

Accessibility of Home Blood Pressure Monitors for Blind and Visually Impaired People

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Abstract

Background:

The prevalence of hypertension comorbid with diabetes is a significant health care issue. Use of the home blood pressure monitor (HBPM) for aiding in the control of hypertension is noteworthy because of benefits that accrue from following a home measurement regimen. To be usable by blind and visually impaired patients, HBPMs must have speech output to convey all screen information, an easily readable visual display, identifiable controls that are easy to use, and an accessible user manual.

Methods:

Data on the physical aspects and the features and functions of nine Food and Drug Administration-approved HBPMs (eight of which were recommended by the British Hypertension Society) were tabulated and analyzed for usability by blind and visually impaired individuals. Video Electronics Standards Association standards were used to measure contrast modulation in the displays of the HBPMs. Ten persons who are blind or visually impaired and who have diabetes were surveyed to determine how they monitor their blood pressure and to learn their ideas for improvements in usability.

Results:

Physical controls were found to be easy to identify, and operating procedures were found to be relatively simple on all of the HBPMs, but user manuals were either inaccessible or minimally accessible to blind persons. The two HBPMs that have speech output do not voice all of the information that is displayed on the screen. Some functions that are standard in the HBPMs without speech output, such as the feature for automatically setting cuff inflation volume and memory, were lacking in the HBPMs with speech output. These features were mentioned as desirable in interviews with legally blind persons who are diabetic and who monitor their blood pressure at home. Visual display output was large and adequate in all of the HBPMs. Michelson contrast for numeric digits in the HBPM displays was also measured, ranging from 55 to 75% for characters with dominant spatial frequency components lying in the range of 0.5–1.0 cycles/degree.

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Abbreviations: (AAMI) American Association for the Advancement of Medical Instrumentation, (BGMs) blood glucose monitors, (BHS) British Hypertension Society, (CSF) contrast sensitivity function, (FDA) Food and Drug Administration, (HBPM) home blood pressure monitor, (IPs) insulin pumps, (LCD) liquid crystal display, (MTF) modulation transfer function, (PDF) Portable Document Format, (SQRI) square-root integral, (VESA) Video Electronics Standards Association

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Abstract cont.**Conclusions:**

Home blood pressure monitors are easy-to-use devices that do not present accessibility barriers that are difficult to surmount, either technically or operationally. Two HBPMs with voice output were found to have a significant degree of accessibility, but they were not found to offer as many features as those HBPMs that were less accessible. Recommendations were made to improve accessibility, including the development of visual display standards that specify a minimally acceptable level of Michelson contrast.

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