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Exploring the Efficacy of Enhancing Chronic Kidney Disease Education with AI-Powered Digital Nursing Voice Assistants

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Background and Objectives

As we move into the era of Artificial Intelligence (AI), digital entities are revolutionizing service provision through the implementation of "human-like AI," engaging with us in real-world scenarios. The aftermath of the COVID-19 pandemic has exacerbated the global shortage of nursing personnel, highlighting the urgent need for information technology to support nurses in various facets of care, including guidance, to alleviate their workload. Given that Taiwan has the highest incidence of chronic kidney disease worldwide, education on daily care and preventive measures for this condition is paramount. This study focuses on generating nursing guidance videos using AI and employing AI to create digital nursing voice assistants capable of mimicking human facial expressions, gestures, and voices through real human videos. These assistants aim to educate patients and evaluate their effectiveness in enhancing hospitalized patients' understanding of "daily care and preventive measures for chronic kidney disease," as well as the satisfaction of nurses with the educational content. While this approach holds promise for nursing education and guidance, there is currently limited literature on the use of generative AI in this field.

The study investigates the impact of AI-generated digital nursing voice assistants on enhancing the knowledge level of chronic kidney disease patients regarding daily care and precautions, as well as their satisfaction with educational interventions.

Methods

This study utilizes artificial intelligence (AI) to create lifelike digital nursing voice assistants by learning from extensive real human conversations, tones, facial expressions, and movements. Based on the expressed content, these assistants generate corresponding facial expressions and full-body movements, producing highly realistic humanoid effects. Supported by deep learning techniques, they serve as digital counterparts to nurses, becoming digital nursing voice assistants.

The study is a pilot randomized controlled trial targeting patients newly diagnosed with chronic kidney disease who are conscious and able to communicate effectively. It aims to recruit 30 participants, randomly assigning them to either the experimental or control group. The experimental group receives AI-generated educational videos executed by digital nursing voice assistants 24 hours after admission, while the control group receives conventional education. This includes nurses verbally providing QR codes for accessing educational materials in PDF format. Both groups complete pre-test questionnaires using a "daily care and precautions for chronic kidney disease" knowledge scale before education. Post-tests and satisfaction surveys are conducted before discharge to assess knowledge levels and satisfaction with educational interventions.

Results

The experimental group scored 96 points in knowledge regarding "daily care and precautions for chronic kidney disease," while the control group scored 88 points. The satisfaction rate for education on "daily care and precautions for chronic kidney disease" was 96.6% in the experimental group and 86.8% in the control group. The results indicate that the intervention of AI-generated digital nursing voice assistants significantly improves both the knowledge scores and satisfaction with education on daily care and precautions for chronic kidney disease compared to conventional education methods.

Conclusion

This study illustrates how AI-generated digital nursing voice assistants play a pivotal role in enhancing education on daily care and preventive measures for chronic kidney disease. Results show notable enhancements in both patient knowledge and satisfaction compared to conventional methods. By harnessing AI technology, healthcare providers can effectively address nursing education gaps, crucial amid the global nursing shortage exacerbated by COVID-19. Additionally, the lifelike capabilities of these assistants offer innovative patient education opportunities, with potential to reshape healthcare practices. Further research is imperative to fully capitalize on AI's benefits in nursing education and to enhance patient outcomes.

Relevance to HPH

AI-generated digital nursing voice assistants play a pivotal role in health promotion hospitals. Through real-time, personalized nursing education, they effectively enhance chronic kidney disease patients' knowledge and satisfaction with daily care. This technology fills gaps in nursing education while alleviating healthcare staff's workload. For health promotion hospitals, this translates to better patient engagement, improved healthcare quality, and reduced hospitalization risks. Additionally, the application of AI-generated digital nursing voice assistants brings higher efficiency and nursing service models that are more aligned with contemporary trends..

Relation to conference main theme

The role of healthcare and innovation for equity Strategies for Health Promoting Hospitals and Health Services to address equity in health .The study explores using AI-driven voice assistants to improve chronic kidney disease education, aligning with the conference theme of integrating innovative technology for patient empowerment and health promotion in hospital and health services.

Relation to one of the HPH Task Forces

Settings approach: health promoting hospitals and health services include Health-promoting hospitals and health services; Access to services and information; Improving care for people with chronic conditions, health problems, and comorbidities; Patient and staff empowerment, reducing distress, and improving well-being Promoting healthy behavior among patients