ORIGINAL RESEARCH

# Using 360-degree videos to raise empathy and understanding of dementia

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## ABSTRACT

A lack of dementia understanding can complicate caring for people living with this condition. Caregivers need to connect with people living with dementia on an affective level to better understand their unique needs. 360-degree video is a type of virtual reality that can allow one to experience how it is to live with dementia. This study utilized 360-degree videos filmed from the point of view of people living with dementia to enhance nursing students and practicing nurses' dementia empathy and understanding. Sixteen participants watched two 360-degree videos and participated in individual in-depth interviews. The cathartic powers of these videos made participants feel isolated, misunderstood, or confused, like those living with dementia. This helped participants reflect on the care they have been providing to patients living with dementia and share how they will enhance their care. Experienced nurses shared insights related to priorities and helpful strategies in providing dementia care. Novice nurses gained a better perspective of how it feels to live with dementia. It is recommended to include these videos as part of orientation, in-service training, and in nursing education curricula. Participants also recommended filming other 360-degree videos portraying scenarios with advanced care strategies useful in dementia care.

**Key Words:** Dementia, 360-degree video, Virtual reality, Virtual embodiment, Empathy

## 1. INTRODUCTION

Behavioural and psychological symptoms of dementia (BPSD) such as agitation, aggression, hallucinations, wandering, or anxiety[1] complicate caring for an aging population. BPSD can cause suffering for people with dementia (PwD) and impose care-related stress on caregivers. The care-related stress due to a lack of understanding and familiarity with effective dementia care strategies might lead to the development of assumptions, negative language, or belittlement toward PwD.[2] The barrier to providing optimal dementia care might stem from a lack of experiential learning opportunities presented to caregivers that would illuminate dementia lived experience.[3] To address gaps in dementia education, nursing educators must explore innovative arts-based knowledge translation (ABKT) strategies that would elicit dementia understanding in caregivers, and that would allow them to connect with PwD on levels beyond theoretical concepts. This is because the care provided to PwD requires caregivers to connect with PwD on emotive levels that can foster holistic human-to-human interaction.

Virtual reality (VR) has recently gained a lot of attention in healthcare education research, as it allows users to see, hear, and interact with objects in a virtual world, which stimulates cognitive and affective domains of learning.[4] VR videos, as educational tools, have been shown to cause changes in psychomotor skills,[5] behaviours and attitudes toward dementia,[6] and attitudes toward major depressive or anxiety

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disorders.[7] A 360-degree video is a form of VR that provides an immersive experience and can be simply utilized with a mobile phone[5] with or without the VR headset.[6] A 360-degree VR video as a form of educational tool is an unexplored arts-based knowledge-translation strategy that can be leveraged to illustrate the lived experience of PwD and elicit greater dementia understanding and empathy.[8]

Empathy is a core quality that nurses ought to demonstrate when caring for PwD. Empathy is a dual process affecting our cognitive and affective domains.[4] Cognitively, we attempt to understand someone by stepping into their shoes to see their perspective. Affectively, we respond to someone's emotional state based on how it impacts us. Although technology is often portrayed as a means hindering empathy development, some authors[4] contend that empathy can be learned, enhanced, or hindered in people when they are submerged in certain technological experiences. This presents a window of opportunity in virtual reality research to create learning experiences that foster empathetic patient-centred dementia care.[9]

The 360-degree video is a valuable educational tool that facilitates the embodiment of someone else's perspective.[10] The 360-degree video allows users to exercise agency over the embodiment of someone else's experience in engaging and convincing ways.[10] For instance, care home/facility practitioners perceived VR application on dementia as a convincing, immersive, insightful, and evocative experience that increased their awareness of and reflection on the care they have provided to PwD.[11] In Canada, feedback on the use of two VR videos (one with a man and the other, with a woman) that situated viewers in the point-of-view (POV) experiences of PwD during the transition from the community into a long-term care home was obtained from nursing students[6] and from the public.[8] Findings revealed that these 360-degree videos offered viewers an opportunity to 'live with dementia' vicariously. In another study, medical students and physicians who experienced VR through the POV of PwD enhanced their understanding of vision and hearing problems in patients with dementia and increased their empathy towards PwD.[12] Although these studies support the benefits of using VR to enhance empathy in healthcare providers, some educators assert that what matters more is not the VR's capacity to make learners feel and understand how a patient with a certain condition feels, but its ability to stimulate learners' curiosity to learn about that person.[13] This empathetic curiosity ignited by VR tools can then translate into stronger clinical and patient-centred care by making healthcare providers want to learn about their patients. Building on previous 360-degree video studies,[6,8] we examined the role of 360-degree videos in enhancing understanding of and empathy toward persons living with dementia among undergraduate nursing students and practicing nurses. We also explored applications of the 360-degree videos that include the POV of PwD in supporting nursing students and nurses when navigating, and strengthening their care provision, during the COVID-19 pandemic.

## 2. Materials and methods

### 2.1 Research design

We used a mixed-method design to enhance understanding and empathy toward dementia using 360-degree videos. The videos viewed by participants were developed before COVID-19 and are part of a larger study aiming to strengthen nurses' ability to empathize with and support PwD.[6,8] They were filmed from the POV of two PwD, Nina and Charles, whose roles were played by professional actors. In those videos, our participants observed the world through the eyes and ears of a person living with dementia who was admitted for an overnight assessment in the Dementia Unit of a Rehabilitation Hospital. Through Nina's or Charles' POV, participants saw how a PwD interacted with the nurse, their family members, and other patients as well as wandered through the corridors and rooms of the hospital. The visual and audio distortions also simulated the impact of aging and dementia on perception, speech, and behaviour. On emotive levels, the videos allowed participants to observe and vicariously experience the pattern of racing thought, dealing with the anxiety of being left in an unknown place, feelings of abandonment by family members, confusion/uncertainty as to what will happen next, and the impact of nurse's therapeutic communication to ease the transition.

The rationale for filming the POV of a female (Nina) and a male (Charles) was to portray the biological sex differences in symptoms of dementia and to explore whether study participants will be able to discern these biological differences in Nina and Charles. We used YouTube's 360-degree video viewing method because of the pandemic instead of the Oculus head-mounted device method. The videos were uploaded to YouTube and viewed by participants on the platform with access from a secure link. Participants were asked to watch these videos using their electronic devices and then reflect on their thoughts and feelings using the study questions as a guide.

### 2.2 Sampling procedure

We used the convenience sampling method to recruit 16 participants between September 2021 to February 2022 from the undergraduate and graduate nursing programs at Toronto Metropolitan University. The research team identified potential stakeholders that would cater most to the desired target

population of nursing students and practicing nurses.[14] We collaborated with relevant stakeholder groups to raise awareness of this study by distributing our research flyer on a bi-weekly basis.

### 2.3 Ethical considerations

Institutional Research Ethics Board approval was obtained for this study. The inclusion criteria were: English speaking; age 18+; an alumnus or a student of the MN/BScN Post-Diploma/PHCNP program at the Toronto Metropolitan University; nursing student, Registered Nurse, Registered Practical Nurse, or Nurse Practitioner who has cared for PwD during the COVID-19 pandemic. Those who expressed their interest to participate in this study received an electronic copy of the informed consent, detailing study information and their right to withdraw from the study.

Participants were asked to create a six-digit code to maintain their confidentiality and allow them to withdraw from the study. Sixteen individual interviews were recorded and transcribed verbatim by the online meeting Zoom platform, cross-transcribed for accuracy, de-identified, and stored on a secured institutional Google Drive folder. Only members of the research team had access to this folder. Participants were reimbursed with a $10 electronic gift card for participating in this study.

### 2.4 Measures

Participants received two 360-degree video links (one of a man and the other of a woman who lived with dementia) and questions from the interview guide to facilitate their reflection after which they scheduled and participated in individual semi-structured interviews via Zoom. Each participant interview lasted between 30 and 45 minutes in length. The focus group questionnaire developed in the first stage of this study[6] guided the development of the interview questions for this study.

### 2.5 Analysis

Transcripts were analyzed using the content analysis method.[15] Each verbatim text was examined for significant pieces of data and assigned a code to concisely describe ideas and experiences shared by participants. Those codes that were related (I. e., described similar or different aspects of the same content) were grouped into categories. These categories were examined for a similar underlying meaning and facilitated the emergence of themes.[15] The research team held several meetings to identify and discuss appropriate methods to analyze data and to cross-compare codes and categories. A constant comparison method was used to determine the convergence of coded data across verbatim texts until data saturation was reached.

## 3. FINDINGS

### 3.1 Demographic characteristics

Participant socio-demographic characteristics are described in Table 1.

**Table 1.** Participant Socio-Demographic Characteristics, n = 16

| Sample characteristics | Frequency, (%) |
|---|---|
| Age (years) | |
| 20-29 | 9 (56.3) |
| 30-39 | 3 (18.8) |
| 40-49 | 2 (12.5) |
| 59+ | 2 (12.5) |
| Gender | |
| Male | 2 (12.5) |
| Female | 14 (87.5) |
| Educational background | |
| BScN in progress | 3 (18.8) |
| Completed BScN | 3 (18.8) |
| Master's degree in progress | 5 (31.3) |
| Completed Master's degree | 5 (31.3) |
| Current role/occupation | |
| Nursing student | 1 (6.3) |
| Nursing student and clinical extern | 2 (12.5) |
| Registered Nurse | 8 (50.0) |
| Advanced Practice Nurse | 5 (31.3) |
| Type of dementia experience | |
| Clinical experience | 13 (81.3) |
| Caregiver to a family member living with dementia and clinical experience | 3 (18.8) |
| A device used to watch 360-degree videos | |
| Mobile | 4 (25.0) |
| Tablet | 1 (6.3) |
| Laptop | 7 (43.8) |
| Desktop | 3 (18.8) |
| Used more than one device | 1 (6.3) |
| Viewing modality preference | |
| Prefer 360-degree | 9 (56.3) |
| Prefer regular video | 2 (12.5) |
| Neutral | 5 (31.3) |
| Cybersickness experiences | |
| Yes | 5 (31.3) |
| No | 11 (68.8) |

The sample comprised females and males of varied ages (M = 34) and educational backgrounds. Each participant had an individual degree of dementia understanding and experience in caring for PwD, which stemmed from clinical or personal experiences in caring for PwD. Participants used different personal devices to watch the 360-degree videos, which were based on their preferences and accessibility. The majority of participants did not use a 360-degree modality previously. Participants shared varied opinions on whether they would prefer 360-degree videos over other viewing modalities like regular YouTube videos. One of them believed that the older generation of nurses like themselves

would prefer a regular video filmed from the first-person perspective without the ability to explore their surroundings present in the 360-video viewing experience. Another participant did not like the 360-degree videos because they were unable to see Nina or Charles' faces. Five participants were neutral/indifferent toward 360-degree features as they believed that two-dimensional videos filmed from the POV would still allow viewers to step into PwD's shoes. However, the majority believed that 360-degree POV features greatly contributed to the immersion and presence, which a regular two-dimensional video could not elicit. Three participants did not utilize 360-degree video features: one of them due to cybersickness; two were not aware of or familiar with the embedded features of the 360-degree video modality. Five participants reported symptoms of cybersickness: one reported feeling nauseated; four felt dizzy and/or disoriented.

### 3.2 Results

Four themes emerged from the content and thematic analysis of verbatim texts: 1) dementia knowledge; 2) 360-degree video experiences; 3) 360-degree video usability; 4) 360-degree video applications.

#### 3.2.1 *Theme 1: Dementia knowledge*

This theme comprises knowledge and understanding participants held about dementia before engaging with 360-degree videos. Similar to the previous study,[6] this knowledge resulted from previous clinical experiences or personal experiences of caring for PwD. Participants viewed dementia as a terminal disease that primarily affects cognition and presents itself in a variety of behavioural psychological symptoms.[1] Participants shared that some of the BPSD observed in PwD presented as verbal and/or physical aggression, agitation, wandering, altered perception of time and space, difficulty with understanding what is happening, care provision dependence, and a high degree of vulnerability in new environments. Dementia was also viewed as a condition leading to cognitive changes, gradual memory dysfunction, language impairment, and forgetfulness. These irreversible changes were sought to have a transformational effect on the individual's identity as they blurred the lines between the old and the new self:

> "888CBC: To me, dementia is a state where the individual is...no longer their ordinary self anymore. It's like they've been transformed into a new person, someone that you can't recognize. And for them, it's a scary, scary part of their lives. I just think they're usually confused, they might be hallucinating, they're always frightened and if things are not familiar to them, then it heightens everything, with their confusion too."

#### 3.2.2 *Theme 2: 360-Degree video experiences*

This theme encapsulates findings on participants' evoked feelings and thoughts about PwD after engaging with 360-degree videos. It also presents participants' perceived usability of the 360-degree video as an educational tool.

*1) Dementia Empathy and Understanding*

Participants reported a better understanding of what a PwD is going through and that being put in similar situations would make them feel similar. The process of engaging with 360-degree videos evoked strong feelings in participants. They believed Nina and Charles felt fear, anxiety, helplessness, isolation, loneliness, abandonment, unfamiliarity, confusion, and being misunderstood when navigating new environments or attempting to express their needs. In addition, having two 360-degree videos that show the POV of two different people deepened participants' understanding of the unique dementia presentation. Validation of the enhanced understanding and empathy toward PwD is captured in the following quotes:

> "XYZ123: it [the 360-degree video] helped me understand their perspective as well. Especially with the loss of memory, impairment to that aspect of their life, confusion can be sudden for them, so I think it's um it's good to see this perspective from a healthcare providers' point of view."

> "ZYY321: The video made me reflect on how scared and lonely they must be with all these changes going on, you know, I felt empathy for them. [. . . ] "

> "GAB909: [...] I definitely empathize with it, I found a lot of the. . . reflections I've had/I've made previously with working with dementia patients and it [the video] kind of resembled a lot of those feelings that I had in the sense that like being at war with their brain and trying to recall things but being unable to, and then that leads to frustration which leads to a lack of expression, which then could lead to them lashing out."

Empathizing with Nina and Charles' feelings fostered participants' reflection on the care they have provided to PwD in real life. Although the cathartic powers of the videos allowed participants to connect with and better understand Nina and Charles emotionally, one participant still expressed difficulty with understanding dementia due to its complex idiosyncratic manifestations:

> "QWE603: um...in a way I understand why they're there, why they would exhibit anxiousness or fearfulness. But understanding dementia as a whole, like how it really affects someone, is still, I would say, still a hard concept to grasp. You know, you can read the science behind everything but still interacting with someone with dementia is still... especially when it's so different between all these residents I worked with - is still something hard for me to completely understand about them. Like I can't, I can't sit there and predict how they're going to act throughout the day, you always have to be on the tip of your toes. But for sure the emotional side from the videos made me understand it better, you know, just like how to deal with it and how to approach it. It's always different, it's always not something I'll totally understand."

*2) Reflections and Gained Insights*

All participants found the 360-degree videos made them think about and reflect on the care they provided to PwD. Participants with more experience caring for PwD reported the videos reinforced and cemented their previous knowledge about dementia care provision. Nursing students and new graduate nurses shared that these videos were paramount to understanding the rationales behind dementia care strategies and contextual factors affecting dementia presentation and care. This allowed novice care providers to think about ways to strengthen their dementia care.

Participants agreed that watching 360-degree videos was an insightful experience. One participant shared their realization of the intentionality behind PwD's behaviours that are commonly misunderstood or frowned upon (i.e., agitation, refusal of care). Another participant realized that individuals continue to remain in their thoughts and feelings of fear, anxiety, or loneliness even after the care is provided and no one is interacting with them during that time. This fostered reflections on dementia care provided during COVID-19 and the accompanying isolating environment imposed on PwD. Participants frequently shared that integrating social activities that stimulate the senses increases the quality of life and slows down the progression of dementia. They also reflected that it is the role of the care provider to ensure a high quality of life for someone who has dementia:

> "BER021: [...] a lot of the time if they're just in their own thoughts, just watching TV, sitting in the room - they're not thriving, they are not living. In long-term care you're in their home, so you want to make their home the most welcoming and the most supportive as possible. If they're just sitting in a room the whole day watching TV - they're not living, they're just sitting on the couch. So you want to help them still live their lives and motivate them to do activities, rather than just leave them to be alone all the time."

A frequent reflection shared by experienced providers was that over time, contextual factors like many years of experience, task-oriented nursing, and nursing shortages desensitize care providers. As such, the 360-degree videos were perceived as a good glimpse into or a reminder of how it might feel to be living with dementia and how it might feel to be gradually losing your own identity. As a result, participants shared that going forward they will take extra time to explain or repeat to PwD what they are going to do and also will be gentle and stay calm with PwD. The majority of the participants also shared that, despite time constraints, staff shortages, and a high provider-to-patient ratio, they will try to connect with a PwD on a humane level more frequently instead of being highly task-oriented, illustrated in this quote: "BER021: most nurses have time constraints, but you can try to make some time to just talk to them after you finish all your tasks so that they feel like they're not alone because I feel like being alone with your thoughts it's probably the worst thing."

#### 3.2.3 *Theme 3: 360-degree video usability*

This theme describes participants' perceptions of being immersed in the 360-degree videos embodying PwD experiences.

*1) Immersion*

Observing the worlds from Nina and Charles' POV via the 360-degree videos created a greater effect on participants than that of being in the position of spectators. These videos transformed passive spectators into active participants by making them feel as though they were the ones who felt scared or isolated. Based on these evoked feelings participants frequently inferred that similar feelings might be experienced by PwD. When asked to reflect on how the 360-degree videos facilitated dementia embodiment and a sense of being immersed, participants shared:

> "AMK820: It was interesting to be behind, to be in that person's head. I thought that was new for me, to be able to see them. Because usually, you see a movie and you watch the person go through, and you are brought into the scene, because you're the observer, but when you are the active participant, you are the person who's

doing it, you're in their head. That was really neat."

"TOR123: [...] if you look at just the traditional video focusing on one area or showing one area, you don't capture what's happening with the individual. Because the video was moving around in different directions, it was depicting how and what an individual who is lost or confused would feel. That was what the video was showing to me. And also, when the person was calm and cooperative, the video was not moving around that much, it was, It was solid. And then, once an individual would come agitated and lost - the video was moving. To me, it kind of showed that this is potentially how a person with dementia would feel."

The experiences of dementia embodiment illustrated through the videos allowed participants to better relate to Nina or Charles, as captured in this quote: "TOR123: the uncertainty, like going to a place that you don't know, and feeling lost, and the video was moving around, and what's going on in your brain. It's something that a normal individual wouldn't experience or wouldn't see it that way.". Although participants did not directly interact with the staff or family members in the videos, observing the POV of Nina or Charles and their interactions with others is what contributed to the perception of presence. This opportunity to indirectly experience the perspective of the PwD was often described by participants as a strong factor that fostered their engagement with the 360-degree videos and motivated their curiosity to continue to watch the videos:

"M3C1Y7: [...] it's more engaging than if I just sat there watching it on TV. . . Maybe I wouldn't have the same thing. . . I think it really allows you to put yourself in their shoes. Where you wouldn't, you know, you would if you're just watching actors playing the part. you would just be, you would just be thinking about that one person's experience, you wouldn't be thinking about - Wow! What if this was me? you know."

Interestingly, a few participants shared how the inability to see the faces of the PwD, as the videos were filmed from the first-person POV, impeded their engagement with the videos. For instance: "TAM101: [...] I found it difficult, and I don't know if it was supposed to be designed this way, but I couldn't see any faces, I couldn't see any identifying features, so that wasn't very engaging if that makes sense.". Another interesting finding revealed the opposing views on how participants perceived the blurry effect in the videos. Certain scenes throughout the video were faded or blurry and the audio was also often distorted. These distortions were created intentionally using special effects that mimicked a perceptual deficit experienced by PwD. Half of the participants believed these video distortions were utilized intentionally and attributed them to the impaired senses experienced by PwD (i.e., vision, hearing, perception), which helped them better understand how PwD might perceive, understand, and navigate their surroundings. The quote below captured how immersion and blurriness aspects of the 360-degree videos demonstrated complex, non-linear interpretations of dementia lived experiences:

"ZYY321: It made me feel...as though the time is really kind of spacing out on you, Like you're not, you know, it's. . . What you're experiencing is not so linear, everything is kind of mixed all together in one moment and you're transitioning from one moment to another."

"JOF621: [...] It was a really interesting experience, especially the fact that things were foggy or blurry. They really added to the visual effects of everything. It just makes you feel disoriented, like exactly like you wrote there, I felt disoriented. And kind of confused at what was happening."

However, a few participants attributed the blurry effect to poor video quality and not Nina or Charles' perceptual deficits illustrated through the POV, which hindered their watching experiences: "888CBC: [...] I guess the video quality was blurry. So, if it was a little more clear it might have been more enjoyable.". Another aspect that interfered with the perceived presence and engagement components was how the videos were filmed. One participant shared that they disliked seeing a go-pro camera on actors playing Nina and Charles and suggested involving film students to help with setting up multi-angle cameras to enhance the video quality and immersion. However, such a recommendation goes beyond the scope of improving the 360-degree videos used in this study as it suggests using a different type of technology to embody the lived experience of PwD.

*2) Cybersickness*

Cybersickness refers to the experiences of dizziness, headache, nausea, disorientation, or discomfort when engaging with extended reality technologies.[16, 17] This phenomenon might occur more frequently even when watching 360-degree videos during the pandemic since work and education are conducted remotely, raising the chance of screen

fatigue.[18] The majority of the participants in this study did not report any signs or symptoms of cybersickness. Three participants reported feeling slightly dizzy and one reported feeling dizzy and disoriented. Only one of them attributed these experiences to the intermittent blurriness in the video. One of the participants had to turn their camera off and just listened to the dialogue in the video with their eyes closed due to the perceived rapid motion of the objects in the videos. Even though this participant was not able to see what Nina or Charles saw, they still shared that even the audio-sensory stimulation in the videos coupled with previous work experience fostered engagement with the content:

> "MAP456: [...] so like I said, I listened. After I stopped watching I listened, so I just closed my eyes and I listened to the actual video. And I found that that was for me, at least, it was just as effective because I could, having already seen a few minutes of the video, I knew what the room looks like, I knew what the environment looks like. So I was able to envision it myself, so I was able to see like, I could hear the, you know, healthcare practitioner talk to me. So just hearing it and having my own experiences with working in long-term care - I knew what that looked like. And I could envision it myself, so I thought it was very engaging."

*3) Opportunities for 360-degree video improvement*

The majority of the participants suggested expanding the content of the 360-degree videos. Many wished to watch a scenario focused on de-escalation strategies and approaches to carrying out toileting/bathing. One participant suggested filming a scenario that illustrates a social activity. This participant explained that it is hard to motivate or convince a person with dementia to attend the activity and so it would be useful to show what strategies can enhance that motivation and prevent aggression/agitation (BER021).

Another frequently shared suggestion was to embed text boxes summarizing key concepts and rationale for nursing interventions. Both novice care providers and experienced nurses suggested filming the "what should be done" versus "what should not be done" videos to highlight effective care strategies to benefit those with minimal knowledge about dementia care strategies.

> "XYZ123: [...] I mean maybe from the nurse's perspective you can maybe deconstruct how the nurse approaches the situation. I mean I'm thinking like in a nursing school, so you view the situation and then you come up with how maybe the nurse interacted: was it a good experience? Was it a bad experience? Is this how it should/shouldn't be? Something like that."

Participants liked receiving interview questions ahead of time. Many of them shared that looking at these questions while they were watching the 360-videos guided the reflexive process and allowed them to focus on specific aspects of the video (i.e., how they feel about PwD; how they understand PwD; how the videos contribute to enhancing their care, etc.). A few participants suggested working on improving the quality of the 360-degree videos due to a split opinion around the intentional distortion effects within the videos. Also, one participant suggested filming 360-degree videos from a different angle to improve engagement and watching experience (i.e., peripheral view instead of a bird's eye view).

A few participants suggested filming a 360-degree video in the context of the COVID-19 pandemic. That is, the actors should be wearing full Personal Protective Equipment and provided care should align with the COVID-19 guidelines, captured by the participant in the quote below, as this would highlight additional layers of challenges imposed by COVID-19 on dementia care provision.

> "ZYY321: I would say, if you wanted a more realistic experience, like implying COVID, you could get everyone acting in full PPE and saying to the [patient] like "Oh, you can't go there, you can't put that, we've got to keep a distance", and then you know they'd be like "why are you wearing a mask?", pull that down. Because some people like to listen, and some people need to be able to recognize faces. That whole experience with them has been pretty depressing for them and then, when they walk around in the hallway and have to wear a mask, they can't keep it on."

Finally, many participants suggested including a short explanation of what a 360-degree is and how to use it considering a few users did not realize that they could move the camera around if they used a mobile device, or that they could use the toggles if they used a desktop/laptop, which impeded the degree of immersion.

#### 3.2.4 *Theme 4: 360-degree video applications*

This theme presents how 360-degree videos allowed participants to reflect on their practical strategies used to provide care to PwD. Participants outlined the priorities of care for PwD in the context of the COVID-19 pandemic. Participants also shared their impressions on how 360-degree videos impacted their care provision.

*1) Practice*

The majority of participants had directly cared for PwD during the COVID-19 pandemic and reported additional challenges with providing care that was triggering a higher incidence of BPSD. As shared by participants, PwD are very vulnerable to changes in their surroundings. The constant changes in policies, guidelines and mandates further disrupted PwD quality of life. One of the biggest reported problems was a lack of social interactions and requirements to remain in isolation. The effect of social isolation was exacerbated by staff having to wear PPE, which made the process of establishing rapport between PwD and the nurse significantly more challenging. These disruptions to the normal routine negatively affected the trajectory of dementia progression. The majority of participants shared that increased nurse-to-patient ratios diminish the quality of care they could provide. They felt rushed with their patients and this rushing was sensed by PwD. Many participants shared how being task-oriented and unintentional rushing often results in responsive behaviours and BPSD (i.e., agitation, wandering) in PwD. For instance: "M3C1Y7: I find when you go fast - you get the person agitated and their behaviours increase and then you're giving them PRNs, which I don't really like to do as often. Because if you can manage it without the extra drugs, then it's beneficial for everyone."

The majority of participants agreed that the 360-degree videos strengthened their ability to care for PwD by fostering reflection on their praxis and seeding a desire to change certain practices to enhance the quality of care. The quote below captures an epiphany that allowed participants to better understand and react to the confusion expressed by a patient with dementia:

> "TOR123: [...] So sometimes you would just say: "oh that patient is confused". But what does confused mean? Why are they confused? And now, when you looked at that video you're like "oh my God, they're confused because they are in an unfamiliar environment, they don't know this place, this is how they would be seeing around very, very lost, and things are moving" ... it's like putting yourself in their shoes."

> "JOF621: I would say that, as a nurse, usually when I'm dealing with a dementia patient - I'm usually like task-oriented or I'm very busy trying to get things done and just some of the things that the patient or the actor was saying really hit hard because I've heard it before and so just seeing how I could kind of feel emotions watching the video, just the way it was done very well and then just seeing the nurse's role - I really was able to feel with that patient and I feel like I'm definitely going to change my nursing practice based on these videos."

After watching the 360-degree videos, most participants believed it is important to do the right task at the right time and consider doing the care at a different time when a PwD is refusing the care:

> "6425NH: [...] often we're doing things to patients at times when they don't want it to be done and that creates a battle. We're trying to bathe someone at eight o'clock in the morning who for their whole life has typically been bathed at 5 pm. Then it becomes a battle, and it is just a waste of time. I think with dementia patients sometimes it's about: "Is now the right time?", and if it isn't - you have to observe their behaviour and their reaction, and maybe consider approaching at a different time. Unfortunately, the reality of our practice settings is that it isn't always possible."

Participants recommended making PwD's rooms home-like and hanging, in their rooms, photos of family members, large clocks, or other posters with cues to guide care to reinforce familiarity with the environment. Such strategy was especially helpful to remind PwD about wearing their masks during a pandemic:

> "YY321: You know, sometimes, if you have posters and visual cues about what this is, what the mask is and that everybody needs to be consistent with it, then they kind of feel that this has to be done. You're not going to get like 100compliance, but just try your best to reinforce that they're taking it down, tell them why it's necessary."

There were a few participants who did not think the videos changed the way they would interact with or care for PwD because they believed they already had a good prior understanding of the concepts the videos were trying to convey. However, most of those participants agreed that the videos were a good reminder of the care challenges faced by PwD. For many, these videos cemented their pre-acquired knowledge and validated the care they have been providing to PwD in different settings. The videos also allowed these participants to be more meaningful and intentional about the care they provide to PwD.

> "TAM101: I don't think it really changed my perspective at all. I think it and maybe

> helped...like most of my background is in the community where people are in their own environments, and I think it was a helpful reminder just how...how when people with dementia or some level of cognitive impairment go into an environment that they're unfamiliar with - just how distressing it can be. So, I did find that it was a helpful reminder watching those videos."

*2) Education*

Participants believed that the illustration of care and PwD experiences mainly can help those who do not have a lot of clinical experiences in caring for PwD, as the videos embody dementia experiences and show the intentionality behind PwD behaviours (RMA110). One participant also shared how these videos portray the transition from home to LTC, which is difficult to comprehend for nursing students, as they did not witness the transition and adjustments to the new home, but only the fragments of PwD lives via their LTC school placements (DAX902).

When asked who would benefit from watching these videos, participants frequently mentioned nursing students, healthcare aids, and novice nurses. In addition, some expanded the list to physicians and other interprofessional team members who interact with PwD. A few participants believed that everybody who could potentially interact with PwD should watch these videos, including porters, medical secretaries, and family members. One participant shared that adding these videos to the dementia care plan and integrating them into the professional development training sessions would significantly improve the quality of care provided to PwD, as it illustrates different ways a healthcare provider interacts with PwD and fosters reflexivity among the viewers (XYZ123).

## 4. DISCUSSION

Findings reveal that 360-degree videos filmed from the POV of PwD enhance understanding of and empathy toward PwD among nursing students and practicing nurses. To our knowledge, 360-degree videos filmed from the POV of PwD used in this multiphase research are the first 360 videos that contextualized dementia care at a Rehabilitation Assessment Overnight stay.[6] Although participants viewed PwD holistically even before engaging with 360-degree videos, the dementia embodiment experience achieved via the 360-degree videos provided participants with a unique opportunity to describe and witness dementia-related biological and psychosocial changes: their self-image, social interactions, and agency. These findings are in line with other research that used VR as an educational intervention to enhance dementia care among caregivers.[11] The emotional and visceral responses shared by participants demonstrate the power of the 360-degree video modality to facilitate the viewer's perceived sense of presence and foster reflexivity, which is in line with other findings.[19] Being able to step into another person's shoes via 360-degree videos might be a significant step or start toward breaking the wall of stigma and previously reported misunderstanding and miscommunication between care providers and PwD.[3]

Although participants in this study did not utilize the VR headsets to view 360-degree videos due to COVID-19 safety precautions, their shared reflections indicated that watching the same 360-degree video content via the YouTube platform still created a sense of dementia embodiment and presence. However, one commonly reported limitation was the challenge of focusing on specific objects or people. The intermittent shakiness of the camera or the camera focusing on the ceiling was attributed to the poor quality of the video. This is a common challenge with using 360-degree video, which others[20] solved with focus assistance techniques that guide viewers' focus on targets and attention. It is worth investigating whether implementing such a strategy can subsequently reduce the chance of cybersickness among viewers.

Telling a story via 360-degree video can be challenging because viewers have the freedom and agency to focus their attention on what interests them most.[21] Using both visual and audio cues to guide the viewers might address this challenge. This suggestion corresponds to the recommendations shared by participants in this study, that is, to include text boxes or embed voice strategies within the videos to guide viewers toward achieving the learning goals of watching these videos. Other limitations that could have impacted the immersion into Nina and Charles' experiences were the inability to see and assess facial expressions and body language. Finally, although many participants shared that learning how to use and navigate the 360-degree videos was a fairly intuitive process that does not require pre-acquired technical knowledge, our findings reveal that it is still helpful to provide users with a prior explanation of how to use this innovative educational technology.

### 4.1 Limitations and considerations

When interpreting the findings of this study, the following should be considered. The participants recruited for the study work with or have worked with PwD, meaning nurses and nursing students who have not worked with PwD could have significantly different experiences when viewing the videos. This could stem from differences in the nursing education programs in which participants are enrolled, types of settings in which participants engaged/cared for PwD (i.e.,

acute versus long-term care settings), and overall years of experience working with PwD, which could influence the interpretation and understanding of dementia and PwD. To better understand the 360-degree videos' utility in educating nurses and nursing students on dementia who have not, but could, have interactions with PwD, future research could aim to understand the impact and experience of the videos on nursing students or nurses who have not worked with PwD. Another limitation of the study is related to the influence of informal caregiving experiences for family members living with dementia. Three participants were caring for or had cared for a family member who lived with dementia. Their experiences of caregiving likely influenced their understanding of dementia in nuanced ways, but how their experiences influence their practice and understanding was not explored or how they may have interpreted the videos differently than those who had only had formal caregiving experiences as a nurse/nursing placement student. Finally, the side effects and difficulty with using the technology reported by a few participants may be mitigated by facilitating practice sessions to orient participants with the technology prior to data collection to lessen the negative effects associated with watching these videos via YouTube or via Virtual Reality head mounted device. Additionally, during these sessions it should be explained that distortions in audio and visual quality are intentional and meant to further immerse viewers in the experience aging and dementia. Future research could look at how informal caregivers' experiences, not just for PwD, influence their professional caregiving practices and how they utilize/interpret content from educational tools such as the 360-degree videos used for this study. Considering research of 360-degree viewing technology and other forms of immersive VR simulations in nursing education is nascent, there is limited data on the direct comparison between 360-degree YouTube video and VR simulation with the use of a head-mounted device. Readers are encouraged to refer to previous studies conducted with nursing students and general public which utilized 360-degree modality with a VR head mounted device.[6,8] Future studies could also explore the effects on participants' learning and empathetic communication by directly comparing the 360-degree technology with the use of Immersive Virtual Reality head-mounted devices to the 360-degree YouTube video employed in this study without using head mounted device.

### 4.2 Implications

This research has implications for education and practice as it has the potential to approximate the lack of experiential learning opportunities for students and healthcare providers in learning about and providing optimal care to PwD. The majority of participants in this study believed 360-degree videos to be an effective educational intervention to complement the theoretical knowledge of dementia learned in their studies. Currently, nursing students receive fragmented knowledge on the experience of living with dementia and what it is like to transition from the old to a new self while transferring to a completely new environment. These videos reflect the continuity of care by allowing viewers to witness PwD during the initial assessment. Integrating these videos into nursing curricula can in turn lead to more knowledgeable, understanding, and empathetic care providers. The 360-degree videos can also be added to the professional development days, orientation training, and in-services for staff as they contribute to and solidify understanding and empathy towards what it feels like to live with neurological symptoms such as dementia. Last, although the insights, emotions, and thoughts evoked by these videos were specific to PwD, they can be transferred to any setting or patient population and influence practice change.

## 5. Conclusion

To conclude, this study contributed to the research on the effectiveness of using arts-based approaches and VR in nursing education. The 360-degree videos filmed from a POV of a person living with dementia demonstrated merit in enhancing nursing students' and practicing nurses' empathy and understanding of PwD and their unique care needs. Further, 360-degree videos should be filmed to demonstrate to learners advanced nursing strategies for dementia care.

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## Authors contributions

Dr. Kristine Newman and Arthur Wang were responsible for the study design and establishing community engagement and collaboration. Halyna Yurkiv was responsible for data collection and initial manuscript drafting, later revised by Dr. Kristine Newman and Arthur Wang. All authors read and approved the final manuscript.

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## CONFLICTS OF INTEREST DISCLOSURE

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## DATA SHARING STATEMENT

No additional data are available.

## OPEN ACCESS



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