Accessibility and readability compliance in Spanish public hospital websites

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Motivation

- The number of e-health websites has increased significantly over the past few years.

- The Internet is used in many ways, from carrying out searches on a wide variety of topics to accessing online services such as those offered by hospitals.

- It is essential that these websites be accessible to all individuals, including those with some sort of disability, is essential.

Contribution

To determine exactly how accessible health information and hospital services are for citizens, the present research has been to analyze 48 of the leading Spanish public hospitals' website homepages to assess their levels of compliance with accessibility and readability guidelines.

Three research questions were addressed:
1. How many hospital sites fulfil WCAG 2.1 Level AA guidelines following regulatory framework?
2. What are the most common types of accessibility problems?
3. What level of readability do hospital websites have?

Background

- **Web Accessibility**

WCAG 2.0 guidelines

🧠 Perceivable ✔

⌨ Operable ✔

Abc Understandable ✔

⚙ Robust ✔

Background

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- **Readability**
  - Readability metrics: Flesch Reading Ease metric, Dale-Chall, Gunning's 'FOG'.
  - The parameters included in these indices are usually the number of words, number of sentences, and number of syllables in a given text.
  - For the Spanish language, there are several approaches (J. Fernández Huerta. 1959)(G. Law. 2011).
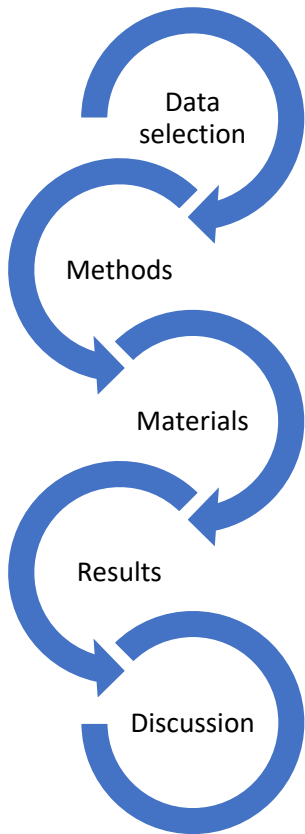
Related Work

- Health websites studies
    - (Kurniawan, P. Zaphiris. 2001) (L. O'Grady. 2005) (X. Zeng, B. Parmanto. 2004) (N. E. Youngblood. 2020)

- Hospital websites studies
    - (Y. S. Kim, K. S. Oh. 2010)(G. Maifredi, et al, 2010)(J. Kuzma, et al, 2017) (P Acosta-Vargas et al, 2018)

- Studies that include Spanish Hospital Websites:
    - (J. Mira, et al, 2006) (G. Llinas, D. Rodriguez-Inesta, et al. 2008), (J. Martins et al, 2016)

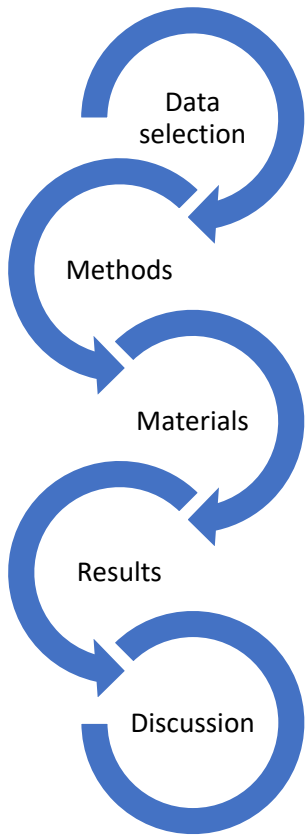Very low web accessibility levels according to WCAG

Exploratory study

Data selection

Data selection

Methods

Materials

Results

Discussion

- The public hospitals with the highest number of beds in each of Spain's. provinces were selected for the study.
- While Spain has 52 provinces, four of them did not have specific websites. The analysis was carried out with a sample of 48.
- The home page of each hospital was selected for accessibility analysis.
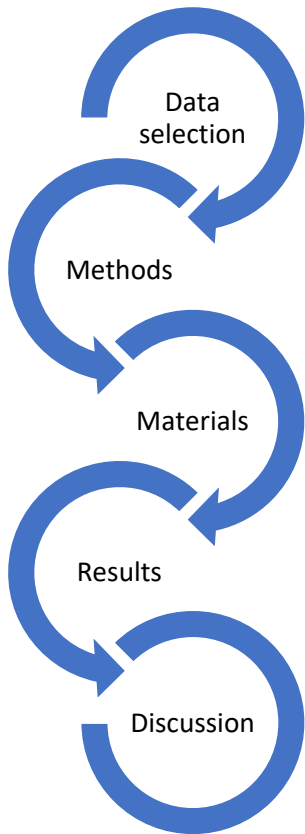
Exploratory study

Method-Web Accessibility:

- A qualitative method based on WCAG 2.1 Level AA.
- The combination of the use of validators together with manual inspections.
- Two experts
- Used tools:
    - Browser add-ons: Web Developer, Wave, Colour Contrast Analyser.
    - Validators: AChecker , Site Improve Accessibility.

Data selection

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Exploratory study

Method-Readability:

- ## Measure: Flesch Index, Inflesz scale

$$I = 206.835 - \frac{62.3S}{P} - \frac{P}{F}$$

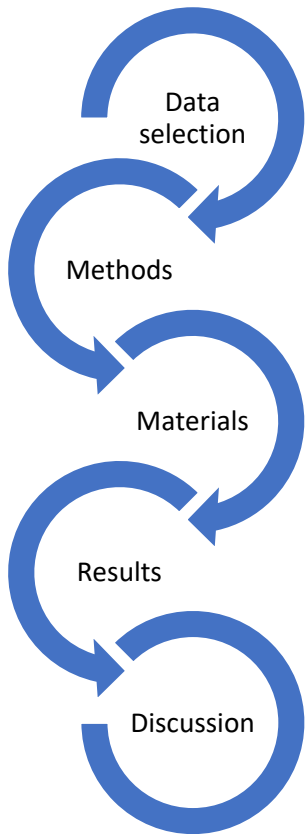| Range	Scale	Content Level
0-40	Very difficult	University, scientific texts
40-55	Somewhat difficult	High school texts, informative magazines, specialized press
55-65	Normal	Secondary school texts, general press, sports press
65-80	Quite easy	Primary education texts, popularizing novels, tabloids
80-100	Very easy	Primary education texts, comics

Data selection
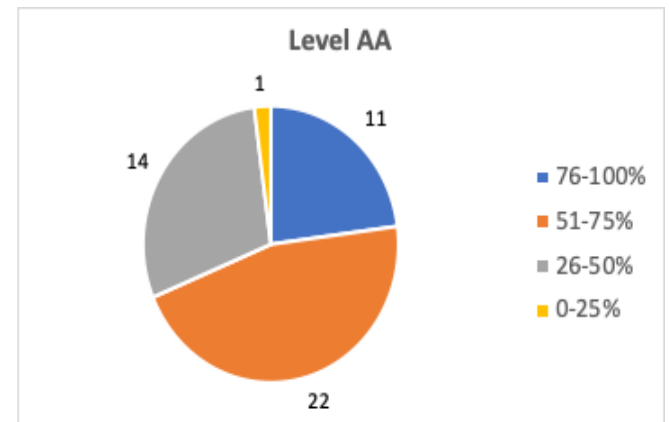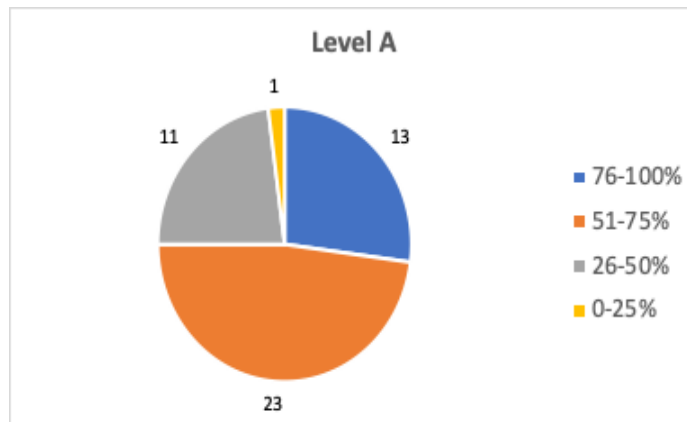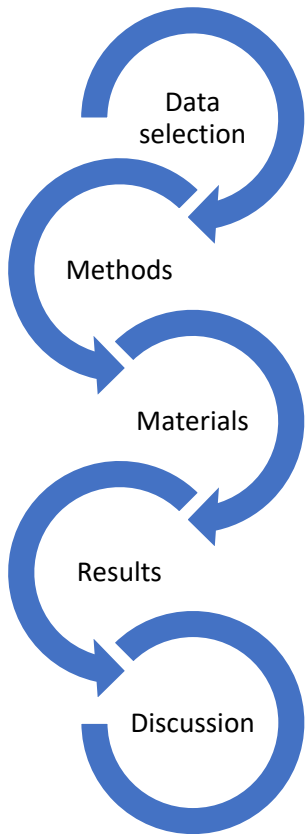
Methods

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Materials

- Accessibility: homepage of each web site (48).
- Readability: Texts of 300 words from the page on patient service.

Data selection

Methods
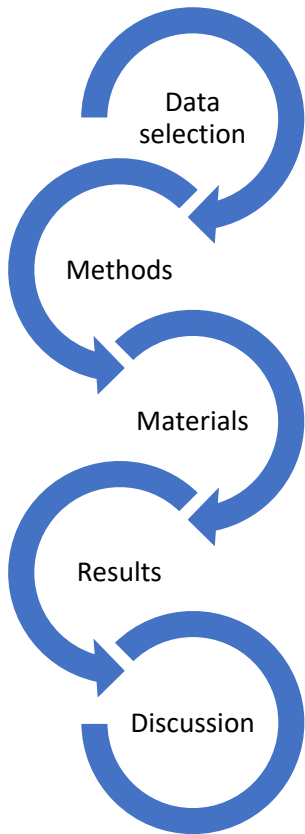
Materials

Results

Discussion

Exploratory study

Results and discussion: RQ1: How many hospital sites fulfil WCAG 2.1 Level AA guidelines following regulatory framework?

Data selection

Methods

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Exploratory study

Results and discussion : RQ1 and RQ2
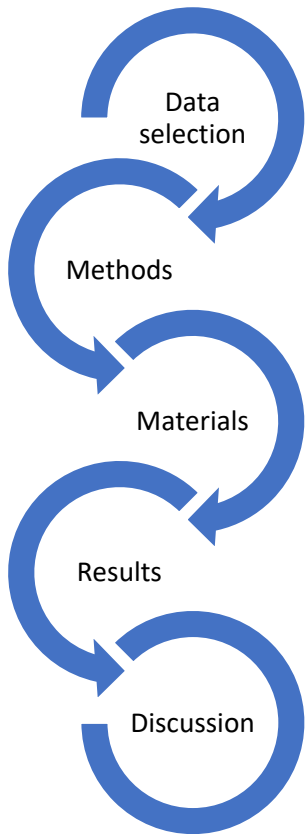
Regarding <u>Principle 1: Perceivable</u>

- Success criteria concerning Principle 1 which are less accomplished and cause accessibility problems when disabled users access these hospitals' web pages.
- Success criterion 1.1.1 (Non-text Content) that is the most basic Level A was not met in 75% of hospital websites analysed. Other success criteria that were not met (81.25%) are the criteria related to colour contrast, such as 1.4.3 (Contrast Minimum) and 1.4.11 (Non-text Contrast) both belonging to Level AA.

Data selection

Methods

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Exploratory study

Results and discussion : RQ1 and RQ2
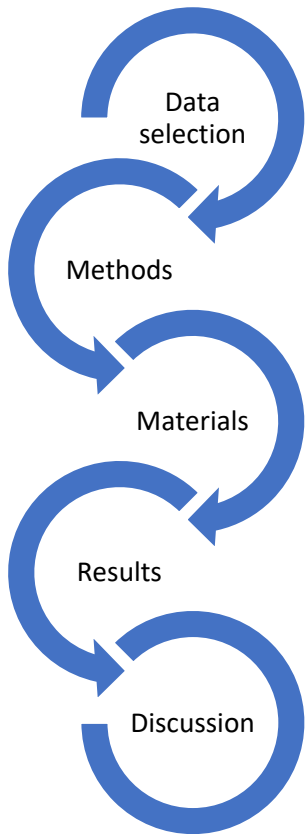
Regarding <u>Principle 2 (Operable)</u>

- One of the requirements with the least incidence of compliance was 2.4.1 (Bypass Blocks) Level A, which was only fulfilled in 29.17% of the hospital websites. Also, only 25% of hospital webpages met another success criterion that significantly impacts accessibility: 2.4.4 (Link Purpose (In Context)) Level A.

Data selection

Methods

Materials

Results

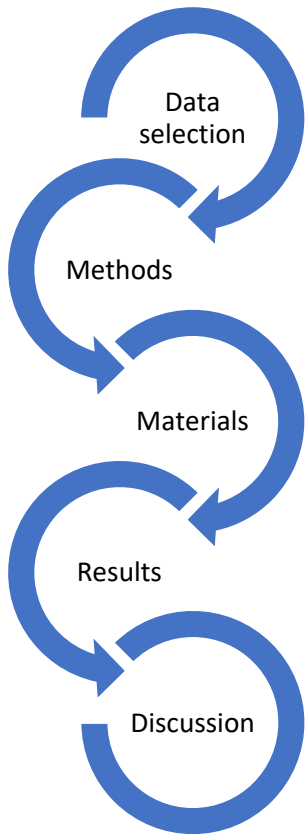Discussion

Exploratory study

Results and discussion : RQ1 and RQ2

- In <u>Principle 3 (Understandable)</u> no unfulfilled success criteria are highlighted
- concerning <u>Principle 4 (Robust),</u> a requirement was detected that was not met and can cause accessibility barriers: 4.1.1 (Parsing) with Level A, which was only achieved by 33.33%

Data selection

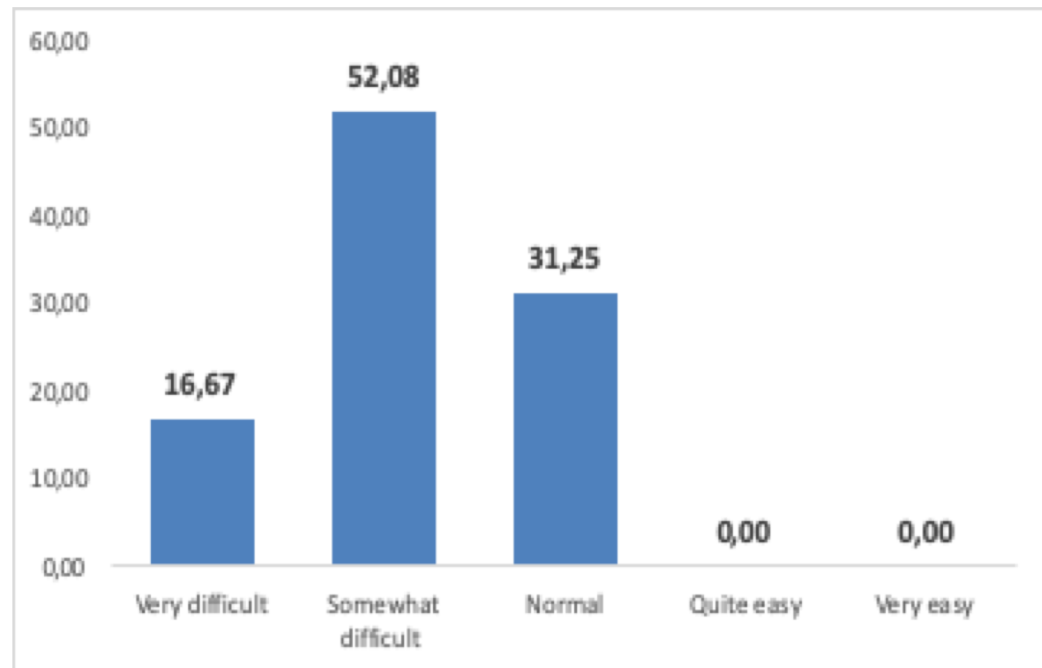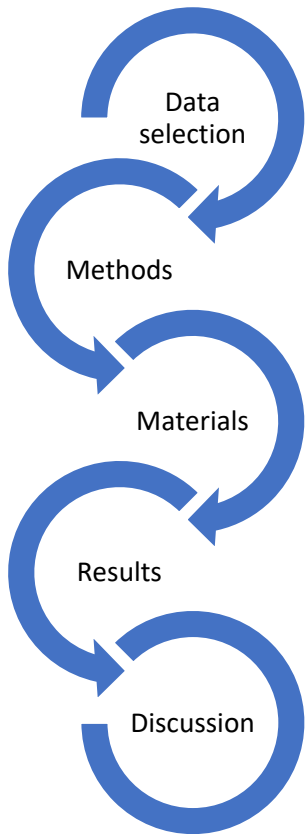Methods

Materials

Results

Discussion

Exploratory study

Results and discussion : RQ1 and RQ2

Data selection

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- On the other hand, strength requirements were detected that were mostly met by all or almost all websites:
- Success criteria 2.1.1 (Keyboard) and 3.2.3 (Consistent Navigation) are especially noteworthy due to their significant positive impact on accessibility. They were fulfilled in 79.17% and 97.92% respectively.

Exploratory study

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Results and discussion : RQ3 What level of readability do hospital websites have?

Data selection

Methods

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Results

Discussion

Texts on the websites of hospitals in Spain are somewhat difficult to understand.

Conclusions

- Hospital websites must be developed in accordance with accessibility guidelines.

- Evaluation of leading public Spanish hospital websites with the recommendations of the WCAG 2.1 Level AA.

- No website is accessible according to the WCAG 2.1 Level AA. Only four websites are compliant with the WCAG 2.1 level A.

- Several errors were identified.

- The readability values obtained by Spanish hospital websites were poor.