ARRT: Augmented Reality and RadioTherapy for Pancreatic Cancer Patient Education

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Background:

Radiotherapy relies on high-quality pre-treatment imaging for precise dose planning and delivery. Techniques involving breath hold cues are used to improve image quality. Previous research has identified a need for accessible patient-specific resources in this field. This research targets patient involvement within the pancreatic cancer radiotherapy patient care pathway, for developing and testing an augmented reality (AR) mobile application to support patient education on the exhale-breath hold.

Methods:

Using anonymized patient datasets, animated 3D models of thoracic and abdominal organs were digitally reconstructed showing organ motion during free-breathing and exhale-breath hold. Clinicians and radiotherapy-experienced patients were involved in the design of the mobile application that presented organ models and animation in life-size through AR. The application was evaluated by health care professionals (HCP) at the Beatson West of Scotland Cancer Centre (n=24) using survey methodology including the Reduced Instructional Materials Motivation Survey (RIMMS) and System Usability Survey (SUS).

Results:

Twenty-four HCPs completed the testing and evaluation. The Reduced Instructional Materials Motivation Survey yielded high user motivation scores of Attention (M = 4.55), Relevance (M = 4.79), Confidence (M = 4.79), and Satisfaction (M = 4.54). The System Usability Score (SUS = 83.96), suggested excellent usability.

Conclusions:

The application effectively communicates the location and motion of upper abdominal organs, emphasizing their relationship to the pancreas. AR applications could effectively communicate radiotherapy information to pancreatic cancer patients and serve as a model for future AR tools in radiotherapy.

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