Examining Patient Work: The When, and How Much of Self-care

Dan Nathan-Roberts\textsuperscript{a}, Richard J. Holden\textsuperscript{b}, Shanqing Yin\textsuperscript{c}, Rupa S. Valdez\textsuperscript{d}

\textsuperscript{a}Department of Industrial and Systems Engineering, San José State University, San Jose, California, USA; \textsuperscript{b}Department of BioHealth Informatics, Indiana University School of Informatics, Indianapolis, Indiana, USA; \textsuperscript{c}Changi General Hospital, SINGAPORE; \textsuperscript{d}Department of Public Health Sciences, University of Virginia, Charlottesville, Virginia, USA

1. Introduction

Workload is a foundational topic in ergonomics, and has been studied in a number of healthcare professions (Gaba & Lee, 1990). However, a key area of healthcare workload that is understudied is the dynamic workload of patients (Holden R. J., 2015). Patient work is also referred to as Treatment Burden (Sav, 2013), and can change drastically during a treatment regimen. By better understanding patient workload and capacity for work it is proposed that we can increase positive outcomes such as health and satisfaction, while decreasing manpower needs for patients and caregivers. To do this, two areas of research need to be further developed; dynamic workload measurement techniques, and a better understanding of a patient’s macroergonomic system.

2. Patient Workload

The field of human factors has developed a robust toolset for measuring workload in pilots, anaesthesiologists and other professions (Xie & Salvendy, 2000). Patient workload has also been measured, however it has primarily been measured subjectively. Previous subjective patient workload measures include interviews & focus groups (Hoonakker, 2014), EEG (Berka, 2004), and encounter transcripts (Holden R. J., 2015). A limitation of all of these methods and toolsets is that workload, and capacity for work are measured as an average, or statically at single point in time. The time-scale changes in most workload measurements, such as the momentary changes studied in anaesthesiologists are nothing like workload ebbs and flows that a patient may experience over days, months, and lifetimes. This limits the ability of healthcare professionals to design effective dynamic treatment regimens. While some researchers have conceptualized dynamic workload (May., 2014), they have not used effective ergonomic methods to measure workload or capacity. Moving forward, it is important for workload and capacity for work to be measured dynamically to better identify where healthcare delivery across settings can be most improved.

3. Sociotechnical Systems

The Systems Engineering Initiative for Patient Safety (SEIPS) model has been used as a framework to understand patient workload (Holden R. J., 2015). SEIPS 2.0 (Holden R. J.-R., 2013), and other macroergonomic concepts, such as Affective Health Design (Nathan-Roberts & Brennan, 2013) highlight the benefits of a holistic view. Macroergonomic models, especially those of workload (Holden R. J., 2011) will be crucial to identify and account for the sources of resources and demands on patients and caregivers.

4. Case examples and current initiatives

Imagine a mother has an appendicitis, needing surgery. After discharge from the hospital, she is overwhelmed by the work of taking care of children, catching up at work, and catching up on home tasks. She doesn’t have time or energy to do the work of properly caring for the healing wound. The wound is not cleaned properly, resulting in a preventable infection, which requires an avoidable readmission to the hospital. Figure 1 shows where using workload and capacity measurement it may be possible to identify mismatches to prevent such a case.

Figure 1 shows a scenario where workload related to self-care increases leading up to and just after an admission, while work capacity decreases due to increased health problems. During most of the hospitalization workload remains low, even as patient recovery increases capacity (e.g., self-ambulation). However, workload increases sharply during discharge preparation as the patient is taught new care regimens. Post-discharge, workload further increases from activities such as filling prescriptions or learning to self-care, while capacity decreases because of all of the other work they must catch up on. These
mismatches represent opportunities to provide care that is more engaging and reduces possible negative outcomes. It is important to note that Figure 1 represents only one hospitalization, and that every admission may follow a different trajectory.

![Diagram of Work Capacity and Workload](image)

Figure 1. Example theoretical difference between patient workload and work capacity leading to, during, and after a hospital stay for an individual hospitalization.

At Changi General Hospital, Singapore, a focus is being placed on helping patients self-rehab. This has been highlighted by the addition of the “Integrated Building”, which features a home-like environment with the goal of encouraging patients to incorporate rehabilitation throughout their own activities of daily living in the hospital. Many exercises can be performed independently, with minimal supervision, speeding recovery. This can lead to new challenges, for example, changing nursing culture to encourage patient self-rehabilitation. Other initiatives at Changi General Hospital are trying to encourage “softer admissions” and “softer discharges;” minimizing the rapid change in workload that patients currently experience crossing the boundaries of traditional hospitals.

5. Conclusion

These new foci in clinical care, and patient-centred macroergonomics research represent important initial forays into understanding dynamic patient workload and capacity. Further research is needed to develop tools to measure workload and capacity in real-time in clinical and non-clinical care settings. Additionally, research is needed to understand the workload and capacity of a community (including patient(s), providers, caregivers, family, and the community) whom all have different needs at different times. The goal of this work is to simultaneously improve care while reducing the burden for care where it is misallocated (to caregivers or patients) leading to better outcomes for everyone.

Acknowledgements

RJH were sponsored by grants from the National Institute on Aging (NIA) of the US National Institutes of Health (NIH) (K01AG044439) and grants UL1 TR000445 and KL2 TR000446 from the National Center for Advancing Translational Sciences (NCATS/NIH) through the Vanderbilt Institute of Clinical and Translational Research (VICTR). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

References


