there should be no such regional or county discrepancies, as there are significant numbers of Spanish speakers across all regions of the United States [14]. Online Spanish health information should be equally accessible regardless of the institution's geographical location.

Of the untranslatable websites, the West, South, and Northeast all had between 22.2% and 26.9% of websites with Spanish educational material available from their homepage, while the Midwest had 7.7%. This material was often limited to specific webpages such as COVID-19 information, and bariatric health information was rarely found in Spanish. The average Fernandez Huerta score for the ease of Spanish readability of these websites was 57.6, indicating relatively difficult text at a tenth to twelfth-grade level. Recommendations by the NIH and AMA are that readability of patient education materials should not exceed a sixth-grade reading level [22–24]. To appropriately educate Spanish-speaking patients online, the majority if not entirety of institutions' websites across the United States should be available in easily readable Spanish.

31.1% of websites without a translation option or easily located Spanish educational material had contact information for their language services or interpreter program available via one mouse click from the homepage. In over half of these websites, this information was found in small English text at the bottom of the homepage within the "Notice of Non-Discrimination" or "Privacy Statement." Though contact information was almost always listed in Spanish, these legal disclaimers are unlikely to be visited by website patrons, let alone clicked on by non-English speakers in search of information in their native language. If web translation is not feasible and such services are the only option given to non-English speakers, they should be easy to locate,

as in the case of the ten websites that provided such links in several languages including Spanish.

It is important to note that many of the websites that were evaluated had Spanish material when using the search bar for keywords such as "Español" or "Spanish," but there was no easy way to access this information in a more organized fashion. The amount of Spanish material found in this manner was highly variable, and its quantification was not within the scope of this study, as search engines and simple search terms have been shown to be inefficient for accessing health information [34]. An easy and cost-effective way to increase Spanish website readability may be to organize institutions' already existing Spanish material into an easily located part of their websites.

Our study does have limitations. The first is that web scraping was conducted manually by a single evaluator. Although websites were methodically searched, there is still the possibility that some information was overlooked. The idea behind this study was to demonstrate what a human can locate on an institution's website and therefore we do not believe this methodology to be a shortcoming of our study. Additionally, online information is dynamic and there is the possibility that some website content has been updated since our data collection. The US Census Survey that we utilized for county-level Spanish-speaking populations was published in 2015 and may not be entirely accurate at the time of publication.

Conclusion

Our study found a disparity in access to Spanish readability options among ASMBS COE websites, both from an institutional and geographic perspective. The high prevalence of obesity, low utilization of bariatric surgery, and relatively low health literacy among the Hispanic patient population puts these patients at a significant disadvantage [1–8]. Shortcomings of Spanish website readability are a correctible barrier to health literacy that may hinder Hispanic patient access to care. The general increasing relevance of online healthcare information adds to the importance of providing readily available online Spanish bariatric health information, particularly for institutions that conduct many bariatric procedures. With currently low Spanish readability of ASMBS COE websites, we would urge these institutions to play a leading role in establishing a norm for Spanish readability. We also suggest that during the ASMBS ACS accreditation process for Bariatric COE, that evaluation of the institution's website be considered for Spanish readability.

Declarations

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