Study protocol: The effects of an app-based acupressure intervention on alleviating fatigue, pruritus, and sleep quality among hemodialysis patients

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Abstract

Objectives: To evaluate the effectiveness of an app-based self-guided acupressure intervention in alleviating fatigue and pruritus, and in improving sleep quality among hemodialysis patients.

Design and subjects: The parallel randomized controlled trial will be employed in one hospital. Block randomization in a 1:1 ratio will be used to assign the patients to the intervention and control groups. It is estimated that 50 to 100 participants receiving hemodialysis will be recruited.

Instrument: The demographic and health-related information questionnaire, the Post-dialysis Fatigue (PDF), 5-D Itch, and Pittsburgh Sleep Quality Index will be used in this study.

Interventions: The intervention group will use an app-based self-guided acupressure program to do the acupressure by themselves once daily for 4 weeks. Participants in the control group will receive usual care and no other intervention.

Data analysis: Both intention-to-treat and per-protocol analysis approaches will be performed. Generalized Estimating Equations (GEE) analysis will be used to assess the effectiveness of the interventions. Sensitivity analysis will be conducted to assess the impact of missing data on the treatment effect if necessary.

Expected outcomes: Participants in the intervention group will know how to do the self-guided acupressure by themselves. If the intervention is effective, the App can be introduced to the hemodialysis patients who need it.

Keywords: chronic kidney disease, fatigue, App, pruritus, self-acupressure, sleep quality

Fatigue is one of the most common and distressing symptoms among hemodialysis (HD) patients, negatively affecting physical function, psychological well-being, and quality of life. Current pharmacological and non-pharmacological interventions show inconsistent effectiveness, highlighting the need for alternative symptom management strategies. Acupressure, a non-invasive therapy from traditional Chinese medicine, has shown potential in reducing fatigue and improving related symptoms. Self-administered acupressure is simple, low-cost, and suitable for long-term self-care. At the same time, mobile health (mHealth) applications have become increasingly useful for supporting selfmanagement in chronic diseases through reminders, education, and personalized feedback. This study aims to evaluate the effectiveness of an app-based self-guided acupressure intervention in reducing fatigue among HD patients, as well as its effects on pruritus and sleep quality. The intervention is based on Bandura's Social Cognitive Theory, particularly the concept of self-efficacy.

The app includes instructional videos, reminder notifications, motivational messages, and self-monitoring functions to encourage regular practice and improve confidence in symptom management. A two-arm parallel randomized controlled trial will be conducted at the hemodialysis unit of Hoe Nhai Hospital, Hanoi, Vietnam.

Eligible participants are HD patients aged 18 years or older with moderate fatigue levels and smartphone access. Approximately 50–100 participants will be recruited and randomly assigned to either the intervention or usual care group. Participants in the intervention group will use the AcuCare mobile application to perform daily self-acupressure for four weeks. The app provides guidance for stimulating four acupoints: SP6, KI1, ST36, and GV29. Reminder notifications and motivational feedback will support adherence. Outcomes, including fatigue, pruritus, sleep

quality, and comfort, will be assessed at baseline, during intervention, immediately post-intervention, and follow-up periods.

Data will be analyzed using SPSS and Generalized Estimating Equations (GEE). Ethical approval will be obtained from the Institutional Review Board of Hanoi University of Public Health, and written informed consent will be collected from all participants.