OPEN ACCESS

Virtual reality in specialist palliative care: a feasibility study to enable clinical practice adoption

Amara Callistus Nwosu ,[1,2] Mark Mills,[2] Simon Roughneen,[3] Sarah Stanley,[2] Laura Chapman,[2] Stephen R Mason[4]

► Additional material is published online only. To view, please visit the journal online (http://dx.doi.org/10.1136/bmjspcare-2020-002327).

[1]International Observatory on End of Life Care, Lancaster University, Faculty of Health and Medicine, Lancaster, UK
[2]Marie Curie Hospice Liverpool, Liverpool, UK
[3]Academic Palliative and End of Life Care Centre, Liverpool University Hospitals NHS Foundation Trust, Liverpool, UK
[4]Palliative Care Unit, University of Liverpool, Liverpool, UK

Correspondence to
Dr Amara Callistus Nwosu, International Observatory on End of Life Care, Lancaster University Faculty of Health and Medicine, Lancaster LA1 4YG, Lancashire, UK; a.nwosu@lancaster.ac.uk

Received 27 March 2020
Revised 3 February 2021
Accepted 4 February 2021
Published Online First
17 February 2021

To cite: Nwosu AC, Mills M, Roughneen S, *et al*. *BMJ Supportive & Palliative Care* 2024;**14**:47–51.

ABSTRACT

Background The use of virtual reality (VR) is increasing in palliative care. However, despite increasing interest in VR, there is little evidence of how this technology can be implemented into practice.

Aims This paper aims to: (1) explore the feasibility of implementing VR therapy, for patients and caregivers, in a hospital specialist inpatient palliative care unit and a hospice, and (2) to identify questions for organisations, to support VR adoption in palliative care.

Methods The Samsung Gear VR system was used in a hospital specialist palliative inpatient unit and a hospice. Patients and caregivers received VR distraction therapy and provided feedback of their experience. Staff completed a feedback questionnaire to explore their opinion of the usefulness of VR in palliative care. A public engagement event was conducted, to identify questions to support implementation of VR in palliative care settings.

Results Fifteen individuals (12 (80%) patients and 3 (20%) caregivers) participated. All had a positive experience. No adverse effects were reported. Ten items were identified for organisations to consider ahead of adoption of VR in palliative care. These were questions about: the purpose of VR; intended population; supporting evidence; session duration; equipment choice; infection control issues; content choice; setting of VR; person(s) responsible for delivery and the maintenance plan.

Conclusions It is feasible to use VR therapy in palliative care; however, further evidence about its efficacy and effectiveness is needed. Palliative care practitioners considering VR use should carefully consider several factors, to ensure that this technology can be used safely and effectively in clinical practice.

Key messages

What was already known?
⇒ The use of Virtual Reality (VR) is increasing in palliative care.
⇒ However, despite increasing interest in VR there is little evidence of how this technology can be implemented into practice.

What are the new findings?
⇒ We conducted a quality improvement project in two UK specialist palliative care inpatient units to explore the feasibility of implementing VR therapy, for patients and caregivers.
⇒ Our data suggests that it is feasible to use VR in hospital and hospice settings.
⇒ VR was well received by patients, caregivers and staff. All participants described a positive experience with no major adverse effects.
⇒ We identified questions for organisations to consider, to support VR adoption in palliative care.

What is their significance?
⇒ Our data suggests that it is feasible to use VR in palliative care.
⇒ Practitioners considering using VR should consider a number of factors, concerning the evidence and practical issues, to ensure that this technology can be used safely and effectively in palliative care.

BACKGROUND

Virtual reality (VR) is a computerised technology that uses visual graphics, sounds and other sensory input to create an interactive computer world.[1] VR is increasingly used in healthcare for symptom management of several conditions.[1–5] The use of VR in palliative care is growing for variety of purposes, such as education delivery,[6 7] and symptom management in hospital[8] and hospices.[9–12] Currently, there is little guidance of how VR should be used in clinical care,[13] and no information about the organisational requirements (eg, internet connectivity) and system processes (eg, infection

control) necessary to ensure VR can be used safely, effectively and sustainably.

AIM

This paper aims to: (1) explore the feasibility of implementing VR therapy, for patients and caregivers, in a hospital specialist inpatient palliative care unit and a hospice, and (2) to identify questions for organisations to support VR adoption in palliative care.

METHODS

This quality improvement project was conducted according to the Plan, Do, Study and Act (PDSA) quality improvement cycle.[14] The PDSA cycle was chosen as it is an accepted mechanism of implementing change. The project was done through the Liverpool Global Digital Exemplar (GDE) programme.[15] The GDE programme is a knowledge-sharing platform developed by the English National Health Service, which enables digitally advanced hospitals to innovate and share knowledge globally.[16]

Planning/organisation

The project was conducted over 3 months (August–October 2018) in two UK specialist palliative care inpatient units. This included a hospital-based 12-bedded (Academic Palliative Care Unit, Liverpool University Hospitals National Health Service Foundation Trust—LUHFT) and a 20-bedded hospice (Marie Curie Hospice Liverpool—MCHL). Both units provide specialist palliative care services (cancer and non-cancer) to a similar geographical population.

Choice of equipment

The Samsung Gear VR system was chosen due to its portability and ease of use (online supplemental file 1: Virtual reality equipment requirements). This involved a Samsung Galaxy S8 phone positioned in a head-mounted display (https://www.samsung.com/global/galaxy/gear-vr/#gear-vr). The foam-face cushion was replaced with a polyurethane cushion (Cusfull) to enable decontamination between participants (via 70% isopropyl alcohol wipe). Bluetooth headphones (Sony WH-CH500) were connected to the phone to provide audio.

Participant evaluation

Inpatient admissions (both sites), outpatients (hospice only) and caregivers (both sites) were identified by clinical staff (MM—MCHL; SR—LUHFT) and were offered the opportunity to use the VR system. Participants providing written consent were asked to choose one of three VR experiences and complete an evaluation. The VR experiences were downloaded from the Oculus Gear VR store[17]; these included: (1) a 5-minute-guided relaxation video of a beach (Relax VR[18]); (2) a 10-minute-guided meditation through a computer-generated forest (Forest of serenity—St Giles Hospice[19]) or (3) a 5-minute-video rollercoaster ride.[20] A modified version of the 'evaluation of VR intervention questionnaire' (online supplemental file 2: Modified virtual reality intervention questionnaire) was used to record feedback.[4] Participants were verbally asked the following (by MM and SR): *What did you think of the VR? What did you like? Was there anything you did not like? Would you want to use this again?*

Staff evaluation

Staff involved in the project were asked to complete an electronic feedback survey (online supplemental file 3: Healthcare professional feedback questionnaire) to gather their feedback on using VR. The survey was a combination of closed and free-text responses. Staff were asked for feedback on the following issues in VR: helpfulness of VR in clinical practice, what went well, problems, barriers and opportunities for future use.

Public evaluation

We identified public opinion to VR in palliative care by organising a public engagement event, which provided an opportunity for lay representatives to share their views(conducted in MCHL, September 2019). We first presented the project results to the group and then we used a modified world café method[21] to ask the attendees the following question: 'what questions can organisations use to support VR adoption in palliative care?' A facilitator (ACN) promoted discussion through open questions, and a scribe (SS) collected written feedback.

RESULTS

Fifteen people participated in the evaluation (table 1). This consisted of 12 (80%) patients and 3 (20%) caregivers. Median age of participants was 63 years (SD ±16.50). The majority were men (n=9, 60%). Cancer was the most common diagnosis for patient participants (n=10; 83.3%). Most people were from the hospice inpatient setting (n=7, 46.7%) followed by hospital (n=6, 40%) and outpatients, respectively (n=2, 13.3%).

Relaxation was the most common reason for using VR (n=11, 73.3%). The beach (n=7, 46.7%) and forest experiences (n=7, 46.7%) were most popular. Most participants had a positive experience of the VR (n=14, 93.3%). All participants indicated that they would like to use the VR again. No major complications were noted; although, two participants (13.3%) reported minor problems (heaviness of the headset, difficulty in adjusting the head straps and problems focusing the image).

Six people (lay representatives) participated in the public engagement event. We identified ten questions to support adoption of VR in palliative care settings, which consisted of the following: the purpose of VR; intended population; supporting evidence; session

Table 1 Participant demographics and virtual reality (VR) characteristics

Participant demographic	N (%)	VR characteristic	N (%)	VR characteristic	N (%)
Median age, years (±SD)	63.0 (±16.50)	*Setting*		*Experience of using VR*	
Male	9 (60)	Hospice inpatient	7 (46.7)	Good	14 (93.3)
Female	6 (40)	Hospice outpatient	2 (13.3)	Indifferent	1 (6.7)
		Hospital	6 (40)	Poor experience	0 (0)
Participants					
Patients	12 (80)	*Reason for VR*		*Adverse events*	
Caregivers	3 (20)	Relaxation	11 (73.3)	Yes	0 (0)
		Pain	2 (13.3)	No	15 (100)
Patient diagnosis, n=12		Boredom alleviation	1 (6.7)		
Cancer	10 (83.3)	Anxiety	1 (6.7)	*Problems with VR use?*	
Amyloidosis	1 (8.3)			Yes	2 (13.3)
Neurological	1 (8.3)	*Choice of VR experience*		No	13 (86.7)
		Beach	7 (46.7)		
		Forest	7 (46.7)	*Would they use VR again?*	
		Rollercoaster	1 (6.7)	Yes	15 (100)
				No	0 (0)
		Time VR used			
		5 min	3 (20)	*Was VR requested to be used again?*	
		10 min	5 (33.3)	Yes	2 (13.3)
		15 min	6 (40)	No	13 (86.7)
		30 min	1 (6.7)		

duration; equipment choice; infection-control issues; content choice; setting of VR; person(s) responsible for delivery and the maintenance plan (online supplemental file 4: Public engagement event discussion—questions for organisations).

Seven staff members completed the feedback survey (online supplemental file 5: Staff perspectives on virtual reality). Most were based in MCHL (n=6, 85.7%) and the majority were doctors (n=4, 57.1%). All respondents rated VR as helpful, providing high Likert scores of 4 (n=4, 57.1%) and 5 (n=3, 42.9%). Following the end of the project, further VR use was recommended by five (71.4%) respondents. All staff stated their willingness to use VR in the future. Free-text responses provided further feedback (online supplemental file 6: Free-text questionnaire responses from health professionals detailing their views about the use of virtual reality in palliative care); in summary, the reported benefits of VR were its ease of use, the improvements in psychological well-being and the observed positive short-term effects in participants. Problems with the VR included the discomfort of the headset, disorientation noted by some participants, and technical issues relating to setting up and charging the device. Barriers to VR use were identified as infection-control issues, issues with staff unfamiliar of how to use the equipment, and technical issues of ensuring the equipment was updated, charged and ready for use. Future possible opportunities to use VR in palliative care were identified, and these included 'distraction therapy' for patients undergoing clinical procedures (eg, ascitic drain insertion), virtual hospice visits, family meetings and therapy sessions.

DISCUSSION

Our data suggest that it is feasible to use VR in hospital and hospice settings. VR was well received by patients, caregivers and staff. All participants described a positive experience with no major adverse effects. Ten questions were identified for organisations to consider, to support VR adoption in palliative care.

Contribution and strengths of this paper

This is the first paper in the literature to begin to develop a framework to consider how VR can be implemented in palliative care. This paper is consistent with previous studies which demonstrate the feasibility of using VR in palliative care settings.

Relation to previous work

The findings of this paper suggest feasibility of VR in hospital palliative care settings. This is consistent with previous work by Niki *et al*,[8] who identified symptomatic improvement for 20 hospital inpatients with advanced cancer. Similarly, our work suggests feasibility of VR in hospice settings, which supports the outcomes of previous studies that demonstrate positive outcomes of VR in hospice populations.[9–12]

For palliative care VR, it is important to consider the purpose of the activity, to identify how content is developed, and to define how (and by whom) it is delivered. Our study used software developed specifically for palliative care[19] and generic resources.[18 20] To date, no VR resources have been validated for the specific purpose of providing symptom relief in palliative care. Consistent with previous work, our findings report that palliative

care VR should be evidence based.[13] Knowledge-transfer considerations to support implementation of VR in palliative care have not been previously reported in the literature. Our study reports on important practical issues, such as choice of VR system, infection-control issues and technical device issues such as storage, charging and maintenance.[22]

Limitations

Limitations to this project are its small scope and feasibility focus, meaning that no conclusions about the effectiveness and efficacy of VR can be made. A completely immersive experience was not possible from the device; meaning that participants may have a better experience with other systems.[10] Some participants struggled to independently operate aspects of the VR device and required assistance, demonstrating that technology should be optimised for user requirements. Remote operation and second screen viewing were not possible from this VR device, which meant that the operator needed to stay with the participant for the entirety of the session.

Technical challenges were observed. First, software updates were frequently required, which necessitated planning to ensure the device was updated prior to use. Second, it was necessary to charge the phone and headphones separately, which was occasionally impractical. Finally, internet connectivity problems were encountered which prevented VR use; cellular mobile internet was used in these occasions, which reduced the video quality.

Implications for policy and practice and research

Our paper highlights a number of practical questions to support organisations considering use of VR in palliative care. Although the clinical use of VR in palliative care appears feasible and safe, further evidence of its benefit, effectiveness and practicality are required before recommendations can be made about its usefulness. Further research is needed to examine whether VR can effectively improve symptom management in palliative care and to ensure its use is practical, meaningful and evidence based.

CONCLUSION

Our data suggest that it is feasible to use VR in palliative care. Practitioners considering using VR should consider a number of factors, concerning the evidence and practical issues, to ensure that this technology can be used safely and effectively in palliative care.

Twitter Amara Callistus Nwosu @amaranwosu

Acknowledgements ACN's, MM's, LC's and SS's hospice posts are supported by Marie Curie Hospice Liverpool. SS's academic post is supported by funding from the National Institute for Health Research (NIHR) North West Coast–Clinical Research Network (CRN).

Contributors Study design—ACN, SR and MM. Data collection—MM and SR. Paper writing—ACN. Critique and review of the final manuscript—ACN, MM, SR, SS, LC and SRM.

Funding Liverpool University Hospitals NHS Foundation Trust, Global Digital Exemplar Programme, used to purchase equipment, £2968.6 (grant number–not applicable). Health and Life Sciences, Faculty Public Engagement Grants Scheme, Wellcome Trust, University of Liverpool, used to fund the patient engagement meeting, £360 (grant number–not applicable).

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

ORCID iD

Amara Callistus Nwosu http://orcid.org/0000-0003-0014-3741

REFERENCES

1 Chirico A, Lucidi F, De Laurentiis M, *et al*. Virtual reality in health system: beyond entertainment. A mini-review on the efficacy of VR during cancer treatment. *J Cell Physiol* 2016;231:275–87.
2 Hajesmaeel Gohari S, Gozali E, Niakan Kalhori SR. Virtual reality applications for chronic conditions management: a review. *Med J Islam Repub Iran* 2019;33:67.
3 Oyama H. Virtual reality for the palliative care of cancer. *Stud Health Technol Inform* 1997;44:87–94.
4 Schneider SM, Hood LE. Virtual reality: a distraction intervention for chemotherapy. *Oncol Nurs Forum* 2007;34:39–46.
5 Oyama H, Kaneda M, Katsumata N, *et al*. Using the bedside wellness system during chemotherapy decreases fatigue and emesis in cancer patients. *J Med Syst* 2000;24:173–82.
6 Evans L, Taubert M. State of the science: the doll is dead: simulation in palliative care education. *BMJ Support Palliat Care* 2019;9:117–9.
7 Lee AL, DeBest M, Koeniger-Donohue R, *et al*. The feasibility and acceptability of using virtual world technology for interprofessional education in palliative care: a mixed methods study. *J Interprof Care* 2020;34:461–71.
8 Niki K, Okamoto Y, Maeda I, *et al*. A novel palliative care approach using virtual reality for improving various symptoms of terminal cancer patients: a preliminary prospective, multicenter study. *J Palliat Med* 2019;22:702–7.
9 Johnson T, Bauler L, Vos D, *et al*. Virtual reality use for symptom management in palliative care: a pilot study to assess user perceptions. *J Palliat Med* 2020;23:1233–8.
10 Popert S, Riat H. P-35 can virtual reality (VR) guided meditation reduce pain? A feasibility and acceptability study. *BMJ Support Palliat Care* 2017;7:A22.
11 Perna-Forrest L. P-34 unlocking the potential of virtual reality in palliative care. *BMJ Support Palliat Care* 2017;7:A22.
12 Perna-Forrest L, Minton O. 149 the potential for virtual reality therapy in palliative care – preliminary findings. *BMJ SupportPalliat Care* 2019;9:A63.
13 Austin P, Lovell M, Siddall P. The efficacy of virtual reality for persistent cancer pain: a call for research. *J Pain Symptom Manage* 2019;58:e11–14.

14 ACT Academy - NHS Improvement. Plan, do, study, act (PDSA) cycles and the model for improvement, 2017. Available: https://improvement.nhs.uk/resources/pdsa-cycles/: NHS Improvement
15 Royal Liverpool Global Digital Exemplar. Digital Liverpool, our digital future, 2017. Available: https://www.rlbuht.nhs.uk/media/5572/digital_liverpool_april_2017.pdf: Liverpool Univerity Hospitals NHS Foundation Trust
16 NHS England. Global digital exemplars, 2018. Available: https://www.england.nhs.uk/digitaltechnology/connecteddigitalsystems/exemplars/
17 Facebook Technologies. Oculus gear VR store. Available: https://www.oculus.com/experiences/gear-vr/2019 [Available from: https://www.oculus.com/experiences/gear-vr/
18 Relax VR. Relax VR, 2019. Available: https://www.relaxvr.co/virtualrealityspas
19 St. Giles Hospice. Forest of serenity, 2017. Available: https://www.stgileshospice.com/forest-of-serenity/
20 Youtube. 3D VR 360 VIDEOS. 360 video VR roller coaster ride 4K, 2018. Available: https://www.youtube.com/watch?v=kxPZfwAM2bE&feature=youtu.be
21 The World Cafe. World CAFE method website of the world CAFE, 2018. Available: http://www.theworldcafe.com/key-concepts-resources/world-cafe-method/#
22 Glegg SMN, Levac DE, Barriers LDE. Barriers, facilitators and interventions to support virtual reality implementation in rehabilitation: a scoping review. *Pm R* 2018;10:1237–51.

Appendix:

Requirements for virtual reality equipment

A working group (ACN, SR and MM) identified requirements to ensure VR could be delivered safely and efficiently in the clinical settings. These requirements included: (1) *use in frailty:* equipment can be used in individuals with limited mobility who are spending the majority of the day in bed or chair; (2) *tether free:* VR equipment is not tethered or dependent on a laptop for its function (as this would limit the opportunity for deliver VR at the bedside); (3) *ease of use:* The VR system is simple to use and remove; (4) *storage:* The device can stored away simply and securely; (5) *infection control:* decontamination of the VR system is needed between participants; (6) *connectivity:* the VR system should work with or without an organisational wireless internet connection; (7) *training*: education for other staff members to deliver the VR should be possible; (8) *maintenance:* charging, maintenance and software updates should be possible in the clinical setting.

Palliative Care Institute
Liverpool

APPENDICES

DATA COLLECTION SHEET: Evaluation of the Virtual Reality (VR) intervention (Version 2: 08/08/2018)

Virtual reality in palliative care – a quality improvement test-bed project

Participant number:
Age: Sex: Diagnosis: Reason for VR:
Date of assessment:

Media chosen
Relax VR beach ☐ Rollercoaster ☐ Forest of serenity ☐ Other (please state) ☐:
Length of time the equipment was used
0- 5 minutes ☐ 6 – 10 minutes ☐ 11 – 15 minutes ☐ >16 minutes ☐
Participant's reaction to VR
Good ☐ Poor ☐ Indifferent ☐ Please explain:
Problems/complications
Yes ☐ No ☐ If yes please state:
Other comments:
Questions for the participant
What did you think of the VR experience?
What did you like?
Can you tell me about any part of the VR experience you didn't like?
Would you want to use this again? On Response - if so/not, what are the reasons for this choice
What could we do differently next time to improve the experience?

PARTICIPANT INFORMATION LEAFLET DATA COLLECTION SHEET: (Version 2: 10/05/2018)

Virtual Reality in Palliative Care feedback

Questions Responses 7

Section 1 of 2

Service evaluation for the Virtual Reality (VR) in Palliative Care project

This questionnaire aims to gain staff perspectives of the Virtual Reality (VR) in palliative care project. This was a Global Digital Exemplar (GDE) test bed project which took place in the Royal Liverpool University Hospital and Marie Curie Hospice Liverpool between 2018 - 2019.

Please complete the short questionnaire if:
- You are a healthcare professional who provided care for a patient or caregiver who participated in the VR project.

After section 1 Continue to next section

Section 2 of 2

Virtual Reality Evalutaion

Please answer the following questions

Which site were you based? *

- Marie Curie Hospice Liverpool
- Royal Liverpool University Hospital

What is your role *

- Nurse
- Health Care Assistant
- Other

If other please state role

Short answer text

Based on your experience of the the VR project, how would you rate the helpfulness of VR for participants? *

	1	2	3	4	5	
Not helpful	○	○	○	○	○	Very helful

In your own words, describe what went well? *

Long answer text

In your own words, describe what didn't go well? *

Long answer text

Following the end of the project, have you recommended VR for use by your patients? *

- Yes
- No

Please explain why *

Long answer text

Would you use VR again for patients/relatives? *

- Yes
- No

Please explain why *

Long answer text

What are the barriers that prevent use of routine VR in palliative care? *

Short answer text

Are there any new ways we could use VR in palliative care? *

Short answer text

Appendix: Public engagement event discussion - questions for organisations to consider to support VR adoption in palliative care

Questions for organisations to consider about VR adoption	**Description**
What is the purpose of VR?	• What is VR being used for? E.g. Distraction from symptoms, treatment of condition (e.g. phobia), education, entertainment, escapism, information (e.g. hospice tour)
Who is VR for?	• Is VR aimed at patients, caregivers, students, staff and the public etc.? • The technology, infrastructure, software and evaluation need to be tailored appropriately to the target audience.
What evidence is available to support use?	• Is there adequate evidence to support use for the intended target population and purpose? • Is there information about the efficacy, effectiveness and safety?
What is the duration of use and repeatability?	• Is there information on how long the VR should be used for? • Should VR be repeated and if so, how often?
How will VR be evaluated?	• How and when should VR be evaluated? • What outcomes should be used for the evaluation?
How will the equipment be chosen?	• What type of VR equipment is best suited for the intended population and purpose? • Should high immersion (less portable) or low immersion (more portable) systems be used?

What are the infection control issues?	• How will devices be cleaned? • Do the devices conform to organisation's infection control policy?
How is content selected?	• How is content created, stored and selected? • Is this appropriate for the intended population and purpose?
Where will VR sessions be conducted?	• Will this be in a dedicated place in the building (e.g. clinic/therapy room) or at the bedside?
Who is responsible for conducting VR?	• Who is responsible for ensuring appropriate use of VR and conducting assessments? • What is the plan to train and support others to use VR equipment? • Are there plans for clinical staff to use this equipment? If so, how will this be achieved in a practical manner?
What is the plan to maintain the equipment?	• What is the plan to maintain the technology? • How will the devices be charged? • Where will the devices be stored? • How will the devices be accessed? • What is the plan to ensure the equipment is running the latest software? • How long will devices be used? • How/when will the devices be replaced?

Appendix: Staff perspectives on virtual reality

Characteristic	**N (%)**
Setting	
Marie Curie Hospice Liverpool	6 (85.7)
Royal Liverpool Hospital	1 (14.3)
Role	
Doctor	4 (57.1)
Nurse	3 (42.9)
Helpfulness of VR	
1 (Not helpful)	0
2	0
3	0
4	4 (57.1)
5 (Very helpful)	3 (42.9)
Following the end of the project, have you recommended VR for use by your patients?	
Yes	5 (71.4)
No	2 (28.6)

Would you use VR again for patients and relatives	
Yes	7 (100)
No	0 (0)

Appendix: Free text questionnaire responses from health professionals detailing their views about the use of virtual reality in palliative care

What went well?	• It provided an experience of distraction from the ward environment and relaxation in some cases. It allowed patients to experience something they couldn't normally or were now unable to. Simple things we take for granted like a walk in the countryside or a ride on a rollercoaster. Helped with symptoms such as anxiety and breathlessness and provided distraction from pain. It provided meditation and relaxation. • It helped improved some of the patients' psychological wellbeing. • Patients enjoyed a distraction from the confines of their room and the novelty of some really great technology. The total joy on their faces was amazing. • I was involved in and supported its use in a small number of patients. Most at the least felt it was a welcome distraction or escape from the ward environment. In a few clearly it had a beneficial short term effect on symptoms. The kit was relatively straightforward to set up, you could go from decision to do it to having it on in a few minutes. • Patient shared an experience with her teenage daughter that they had not managed to do in reality but wanted to. • Some patients reported huge benefits from the VR project, mainly that the use of VR eased boredom. • Patients were excited to try out new technology (a first for many of them) and found it enjoyable and a welcome distraction from their current situation.

In your own words what didn't go well? In your own words what didn't go well?	• This related to the technology itself. The headset is bulky and the optics sometimes unclear, even with adjustment in real time. Some patients found the device heavy. Occasional dizziness (depending on the video requested). Patients with hearing or visual disturbance are unable to enjoy the experience as much. • For those who are totally bed bound, some of the nuances of 'total immersion' 360 detail could not be accessed and fully enjoyed, due to mobility constraints. Inability to fully turn or in some cases even sit up, marred their experience a little. • The videos/experiences we had access to were quite limited. Some patients, often older didn't seem to find it intuitive and had issues with sound. • They had to do it one at a time as I only had 1 headset • Sometimes the phone wasn't charged for use. • Some found the headset a little cumbersome and had difficulty focussing on the picture
Why have you recommended VR for use by your patients	• During the project we gained such positive feedback from patients, so I knew it generally was a good experience that is out of the norm. It has been particularly useful for patients who have requested a specific experience. For example " I would like to walk in the welsh countryside" or "I would like a tour of anfield football stadium" These insights from patients are usually when asking patients about there spiritual needs i.e. what's important to you? and what do you miss in life ? so VR can be a helpful tool in addressing some of these needs.

	• There is a huge array of scenarios available to download. Some could even tick 'bucket list' items for a patient, a visit to the Grand Canyon or the Northern Lights etc. • Clearly a low harm option in those with troublesome symptoms. In others just a treat or distraction! Needs a clear process for someone to be responsible to lead on it. • some patient finding it relaxing but it gives some a way of achieving something they may not have had a chance to do in reality, which is not the same but can provide a sense of calm and achievement • I'm unsure where the headsets are! • One patient had a wish to visit a particular part of the world again - due to the pandemic this was not possible and so a VR version was found for him
Why would you use VR again for patients/relatives?	• Palliative care embraces the holistic approach of medicine. Supporting families and significant others is a large chunk of our work. VR can help with relaxation and distraction/ meditation, which can be very helpful when supporting loved ones through a challenging time in their lives. • It helped improved some of the patients' psychological wellbeing. Some patients reported that they enjoyed the experience. • All of the above reasons, it really perked up their day and they were keen to tell visitors how much they enjoyed it • The patient and her daughter thought of this a an experience they had shared and that was hugely important to them • It is well tolerated and enjoyable. Patients seem more relaxed after using it

What are the barriers that prevent use of routine VR in palliative care?	• Infection control issues (although we were able to use the devices in a safe way) some patients for example with head and neck cancers were excluded. I think we should offer it as a more routine part of our assessments of patients. • Access to equipment, need to ensure equipment always charged and ready to use. • We need to be careful with infection control, and also take into account patients physical constraints • Familiarity with tech. Funding. • Lack of equipment and staff training, sometimes time restraints may impact on use • Staff being unsure of how to use equipment. • Unfamiliarity of staff with setting it up and using it.
Are there any new ways we could use VR in palliative care?	• I had some experience of using VR in outpatients. This was successful, provided a more enjoyable experience waiting for an appointment and relaxed the patient prior to having sometimes difficult conversations. We could use VR to provide a virtual experience of the hospice. ie as lots of patients are unsure of what a hospice looks like and the work we do, this may ease apprehension. • It potentially could be used as distraction during a procedure for example an ascitic drain.

	• A 360 camera could recorded footage of relatives unable to attend or from different countries where the patient could be transferred into their relatives sitting room and enjoy a message from loved ones • Group activities with patients. • Maybe could be used in therapy sessions