Interpretation of way-finding healthcare symbols by a multicultural population: Navigation signage design for global health

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ABSTRACT

The interpretation of way-finding symbols for healthcare facilities in a multicultural community was assessed in a cross-sectional study. One hundred participants recruited from Al Ain city in the United Arab Emirates were asked to interpret 28 healthcare symbols developed at *Hablamos Juntos* (such as vaccinations and laboratory) as well as 18 general-purpose symbols (such as elevators and restrooms). The mean age was 27.6 years (16–55 years) of whom 84 (84%) were females. Healthcare symbols were more difficult to comprehend than general-purpose signs. Symbols referring to abstract concepts were the most misinterpreted including oncology, diabetes education, outpatient clinic, interpretive services, pharmacy, internal medicine, registration, social services, obstetrics and gynecology, pediatrics and infectious diseases. Interpretation rates varied across cultural backgrounds and increased with higher education and younger age. Signage within healthcare facilities should be tested among older persons, those with limited literacy and across a wide range of cultures.

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1. Introduction

The ease of way-finding or navigating to a specific part of a hospital or clinic is a quality issue to be safeguarded in the design of healthcare systems (MacKenzie and Krusberg, 1996). Along with noise control, privacy, safety and general ambience, way-finding in health facilities can profoundly affect patient and family well-being (Frasca-Beaulieu, 1999). Visitors to a health facility rely on signs with text and symbols to navigate to specific destinations such as a laboratory or an imaging room. Signs with visual symbols are suited for rapid communication with the ability to cross age and language boundaries (Foster, 2001). Way-finding signs help greatly in faster escape during emergencies (Tang et al., 2009). Apart from being rapidly interpretable, symbols are compact and yet more prominent and noticeable than textual signs (Foster, 2001; Shieh and Huang, 2003). Symbols are easier to follow and more likely to be understood and retained than multilingual text signs by patients from diverse language backgrounds. In compliance with statutory requirements for improving access to persons with disabilities,

signs should be designed for recognition by older patients and those with disabilities (Scialfa et al., 2008).

A set of healthcare symbols has been developed after testing in the US (Hablamos Juntos, 2004), and several hospitals have incorporated them in way-finding signage with positive results (Cooper, 2010). Unfortunately, these 'universal healthcare symbols' have not been extensively tested in an international multicultural context to assess their application for global use. As more patients from diverse backgrounds seek care across regional borders, universally recognized healthcare symbols are imperative. Our setting, the city of Al Ain in the rapidly developing United Arab Emirates (UAE), is a highly multicultural mix with its native Arabic community as well as a large (69 percent) expatriate population (Statistics Center Abu Dhabi, 2012) from North America, Europe, Africa and South Asia. Local hospitals tend to utilize monolingual (English only) and bilingual (English and Arabic) text-based signs with general-purpose symbols such as for exit and no smoking. Thus, visitors to healthcare facilities from certain demographic groups may experience barriers to access and way finding.

We conducted this study to find out whether persons from different cultures, age groups and literacy levels interpret standard healthcare symbols correctly. These user factors are important in the design, testing and placement of symbols in healthcare facilities

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worldwide. As these symbols refer to frequently utilized medical services such as radiology, laboratory and emergency, their interpretation is of paramount importance.

2. Methods

2.1. Research ethics approval

Ethics approval was granted by UAE University Office of the Vice Provost for Research and Graduate Studies to conduct a crosssectional study to assess to comprehension of healthcare symbols (Ref. No. VPRGS/131).

2.2. Participants

We recruited participants using convenience (non-random) sampling in community non-healthcare settings within the city of Al Ain, UAE in June 2010. Eligibility criteria included age equal to or greater than 16 years and no apparent visual or mental impairment. To ensure a broadly representative sample, we purposefully attempted to recruit participants across a range of age, gender, race and educational backgrounds. A trained interviewer (MSA) explained the study procedures and obtained written informed consent assuring confidentiality and voluntary participation prior to participation. Personally identifiable data such as name, address and exact date of birth were not collected.

2.3. Symbols

We studied the healthcare symbols (Fig. 1) developed at *Hablamos Juntos*, a project funded by the Robert Wood Johnson Foundation and administered by University of California San Francisco School of Medicine (Hablamos Juntos, 2008). This set of 28 healthcare symbols was developed in 2003 after testing on over 300 subjects. Symbols that scored more than 87% on the comprehension test were assessed to be the "most meaningful" among the population studied. This was followed by further refinement, testing and placement in four healthcare facilities across the US (Cooper, 2010).

In order to obtain a reference for comparison (controls), we included 18 general-purpose symbols (Fig. 2) that are commonly used internationally for navigation in healthcare as well as non-healthcare facilities ("Department of Transportation (DOT) Symbols," n.d.). These universally recognizable signs included the ubiquitous symbols for 'no smoking' and 'restrooms'. We compared the comprehension scores for healthcare and general purpose symbols with the latter as a reference baseline.

After replacing the descriptive labels next to the symbols with serial numbers using Adobe Acrobat software, each set was printed on A4 paper using a monochrome laser printer [Kyocera taskALFA 520i]. The printed size of each graphic was 2×2 cm^2 for healthcare symbols and 3.75×3.75 cm^2 for general symbols.

2.4. Instruments

We developed a structured data collection form, which included fields for recording demographic data including age, gender, cultural background and educational attainment [Appendix/Supplementary materials]. The instrument was pilot tested for any unforeseen problems. The study was interviewer administered and thus the participants were not asked to write down their responses. This allowed us to include persons with limited literacy.

Fig. 1. Healthcare symbols developed at *Hablamos Juntos* (shown to participants without text labels).

2.5. Health literacy assessment

The study included a question during the interview: "Do you need help in filling out medical forms?" in order to assess health literacy of the study participant. This is a validated (Chew et al., 2008) screening question and achieves accuracy comparable to more elaborate health literacy screening tools such as TOFHLA (Parker et al., 1995) and REALM (Davis et al., 1991). Although years of educational attainment correlates with health literacy, the relationship is not always reliable (Sørensen et al., 2012).