World Academy of Science, Engineering and Technology
International Journal of Nursing and Health Sciences
Vol:12, No:09, 2018

Applying an Automatic Speech Intelligent System to the Health Care of Patients Undergoing Long-Term Hemodialysis

Authors : Kuo-Kai Lin, Po-Lun Chang

Abstract : Research Background and Purpose: Following the development of the Internet and multimedia, the Internet and information technology have become crucial avenues of modern communication and knowledge acquisition. The advantages of using mobile devices for learning include making learning borderless and accessible. Mobile learning has become a trend in disease management and health promotion in recent years. End-stage renal disease (ESRD) is an irreversible chronic disease, and patients who do not receive kidney transplants can only rely on hemodialysis or peritoneal dialysis to survive. Due to the complexities in caregiving for patients with ESRD that stem from their advanced age and other comorbidities, the patients' incapacity of self-care leads to an increase in the need to rely on their families or primary caregivers, although whether the primary caregivers adequately understand and implement patient care is a topic of concern. Therefore, this study explored whether primary caregivers' health care provisions can be improved through the intervention of an automatic speech intelligent system, thereby improving the objective health outcomes of patients undergoing long-term dialysis. Method: This study developed an automatic speech intelligent system with healthcare functions such as health information voice prompt, two-way feedback, real-time push notification, and health information delivery. Convenience sampling was adopted to recruit eligible patients from a hemodialysis center at a regional teaching hospital as research participants. A one-group pretest-posttest design was adopted. Descriptive and inferential statistics were calculated from the demographic information collected from questionnaires answered by patients and primary caregivers, and from a medical record review, a health care scale (recorded six months before and after the implementation of intervention measures), a subjective health assessment, and a report of objective physiological indicators. The changes in health care behaviors, subjective health status, and physiological indicators before and after the intervention of the proposed automatic speech intelligent system were then compared. Conclusion and Discussion: The preliminary automatic speech intelligent system developed in this study was tested with 20 pretest patients at the recruitment location, and their health care capacity scores improved from 59.1 to 72.8; comparisons through a nonparametric test indicated a significant difference ($p < .01$). The average score for their subjective health assessment rose from 2.8 to 3.3. A survey of their objective physiological indicators discovered that the compliance rate for the blood potassium level was the most significant indicator; its average compliance rate increased from 81% to 94%. The results demonstrated that this automatic speech intelligent system yielded a higher efficacy for chronic disease care than did conventional health education delivered by nurses. Therefore, future efforts will continue to increase the number of recruited patients and to refine the intelligent system. Future improvements to the intelligent system can be expected to enhance its effectiveness even further.

Keywords : automatic speech intelligent system for health care, primary caregiver, long-term hemodialysis, health care capabilities, health outcomes
Conference Title : ICN 2018 : International Conference on Nursing
Conference Location : London, United Kingdom
Conference Dates : September 27-28, 2018