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### **Development of an App to Track Fatigue in Patients on Hemodialysis**

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Little is known about the temporal pattern of fatigue for patients on hemodialysis. It may be impractical to ask patients who experience fatigue and have limited time in their day to use paper and pencil fatigue assessment instruments several times a day in an effort to measure and track fatigue. The expansion of telehealth may prove to be useful in solving this dilemma. Therefore, the purpose of this study is to develop and test the feasibility of a mobile application designed to assess the temporal pattern of fatigue in patients on hemodialysis.

A mockup of the mobile application was built featuring fatigue assessments prompted upon waking, immediately before dialysis, immediately after dialysis, and at bedtime on a daily basis. Usability and efficiency were incorporated into the design by using easily visible colors, maintaining a low reading level, integrating reminders, and asking only essential questions. The mockup was reviewed and edited by other researchers and the programmer before being built into a functional application. It will be evaluated by a minimum of five dialysis nurses or technicians and five nephrologists. Health care staff will be given an electronic survey requesting their feedback on usability, feasibility, and overall opinion of the application. We will also recruit a total of 15 end-stage renal disease patients receiving hemodialysis and 15 control participants to use the application for one week, then evaluate their experience with the application. The evaluation will be summarized, and the application will be updated to reflect recommendations.

Research is ongoing. We anticipate that healthcare personnel will rate the application with a high level of usability and will encourage their patients to use it in their practice. Additionally, we anticipate that our participants will find the application easy to use and understand and that they will report a willingness to use if asked to participate in further research.

A clear understanding of patients' on hemodialysis pattern of fatigue may provide evidence for adapting current best practices. These practices may include, but not be limited to: dialysis schedules, medication timing, mealtimes, activity scheduling, and interventions. The technology exists to integrate activity tracking watches into mobile applications; thus, the effects of exercise and/or sleep interventions on fatigue can be further studied in this patient population.

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