2021

Virtual Reality For Therapeutic Recreation In Dementia Hospice Care: A Feasibility Study

Claire Ferguson
University of Nebraska Medical Center

Natalie Manley
University of Nebraska Medical Center

Elizabeth Lyden
University of Nebraska Medical Center

Julie Blaskewicz Boron
University of Nebraska Medical Center

Marcia Shade
University of Nebraska Medical Center

VIRTUAL REALITY FOR THERAPEUTIC RECREATION IN DEMENTIA HOSPICE CARE: A FEASIBILITY STUDY

Claire Ferguson, BA, M3; Dr. Natalie Manley, MD, MPH; Elizabeth Lyden, BA, MA, MS; Julie Blaskewicz Boron, PhD; Marcia Y. Shade, PhD, BS, RN

Department of Internal Medicine Division of Geriatrics, Gerontology, and Palliative Medicine, University of Nebraska Medical Center

Research conducted at multiple Hillcrest Health Services facilities and private residences

Purpose

- Feasibility study to explore virtual reality (VR) via wireless goggles as a therapeutic recreation for people with dementia on hospice (hPWD)
- To explore the acceptability of VR to hPWD
- To identify any problems and/or benefits associated with using VR as a form of therapeutic recreation in hPWD on hospice

Background

- Behavioral and psychological symptoms of dementia (BPSD) include: apathy, agitation, anxiety, elation, depression, disinhibition, and delusions/hallucinations (Cerejeira)
  - BPSD are variable, compounding, and taxing on caregivers
  - Current treatments include music, aroma, multi-sense, reminiscence, and cognitive behavioral therapies, as well as sedating or antipsychotic pharmacology
- Little in the literature regarding recreational VR use in those with dementia. However, VR has been used as a tool to screen/evaluate for a dementia diagnosis, as it creates a safe, easily adaptable, and more life-like environment than traditional pen and paper cognitive task tests (Flynn, Schultheis).
  - Previous research has shown that PWD do not experience any exceptional adverse events or simulator sickness when using some forms of VR technology (Flynn).
  - Previous research used VR technology involving large screens and hand held Wii-like devices. None had used immersive goggles.
- Despite numerous human interest and media reports demonstrating the positive effects, tolerability and acceptability of immersive virtual reality in the elderly, there is a lack of published research in this setting, especially regarding dementia and hospice.

Methods

CONSENT
- Convenience sample of patients enrolled in hospice through local hospice agency
- All patient's lacked capacity to consent and so consent was obtained through participant's Power of Attorney
- Baseline PAIN-AD score done

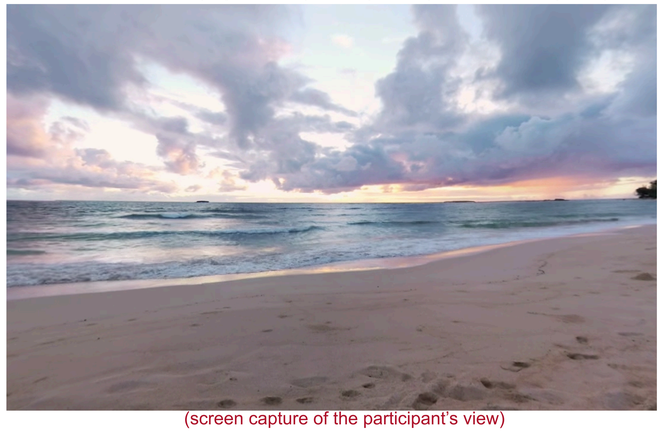
Goggles ON
- *"Can you see the waves?"*
- *"Are the goggles comfortable?"*
- Timer and background wave noises started
- PAIN-AD every 5 min of use

Goggles OFF
- *"Did you enjoy doing that?"*
- *"Would you do that again?"*
- *"Where else would you like to go besides the beach?"*
- Final PAIN-AD score collected

FOLLOW UP
- > 3 hours later, primary caregiver was called to assess for any changes from the participant's baseline, positive or negative
- Statistics were calculated using SAS version 9.4.

VR Experience

- VR Goggles: Lenovo Mirage Solo with Day Dream
- Video: Malaekahana Sunrise (360° Video, 4K) - 3.5 min video looped 12 times in a continuous playlist
  - Video played through YouTube Premium browser on the goggles
  - Video selected due to lack of excessive motion or scene changes, lack of people in the scene, and distance from water
  - Ocean wave sounds played from phone speaker placed near the participant



(screen capture of the participant's view)

Results

Demographics	Primary Dementia Diagnosis	Residence
Mean Age: 85yrs	Alzheimers Disease: 11	Home: 4
Females: 22 — Males: 3	Vascular Dementia: 6	Assisted Living: 1
Caucasian: 21 — Black: 3	Mixed Dementia: 5	Nursing Home: 13
FAST: <7= 5; ≥7= 12	Other/Unspecified: 3	Memory Care: 7

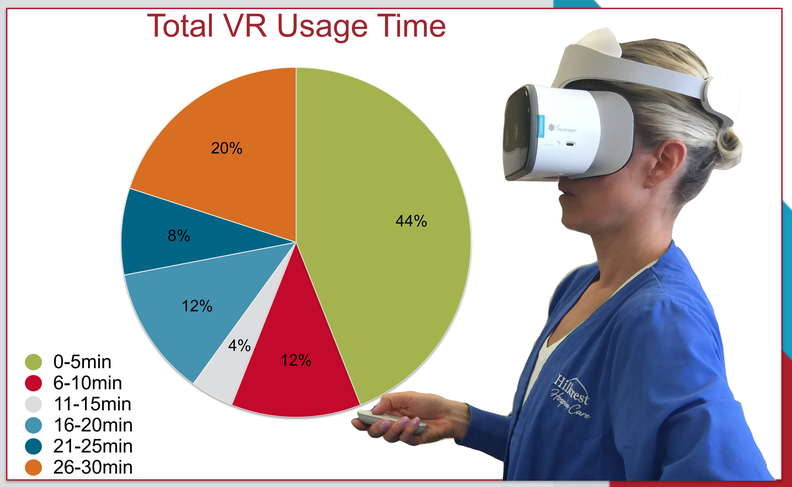
- **Fourteen reported enjoying the VR and 12 would do it again (n=4 unable to respond verbally).**
- Two stopped VR early due to a ≥ 2-point increase in PAIN AD score from baseline per protocol.
- At phone follow-up, one participant was reported to have increased hallucinations and another to be more tearful.

Qualitative Findings

- **Four themes emerged: narration, affirmation, comfort level, and unfulfilled.**
  - Narration occurred when a participant recounted what he/she experienced while wearing the headset
  - Affirmation suggested that the participant either enjoyed or was appreciative of the VR experience
  - Comfort level was demonstrated by comments about wearing the headset
  - Unfulfilled included comments indicating that the participant was somewhat unsatisfied with their experience

Theme	% With	Example
Narration	44%, n=7	*Participant counted islands multiple times. Narrated what she saw. "The sounds of the ocean, this is really wonderful, I love the ocean." "Now its a different time of day, that's pleasant."*
Affirmation	44%, n=7	*"Looks better than what I've been looking at," "Hmmm that's pretty."*
Comfort Level	50%, n=8	*Participant's head was too small for strap, and they said it was heavy on their nose*
Unfulfilled	44%, n=7	*"Its a one time experience, you don't need it twice"; "What else do I get to see?"*

Total VR Usage Time



Conclusions and Future Directions

- **VR use was generally safe and enjoyable in this population of people with dementia on hospice.**
- There was no statistically significant difference between dementia type and usage time, or dementia severity and usage time
- Two participants had worsened baseline behavioral and psychological symptoms of dementia after VR use.
- Future research will need a larger sample size with a control group.
- We hypothesize that in the right setting, VR can provide meaningful activity and enhance quality of life for hPWD and could potentially be a non-pharmacologic intervention for BPSD.
- In practice we have found it to be a useful tool to help hospice patients achieve non-achievable "bucket list" items at the end of life. Such as "going to the beach one last time," going fishing and flying a plane.

References

- CBS This Morning. Senior community explores the world with virtual reality. [Video]. YouTube. CBS This Morning; Sept 1 2016.
- Cerejeira J, Lagarto L, Mukaetova-Ladinska EB. Behavioral and Psychological Symptoms of Dementia. Frontiers in Neurology. 2012;3:73. doi:10.3389/fneur.2012.00073.
- Flynn D, van Schaik P, Blackman T, Femcott C, Hobbs B, Calderon C. Developing a virtual reality-based methodology for people with dementia: A feasibility study. Cyber-psychol Behav. 2003;6(6):591–611.
- Realidyne. Malaekahana sunrise (360° video, 4K). [Video]. YouTube: Realidyne; 2015.
- Schultheis, Maria & Rizzo, Albert. (2001). The application of virtual reality technology in rehabilitation. Rehabilitation Psychology. 46. 296-311. 10.1037/0090-5550.46.3.296.

Acknowledgements

- Many thanks to Lenovo for generously donating a Mirage Headset for the purpose of this study.
- Many thanks to the Hillcrest Hospice for participating in this research endeavor.
- Many thanks to the nurses and staff who helped with coordinating with subjects and caregivers.
- Many thanks for the ongoing loving care provided by both formal and informal caregivers.