ABSTRACT

Home safety assessments and modification interventions are inherently complex and require a high degree of professional reasoning and shared decision making. Emerging mobile technologies offer innovative opportunities for improving outcomes among persons with disabilities by facilitating decision-making processes among providers. Mobile technology is capable of capturing and organizing extensive amounts of data which can inform decisions about assessment processes, intervention options, and outcomes over the course of time. Clinical decision support is incorporated into several existing mobile applications (apps) and may improve adherence to recommended guidelines. This paper describes the clinical reasoning, decision making and home assessment processes among six occupational therapists engaged in the psychometric testing of the app. Results showed that the less experienced therapists systematically went through each component of the app while therapists with greater years of experience moved around the app to access sections that were relevant and pertinent to the environment or the topic of discussion at the particular moment. Additionally, the more experienced therapists were very detailed and specific in their home recommendations based on the evaluations, while the newer therapists were less specific. These results suggest that novice therapists and those who complete fewer home safety assessments per year may benefit from the embedded decision support system within HESTIA as it was designed to support a systematic and comprehensive home safety assessment. Additional research is necessary to better understand how HESTIA’s integrated decision supports are used by home evaluators. This preliminary study also suggested future directions for the development of the app including finalizing the structured recommendation module and in-depth training modules.

INTRODUCTION

Home safety assessments and modification interventions are inherently complex and require a high degree of professional reasoning and shared decision making [1]. Emerging mobile technologies offer innovative opportunities for improving outcomes among persons with disabilities by facilitating decision-making processes among providers [1]. In fact, interdisciplinary home evaluators largely favor the idea of integrating decision-making supports into mobile technology home safety assessments by incorporating flexible cueing features and supporting recommendation development by auto-populating,

Figure 1: Sample PEO Components of HESTIA
filtering, organizing, and prioritizing information particularly among novice stakeholder who desire to gain expertise [2].

Mobile technology is capable of capturing and organizing extensive amounts of data which can inform decisions about assessment processes, intervention options, and outcomes over the course of time [3]. Clinical decision support is incorporated into several existing mobile applications (apps) and may improve adherence to recommended guidelines [4].

HESTIA is a home safety assessment app that has gone through extensive usability testing and was largely based on end-user wants and needs for content, structure and flow [5]. It was specifically designed to incorporate decision supports to guide home assessment processes among interdisciplinary home evaluators. Specifically, the app is framed around the Person-Environment-Occupation (PEO) Model as a framework to encourage a client-centered approach (Figure 1).

HESTIA collects home assessment data within each domain of PEO which can encourage comprehensive assessment following a flexible, and pre-identified standard home assessment process [2]. HESTIA also contains a complex algorithm where collected data on health conditions, assistive technologies, difficulty with everyday tasks (occupations), and environments within the home are filtered to predict potential problem areas and presented during the assessment through auto-populated fields. The app is still in development and the research and development teams are working toward creating a full report which organizes and prioritizes collected data with guidelines for intervention development. However, our team conducted initial validity and reliability testing of the HESTIA assessment. Our objective is to describe clinical reasoning, decision making and home assessment processes among six occupational therapists engaged in the psychometric testing of the app.

METHODS

The current study qualitatively examines occupational therapist participants home assessment processes while using HESTIA during home safety assessments for community-dwelling older adults or persons with disabilities. Our research question is, how does the HESTIA app guide occupational therapists’ home safety assessment processes and intervention recommendations? Specifically, we evaluated the ability of the app to facilitate procedural and pragmatic reasoning among the therapists as they complete the home assessment and recommendation process. Procedural reasoning is the type of reasoning in which the therapist considers and uses intervention possibilities based on a client’s condition, their habits, routines and may be driven by scientific evidence, while pragmatic or practical reasoning is used to match the intervention with the current possibilities or availability of the service delivery venue [6].

Occupational therapists (N=6) were recruited for the larger psychometric study using purposive and snowball sampling techniques. The study was approved by the university IRB and participants (therapists) provided written informed consent prior to being enrolled in the study. Participants completed a single training visit at their specified location (i.e., Philadelphia, Dallas, Milwaukee) where site coordinators administered a structured training protocol on home assessment and app use. Each participant demonstrated competency with the content as measured by a written assessment completed during the same on-site training visit. Each participant pair completed four home safety assessments simultaneously with community-dwelling older adults or persons with disability identified by local non-profit organizations. Assessments were video-recorded for later qualitative analysis.

Data analysis for the current study involved preliminary examination of video-recordings of home assessment processes and intervention recommendations by the research team to understand similarities and differences in the use of the app and reasoning processes while completing a home assessment using HESTIA. We evaluated procedural reasoning in the way the therapists used the app to complete the home assessment process and pragmatic reasoning in the type and quality of recommendations they provided based on the evaluations.

RESULTS

The therapists in this study were diverse for numbers of years of experience as an occupational therapist, number of years of experience in completing home evaluations and the numbers of home evaluations they completed each year (Table 1). All the home owners used in the recorded assessments had functional limitations that demonstrated a need for a home evaluation.
Differences were seen in the use of the app by the therapists who had greater than 10 years of experience in completing home evaluations compared to those who had lesser than 10 years of experience. The less experienced therapists systematically went through each component of the app as organized based on our initial content development research [2]. However, the therapists with greater years of experience completing home evaluations moved around the app to access sections that were relevant and pertinent to the environment or the topic of discussion at the particular moment.

Differences were also observed in the level of detail and comprehensiveness of intervention recommendations provided by therapist participants. The more experienced therapists were very detailed and specific in their home recommendations based on the evaluations, while the newer therapists were less specific. Interestingly, the mid-level therapists with 9-10 years of experience that completed less than twenty home safety assessments per year developed in-depth intervention recommendations that seemed to be guided by the HESTIA app.

**DISCUSSION**

The occupational therapists in this study used different processes for completing the home safety assessments and provided recommendations that varied in comprehensiveness. Beginning with HESTIA’s initial content development, home evaluation stakeholders expressed that decision supports would be particularly useful for those with lesser experience and those who do not regularly complete home safety assessments. The decision supports already integrated into HESTIA seemed to support assessment processes and recommendations for therapists that complete fewer home safety assessments per year. However, those who complete a greater number of assessments per year or have a greater number of years of experience may be less likely to be influenced by the decision support systems as they have established processes for completing assessment and developing recommendations. Additionally, it appears that therapists who complete a large number of assessments per year (approximately 600) have very high productivity expectations which may limit the comprehensiveness of the assessments they complete.

HESTIA did not have all of the decision support systems completely integrated into the app at the time of reliability and validity testing. It is possible that full integration of the decision supports will have a greater influence on intervention development for both novice and expert therapists that complete a range of home safety assessments per year. For instance, the report module integrates a method for prioritizing recommendations based on homeowner wants and needs. Additionally, the report module guides therapist intervention development plan by using a systematic approach for shared decision making around intervention approach decisions (e.g., redesign the environment, use assistive technology, compensate for the impairment) based on the IMPACT2 Model [7]. Furthermore, the tool belt feature of the app enables home evaluators to take measurements with their device and be guided through intervention development within the report module by using either ADA guidelines or client-centered measurements and this feature was not fully integrated at the time of this study.

Nonetheless, the HESTIA app may be particularly useful among novice home evaluators or those who do not complete a large number of home evaluations per year. They may significantly benefit from an app that guides their decision making and clinical reasoning processes. For the more experienced therapists, the app may be less useful since this population may have established methods of conducting home assessments which have proven to be successful throughout their careers.

Additionally, the differences in the types of recommendations provided by therapists highlight the need for fully integrating the systematic and guided recommendation process in the report module and an in-depth training module. The research and development teams are currently working toward fully integrating the report and training module into the app.

**CONCLUSIONS**
This study evaluated both procedural and pragmatic reasoning of the therapists as facilitated by the HESTIA app through retrospective video analysis of home evaluations. Results suggest that novice therapists and those who complete fewer home safety assessments per year may benefit from the embedded decision support system within HESTIA as it was designed to support a systematic and comprehensive home safety assessment. Additional research is necessary to better understand how HESTIA's integrated decision supports are used by home evaluators. This preliminary study also suggested future directions for the development of the app including finalizing the structured recommendation module and in-depth training modules.

REFERENCES


