



Patient Engaged Human Factors and Ergonomics: Performance Barriers to the Work of Medication Management in Older Heart Failure Patients

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Background: Human factors and ergonomic (HFE) theories and methods have successfully been applied to the work of health care professionals to improve safety, effectiveness, and efficiency of healthcare delivery. HFE approaches have rarely been utilized to explore the performance of patients as active agents engaged in healthcare work.

Purpose: The purpose of this study was to describe the nature and prevalence of barriers to medication management performance of older adult heart failure (HF) patients using a patient engaged HFE work system model.

Methods: This study was a secondary analysis of data from a previous self-care barriers study by the authors. For this study, we extracted frequently reported barriers specifically related to medication management. Data were collected from and about elderly heart failure patients (N=30) and their caregivers (N=14) using audio-video taped interviews (30 to 90 minutes), clinic and home observations, surveys, and medical record review. Transcribed verbatim, data files were analyzed in NVIVO 10 by three analysts using a stepwise analytic process beginning with identifying and broadly coding barriers (person, task, tool, context) and later focusing on extending the conceptual model, identifying patterns, and iterative revision of the coding. Convergence between researchers was assured through training, theoretical grounding, and four extensive coding discussions to facilitate analytic convergence.

Results: Thirty patients aged ≥ 65 with HF were recruited from an outpatient cardiology clinic of a large academic medical center in the Southeast US. Their mean age was 73.8 years (SD=6.6, range: 65-86 years); 17/30 (57%) were male; and 18/30(60%) were White, non-Hispanic (33% Black/African American); 33% completed 12 years of formal education (30% completed <12 y); 53% were married (23% widowed); 87% were not working/retired; and 75% had an annual household income \leq \$50,000 (25% \leq \$15,000). At least one caregiver accompanied 44% of patients. Medications management barriers most frequently reported were related to attributes of tasks (442 references, 100% of participants). Task complexity and difficulty (209 references, 100% of participants) included the number of pieces or subtasks (74 references, 75% of participants), conditionality (x contingent on y) (39 references, 47% of participants), and task clarity and ambiguity (31 references, 50% of participants). The consequences of medication tasks (114 references, 93% of participants) frequently mentioned were the effects of medications on body, health, and mind (58 references, 87% of participants), and medication task effects on life and daily routine (32 references, 53% of participants). Person barriers frequently reported were lack of knowledge concerning medication treatments, indications, instructions, and names (45 references, 63% of participants) and negative attitudes towards medications in general (19 references, 23% of participants).

Conclusion: This HFE informed study revealed that barriers to the medication management work of older HF patients primarily involved task complexity and the effects of medication tasks on the patient's body and life. Knowledge and attitude barriers were also frequently mentioned. To support medication management in older heart failure patients, the design of future tools and technologies will need to consider how to reduce the complexity demands of this work, provide strategy support for medication effects, and supply informational support to improve knowledge.