

**A pilot study to explore healthcare professionals' perception of using a
web-based reminiscence therapy to support dementia care during the
COVID-19 pandemic and beyond**

by

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A thesis submitted to the School of Graduate and Postdoctoral Studies in partial
fulfillment of the requirements for the degree of

Master of Health Sciences in Community, Public and Population Health

Faculty of Health Sciences

University of Ontario Institute of Technology (Ontario Tech University)

Oshawa, Ontario, Canada

May 2022

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THESIS EXAMINATION INFORMATION

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Master of Health Sciences in Community, Public and Population Health

Thesis title: A pilot study to explore healthcare professionals' perception of using a web-based reminiscence therapy to support dementia care during the COVID-19 pandemic and beyond
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An oral defense of this thesis took place on *25th April 2022* in front of the following examining committee:

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The above committee determined that the thesis is acceptable in form and content and that a satisfactory knowledge of the field covered by the thesis was demonstrated by the candidate during an oral examination. A signed copy of the Certificate of Approval is available from the School of Graduate and Postdoctoral Studies.

ABSTRACT

Introduction: Reminiscence therapy (RT) is the most common non-pharmacological treatment for dementia care. The therapy stimulates the senses to evoke memories and may reduce Behavioral and Psychological Symptoms of Dementia (BPSD). Digital RT, such as web-based (WBRT), has the potential to support dementia care and reduce the caregiving burden. This study aimed to explore HCPs' perceptions of utilizing WBRT in institutionalized settings to manage BPSD during the COVID-19.

Method: A qualitative phenomenological descriptive study was adopted and guided by Graham's Knowledge to Action framework. An online training on the use of WBRT was conducted, followed by qualitative interviews with HCPs.

Results: Four major themes were identified on the potential use of WBRT in dementia care, including usability and efficacy, impact on caregiving, capability of reducing BPSD, and feasibility during COVID-19 social distancing.

Conclusion: The knowledge generated from this study will guide the future application of WBRT to support dementia care in diverse healthcare settings.

Keywords: Dementia; Reminiscence therapy; Digital; Web-based; COVID-19

AUTHOR'S DECLARATION

I hereby declare that this thesis consists of original work of which I have authored. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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The research work in this thesis that was performed in compliance with the regulations of Ontario Tech's Research Ethics Board under **REB Certificate number 19-011-B**.

Rabia Akhter

STATEMENT OF CONTRIBUTIONS

I hereby certify that I am the sole author of this thesis and that no part of this thesis has been published or submitted for publication. I have used standard referencing practices to acknowledge ideas, research techniques, or other materials that belong to others. Furthermore, I hereby certify that I am the sole source of the creative works and/or inventive knowledge described in this thesis.

DEDICATION

To all the healthcare workers around the world for their tremendous support and care during COVID-19 pandemic.

ACKNOWLEDGEMENTS

I want to express my sincere gratitude to my Supervisor Dr. Winnie Sun. Thank you very much for believing in me and accepting me as a graduate student. You have supported me and guided me in every step of my thesis. Thank you for giving me the opportunity to work as a Research Assistant. This involvement benefitted me immensely as I got exposure to various research work before the initiation of my thesis.

A sincere thank you to my supervisory committee member Dr. Manon Lemonde and Dr. Alvaro Quevedo, for your tremendous support. I am extremely grateful for your time and appreciate your valuable guidance and suggestions for my thesis.

To my husband, Rashid, thank you for your continuous support and encouragement. Thank you for understanding my busy schedule and helping me with household chores so that I can concentrate on my study. To my parents, thank you for trusting my ability and your words of motivation.

I want to extend special thanks to the healthcare professionals of Ontario Shores center for mental health sciences for participation in my study. In particular, I would like to thank Sheri Horsburgh, Clinical manager of Ontario shores, and her team for their assistance with the recruitment process.

Furthermore, Thank you to my dear God for everything. I am grateful because I know you have given me the strength and such wonderful mentors and families who supported and accompanied me throughout my master's journey.

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LIST OF ABBREVIATIONS

PWD	Persons with Dementia
HCP	Healthcare professionals
BPSD	Behavioral and psychological symptoms of dementia
WB	Web-based
App	Application
RT	Reminiscence therapy
WBRT	Web-based reminiscence therapy
KT	Knowledge translation
GDU	Geriatric Dementia Unit
GTU	Geriatric Transitional Unit
ICT	Information and Communication technology
VR	Virtual Reality

Chapter 1: INTRODUCTION

According to Statistics Canada, in 2021, about 19% of Canadians were age 65+, and 3% of the total population was aged > 85 years. The proportion of the aging population could account for between 21% and 30% by 2068 (Statistics Canada, 2019). As people age, their overall health, physical and mental functioning, nutritional requirements, and social situation change. Increased life expectancy has led to a rise in the number of older adults who sometimes struggle to live independently as they are prone to disabilities and physical limitations (Rimmer, 1994). There is also high prevalence of cognitive impairment among elderly population which is associated with functional disability and require the need for institutionalized care (Graham,et al, 1997). Dementia is one of the leading causes of cognitive impairment among older adult populations. It is so common that, every three seconds, someone somewhere in the world develops dementia (Patterson, 2018). Around 50 million people in the world are suffering from dementia, and nearly 10 million new cases get diagnosed every year (World Health Organization, 2019). Moreover, the number of Canadians with dementia is also increasing. As of today, around half a million Canadians are living with dementia, and about 25,000 new cases are diagnosed every year. It is expected that the number will rise to 937,000, an increase of 66 percent by 2031 (Alzheimer's Society Canada, 2020).

Dementia and its impact

Defining dementia:

Dementia is a chronic syndrome of the mental process which could be caused by brain diseases or injury (National Institute of Health, 2017). According to the Diagnostic and

Statistical Manual, Edition 5 (DSM-5), dementia is classified as a neurocognitive disorder (American Psychiatric Association, 2013). It is characterized by memory loss, difficulties in speaking, thinking or problem-solving ability, handling complex tasks, and challenges with planning and organizing (Tarawneh & Holtzman, 2012). Thus, the concerning issue in dementia is the inability to carry out everyday activities as a consequence of diminished cognitive (thinking) ability.

Dementia is not a single disease but is rather a general term for impaired ability to think, remember or make decisions that hampers day-to-day activities. There are different types of dementia such as,- Alzheimer's disease, Lewy Body disease, vascular dementia (due to strokes), frontotemporal dementia, Creutzfeldt-Jakob disease, head trauma, Parkinson's disease, and Huntington's disease. However, Alzheimer's disease is the most common type and contributes 60-70% of all dementia cases. (Alzheimer's Society Canada, 2018). Dementia is progressive in nature, and it gradually gets worse as more brain cells get destroyed, eventually leading to death.

Impact of dementia:

Dementia has a wide range of physical, psychological, economic, and social effects (World Health Organization, 2019). Persons with dementia (PWD) suffer physically due to insomnia, loss of appetite and difficulty in swallowing. They often struggle socially as they interact with their spouses, partners and families. PWDs may start forgetting people's name which can be frustrating to both patient and families. Dementia also impacts economically as PWD need institutionalized care and/or assistance from caregiver which could be an added financial burden.

PWDs experience changes in their emotional responses. For instance, PWD feels less control over their behaviors. They may be irritated, agitated, and prone to rapid mood fluctuations or overreactions to situations. They may also react emotionally to certain circumstances (by becoming upset and tearful), as their ability to think clearly about the situation declines (Cohen-Mansfield, Cohen, Golander, & Heinik, 2016), which subsequently negatively impacts the autonomy of older adults to perform complex everyday activities.

PWDs generally require high levels of care by both formal (healthcare professionals) and informal caregivers (family members or loved ones) (Feast, Moniz-Cook, Stoner, Charlesworth, & Orrell, 2016). The literature indicates that presence of behavioral and psychological symptoms of dementia (BPSD) causes caregiver distress, especially due to patient's agitation and aggression (Song & Oh, 2015). Musich et al. report that caring for PWD is more stressful than caring for older adults with other disabilities (Musich, Wang, Kraemer, Hawkins, & Wicker, 2017). Studies also report that caregiving responsibilities negatively affects psychological and physical health of caregivers (Kim, Chang, Rose, & Kim, 2012). Caregivers also report physical/verbal abuse by PWDs with exhibiting BPSD, which leads to challenging interaction between them and subsequently impacts the quality of care received by PWD (Kales et al., 2015). Without the appropriate support from a caregiver, PWD's quality of life may be compromised. They might not be able to interact socially or could struggle with daily activities. Such lack of care would necessitate the need for hospitalization, leading to potential financial and economic implications. The estimated costs of dementia management in Canada are \$10.4 billion per year as of 2016, and it is predicted to rise by 60 percent to \$16.6 billion by 2031 (Alzheimer's Society Canada, 2020).

Behavioral and Psychological Symptoms of Dementia:

BPSDs are among the most serious complications of dementia. The clinical presentation of BPSD includes anxiety, depression, agitation (a state of anxiety), restlessness, aggression (hostile or violent behaviors), hallucination (unreal perceptions), delusions (false beliefs), apathy (lack of initiative), sleep disturbances, and wandering (moving aimlessly from place to place) (Manabe & Kosaka, 2017).

Around 80% of PWDs will develop BPSD throughout their disease progression (Abraha et al., 2017). The risk factors for BPSD are multiple, including biological, psychological, and environmental factors (Cerejeira et al., 2012). Among the biological factors, brain changes and effect of psychotropic medications are the most common. For instance, medications might differ from person to person. The use of medications (such as cholinesterase inhibitors) may influence the structure of the apathy factor (i.e., reduced motivational drive) (Aalten et al., 2008). Also, PWD suffering from multiple morbidities are at greater risk for developing BPSD. Psychopathological symptoms may influence the BPSD symptoms, particularly anxiety, agitation, and irritability (Prado-Jean et al., 2010). Furthermore, physical and psychosocial environment such as living arrangements (e.g., crowded housing) and caregivers' attitude towards challenging behaviors causes sensory overstimulation, thus contributing to the range of BPSD symptoms, with the most common ones being aggression and wandering (Kunik et al., 2010).

BPSD not only causes individual suffering but also gives rise to caregiver burden. BPSD are the most distressing consequences of dementia, which is challenging to manage and cause great suffering to PWDs and their formal and informal caregivers (Tible, Riese, Savaskan, & Von Gunten, 2017). Furthermore, there is no permanent treatment that prevents BPSD or delays its progression. An effective treatment is urgently needed in the

prevention and management of BPSD for PWDs and to reduce the burdens of their caregivers.

Management of BPSD:

BPSD management is highly challenging for the healthcare professionals (HCPs) due to its complex etiopathogenesis of the signs and symptoms. Though there are no permanent solutions available to manage BPSD and its progressive nature, several pharmacological and non-pharmacological treatment are proven to be effective to some extent (Tible et al., 2017).

The common pharmacological treatment used in BPSD management are antipsychotics, anti-depressants, anti-dementia, and sedatives (Masopust, Protopopová, Vališ, Pavelek, & Klímová., 2018). However, the pharmacological treatment results in several negative side-effects such as anxiety, distress, aggression, lethargy, cognitive decline, and increased risk of falls (Marum., 2017). As a result, non-pharmacologic treatments (NPT) are beginning to emerge as an alternative strategy and are effective in reducing the intensity of BPSD, as well as enhancing the quality of life among PWDs and their caregivers.

The literature highlights the different types of NPTs, such as exercises and motor rehabilitation, sensory practices, cognitive rehabilitation, occupational therapy, reminiscence therapy and psychological therapy (Oliveira et al., 2015). Reminiscence therapy (RT) has been getting attention over the years as a NPT option for BPSD (Park, Lee, Yang, & Song, 2019; Shigihara, Hoshi, Shinada, Okada, & Kamada, 2020,

Zucchella et al, 2018). It involves conversation with the patient about events and experiences from their past with the intention to stimulate mental ability and evoke memories. This in turn develop positive feelings among PWD while reducing their anxiety and stress.

Newer technologies, including information and communication technologies (ICTs), Virtual Reality (VR), gaming, and telemedicine, are also considered non-pharmacological options for treating dementia. Evidence favoring NPTs are still in their preliminary phases and researchers have suggested extensive testing or research before reaching conclusions on their effectiveness (Zucchella et al., 2018). Most experts recommend NPT as the first-line approach in the treatment of dementia since they are the safer alternatives in regard to their potential adverse side effects. NPTs are intended to reduce BPSD, improve/maintain functional capacity, and manage emotional disorders associated with dementia (Scales, Zimmerman, & Miller ,2018). Music, simulated presence, sensory stimulation, and validation therapies are examples of NPT that helped reduce BPSD. Studies also found that cognitive stimulation and RT improved cognitive function (Meyer & O'Keefe, 2018), depressive symptoms, and quality of life in PWD (Lök, Bademli, & Selçuk-Tosun, 2019). A study of simple home-based technology that incorporated RT provided by HCPs in the form of simulated presence was effective in treating BPSD (Lim & Ong, 2018). However, this result is based on a single case study.

Reminiscence therapy:

RT is a form of NPT that improve dementia. It is a treatment that stimulates all the senses — sight, sound, touch, smell, and taste —to aid PWDs to remember events, people, and places from their past lives (Woods et al., 2018). Using a client-centered care approach,

therapy usually includes activities, such as conversation or more advanced clinical treatments, to facilitate recollection of memories from the distant past into present awareness. The therapy could consist of storytelling about past events facilitated by aids such as photos, music, videos, and past objects (Woods et al., 2018). A systematic review and meta-analysis by Park et al. (2019) revealed that RT improves depression and could substitute antipsychotics among PWDs. RT could improve cognition, mood, communication, and the quality of life for PWDs, which could be improved by mitigating the negative impact of BPSD (Park et al., 2019).

Though, there are no formal categorization of RT, based on use of technology they can be divided into either traditional RT or digital RT. In traditional RT, HCPs interact with PWD through conversations or physical aids like photos or objects from the patient's past. Digital RT follow a similar philosophy, however, the mode of RT delivery uses some form of digital aspect, like use of tablet, smartphone, VR device, etc. Although traditional RT slows the progression of dementia, it has its limitations that need to be addressed. The effects of traditional RT are inconsistent and differ considerably across settings and modalities (Woods et al., 2018). The way RT therapy is delivered is dependent on training and expertise of the HCPIt also depends on the resources available at the institution. Also, HCPs need to deliver and repeat the dialogue several times to remind the PWDs about their past with the traditional RT. There is a lot of repetition involved in the process. Besides, items required for memory triggers must be collected and prepared before each session, which could be time-consuming and could be seen as a challenging caregiving responsibility. (Uchiya, Nishimura, Hirano, & Sakurai, 2018).

Technology and RT:

Literature suggests using Information and Communication Technology (ICT) to improve the HCPs convenience and usability of RT (also known as digital RT), which is considered to be a feasible method to facilitate RT using webcams, photos, music, videos, and computer graphics. Technology has significant potential to advance traditional RT. Some of these benefits are access to abundant and engaging reminiscence multimedia materials and PWD's opportunity to engage in social interactions and take ownership of the conversation (Lazar, Thompson, & Demiris,2014). The technology might prevent PWD to be limited to hard-copy photos or videos supplied by their family members. For instance, unlimited multimedia contents (pictures and videos of beaches, scenery, locations, etc.) can be accessed from the internet that can be selected or customized according to the needs of PWD. These contents could trigger emotions in PWD and help HCPs to achieve a better understanding of their patients. The PWD might also get excited with the wide range of contents to better engage them in conversations with the HCPs A systematic review conducted to evaluate the effects of technology-based cognitive training for PWDs also found supporting evidence in favor of use of technology for cognitive improvement. The major types of technologies, such as computerized software, gaming consoles, tablets, and virtual reality (VR), have been shown to address the limitations of traditional RT and were found to improve the cognitive functions of PWDs, as well as to improve the caregiving experiences (Ge, Zhu, Wu, & McConnell, 2018). It is still unclear as to how uses of such computer-based technology improve cognitive functions, however studies suggest that it could be due to usability and motivational factors related to real time interactions and feedback received from the training (Man, Chung, & Lee,2012). Since these computer-based technologies have shown to improve

cognitive functions and memory in PWD, they can potentially be used for RT.

Furthermore, technology has a significant role in reducing social isolation as it can virtually connect PWDs with their family members. For instance, PWDs who are isolated in institutionalized settings such as long-term care (LTC) can be provided with technology and social contacts, which could potentially decrease their sense of loneliness, depression and self-isolation (Fakoya, McCorry & Donnelly, 2020). The opportunity to access technology by PWDs in LTC and other facilities would enable them to maintain a social connection with their loved ones.

Among the computer-based solutions, VR has been showing potential as a mode for RT delivery. VR is a new branch of ICT, which has been suggested for use in some areas of neuropsychology. Through this technology, one's surroundings can be seamlessly replaced by a virtual world of their choosing. Emerging VR applications today seem to address the cognitive training of dementia patients, help with concentrating on navigation, and improves cognitive functionality (Jekel et al., 2015). Literature indicates that VR has shown a positive impact in advancing the treatment of RT, even in persons with physical and cognitive impairment (Liao, Tseng, Lin, Wang, & Hsu, 2020). VR may have the potential to enhance dementia care, especially during the COVID-19 pandemic. Despite its potential benefits, the effects of VR, such as motion sickness, which can cause during or after VR use can be a concerning issue in an institutionalized setting (Bohil, Alicea, & Biocca., 2011). Besides, the access of VR gear and the associated software can be comparatively expensive and may not be accessible by older adult populations in institutionalized settings. Additionally, maintaining hygiene of the gear after each use could be an added burden for the HCPs during the pandemic.

RT through mobile applications (app) can be also a suitable option, as the app does not require specialized equipment or space. Users can upload personal materials into mobile devices and view them as often as they want to stimulate their past memories. The users can adjust the screen size of their mobile devices (phones and tablets), potentially increasing users' attention and convenience (Punchoojit & Hongwarittorn, 2017).

Even though RT through a mobile app can be beneficial, there are a few limitations too. Mobile apps are built for a specific platform, such as iPhone and Android. They need to be downloaded and installed through an app store. On the other hand, a web-based (WB) application could be accessed via an internet browser and is flexible to any device for viewing. It doesn't usually require downloading and installation of additional application or software. The literature suggests that WB applications has shown a positive impact in advancing the treatment of RT, even in persons with physical and cognitive impairment (Rehm et al., 2016). The pictures and videos help stimulate the memory of the PWD and can It improve their mood and cognitive ability

Similarly, using a USB (Universal Serial Bus) stick to store personal reminiscence materials, such as pictures, videos, and music could be an economical alternative. They are affordable and provide flexibility for use with private or shared devices (laptop/television). Using a personal USB stick might eliminate the need to remember a username/password but carrying and storing the device could be an issue for both PWD and their caregivers (Lazar et al., 2014). However, it has limitation like the possibility of losing it, which can be overcome by using cloud- based storage services.

The advantages of technology to support PWD and their HCPs is increasingly being recognized. However, they are far from being widely implemented and practiced in

healthcare settings. The literature suggests several reasons behind this challenge. One reason is that the development of technological solutions is slow in keeping pace with the needs of PWD (Smith, 2015). Another reason is that the development and design of technology are mostly aimed at PWD rather than their caregivers who use them (Astell, 2015). Also, along with PWD, their family members or loved ones and HCPs who provide dementia care are unfamiliar with how to best utilize the technology and do not have adequate knowledge and experience to implement it. There is an urgent need to develop new technological approaches to enhance the delivery of dementia care, especially during the COVID-19 pandemic, where traditional caregiving methods can no longer be feasible.

COVID-19 pandemic and dementia care

At the present time, the COVID-19 pandemic is the most serious public health issues affecting globally. The number of COVID -19 cases is significantly high in Canada and is increasing on a daily basis. Older adults are found to be the most vulnerable population during this pandemic. In Canada, most older adults tend to live alone or with their spouse, either at home or in institutional or communal settings, such as in LTC facilities. It is reported that most of the residents of LTC facilities are 80 years old, and 70% of them are suffering from dementia (Hsu et al., 2020).

It has been identified from several studies that dementia care in LTC facilities has been severely affected (Akhter, R., & Sun, W. 2022; Lai et al. 2020). The effect of pandemic significantly impacts the lives of PWD, family members, healthcare professionals, and the healthcare system as a whole. The social distancing protocol among residents of LTC also

increases the caregiving burden of HCPs. The high-risk working environment subsequently results in the shortage of staff at these LTCs (Flint, Bingham, & Iaboni.,2020). HCPs have to conduct one-on-one session with the LTC residents for care delivery and social recreational activities while taking extra precaution (such as frequent hand washing, wearing Personal Protective Equipment) and maintaining physical distancing.

Social distancing is a significant preventive measure to limit the spread of COVID-19 (Centers for Disease Control and Prevention, 2020) and keep oneself safe from getting infected. To prevent contamination, authorities have banned or limited visits from family member in high-risk settings such as LTC facilities. Various on-site group activities and social interactions have also been abandoned. Such physical distancing measures have in turn given rise to social distancing. For PWDs who are already dealing with memory loss, reduced problem-solving abilities, and other cognitive impairments, social distancing is an added burden. PWD faces difficulties in understanding safeguard procedures and following public health information. Also, due to their cognitive impairment, they lack the knowledge regarding the use of telecommunication, which is their only social platform to stay connected with others. They are, therefore at higher risk of experiencing loneliness and social isolation (Wang, 2020). Loneliness can result in poor health outcomes, including depression, anxiety, and worsening of dementia symptoms (Sundström, Adolfsson, Nordin, & Adolfsson.,2020). With visitor ban in LTCs, the older adults lost face-to-face, in-person contact with their family members, which seems to have adversely affected their social connection. Additionally, group activities in LTC are

not permitted to comply with social distancing protocol, which might have led to increased risks of social isolation for LTC residents.

Potential benefits of web-based reminiscence therapy:

As we notice from earlier discussion, COVID-19 pandemic has made it a challenge for both formal and informal caregivers to care for PWDs during social distancing.

The **Web-Based Reminiscence Therapy** (WBRT) is a form of digital RT application where HCPs can use any device with a web-browser to provide RT. The application allows HCPs to create separate accounts for each PWD in their care and upload media contents such as pictures, audio, and videos in order to access them during RT sessions. This feature of the app highlights the client centered care options of RT as individualized content of PWD can be uploaded based on their personal life and preferences. The web-app also has a generic photo album feature which can be used to deliver group RT among the PWD with similar interest. For instance, if a group of PWD like beaches, a generic picture of beaches can be displayed to them during the RT sessions.

Studies specific to WBRT are limited, however digital RT provided through android app has been reported to decrease the sense of loneliness, reduce the levels of anxiety and isolation, and improve the overall quality of life for PWD. WB application have been found to increase interaction between PWD and caregivers (Ferm, Ekström Larsson, & Samuelsson, 2021). Moreover, it has been suggested that digital RT may positively affect the cognitive behavior and emotional wellbeing of PWDs (Moon & Park, 2020). A recent systematic review has also advocated for the use of technology for cognitive

improvement (Ge, Zhu, Wu, & McConnell, 2018). Since WBRT is a form of digital RT, it has the potential to be used as an alternative form of RT in the institutionalized settings.

As discussed earlier, there are limited number of studies that have investigated technology-based RT in the treatment of dementia. To our knowledge there are no studies that specifically explore at WB application as an option for RT in managing BPSD. There is also a lack of emphasis on utilizing qualitative methodology to explore the perceptions of HCPs in the utilization of WBRT to support dementia care. Further research needs to be conducted to examine the perceptions of HCPs about the benefits of WBRT application and to what extent this technology could potentially improve the HCPs capacity to manage BPSD, especially during the challenges of the COVID-19 pandemic.

Study purpose

The purpose of this research study is to conduct a qualitative phenomenological descriptive study to explore the perceptions of HCPs about the use of WBRT in institutionalized settings to manage BPSD during the COVID-19 pandemic.

The overarching research question is:

"What are HCPs perceptions of using WB applications s to support RT for the management of BPSD in the institutionalized setting during the COVID-19 pandemic and beyond?"

Significance of the study

The anticipated outcome of this study is to gather the perceptions and experiences of HCPs in the institutionalized settings regarding the impact of WBRT on reducing PWD's levels of BPSD. Currently, around 261,000 PWDs live within the publicly funded long-term care settings in Canada (Canadian Institute for Health Information, 2020). Thus, a rising number of PWDs in long-term care facilities have increased caregiving burden for HCPs. Caring for patients along with maintaining COVID-19 protocol makes it challenging for HCPs. It increases their stress, anxiety and work burden. WBRT if found to be feasible could reduce caregiving burden. Once HCPs get trained with the interface, they can upload RT contents into the application thereby reducing the need to arrange RT materials before each session. They can even display the RT materials in presentation mode in any device and arrange for PWD to view them independently. This could reduce continuous monitoring/assistance from the HCPs.

Overall, knowledge and evidence generated from this study will explore if WBRT can be considered as a feasible solution for reducing care giving burden amidst the current pandemic. Based on HCPs perception stakeholders can examine whether it would be worth implementing WBRT in diverse healthcare settings such as long-term care, retirement home, or ambulatory care, or rehabilitation settings.

Chapter 2: LITERATURE REVIEW

The literature review was conducted to explore the potential of WBRT on managing BPSD, and its impact on HCPs responsibilities during the COVID-19 pandemic and beyond. Methods for the review, including the inclusion and exclusion criteria, search strategy, and data analysis methods, along with the findings, are presented below.

Literature review method

Inclusion and exclusion: A search was conducted to determine the existing literature surrounding digital technology used for RT, more particularly web-based applications. It was observed from the investigation that WB applications for RT have not been explored. It was also identified that most of the studies were experimenting with digital technologies as RT, however studies on WB ones, directed specifically towards PWD, were limited. Researcher tried to capture as much literature as possible being mindful of the fact that digital technologies change greatly over a decade. Thus, to provide the latest and updated information about the application articles published in the last twelve years (2010-2021) were given priority. Articles that were published until May 2021 and in English were included in the search. This literature search aimed to identify studies that were based on the use of WB applications for dementia care, the impact of WB as RT in the management of BPSD, and the potential use of this technology in promoting caregiver's ability in managing dementia care during the pandemic.

Keywords for the search term included 'Older Adults, 'Dementia, 'Behavioural and Psychological Symptoms of Dementia', 'Reminiscence Therapy,' 'Technology', 'Digital' 'Web-based, and 'COVID-19' in various combinations. 'Elderly,' 'Geriatrics,' 'Seniors'

were also used within the keyword set to describe older adults. For Reminiscence therapy, 'Reminiscence,' 'Memory ' OR 'Cognition' and for Dementia and Behavioural and Psychological Symptoms of Dementia', 'Alzheimer's Disease' 'Cognitive Impairment', 'Cognitive Limitation' or 'BPSD' were used interchangeably. To define 'Web-based – 'Website' and Webpage' were included. Furthermore, for COVID-19- 'Novel Coronavirus' or 'SARS COV-2' were included. The target population involved PWD, their informal caregivers (family members and loved ones), and formal caregivers (healthcare professionals such as nurses, personal support workers, and other healthcare staff).

Articles that discussed the impact of mental health disorders other than dementia were excluded as dementia was the main focus of this literature review. Also, articles that used WB/ technology exclusively for assessment, diagnosis, and training of dementia care were also excluded from the review.

Search strategies and data analysis: An extensive literature search was conducted using the Ontario Tech University library databases, which included PubMed electronic databases and Willey library. Regardless of the study design, potential papers that addressed the keywords and search terms with relevance to the research topic were retrieved. A total of 5527 research papers were identified from the keyword search of both databases, which consisted of peer-reviewed articles, book chapters, eBooks/books, and thesis/ dissertations. Researchers did not limit to any publication type. The search strategies were similar for all databases using consistent inclusion and exclusion criteria. Government reports, websites, working papers and other grey literatures on this research topic were searched.

Abstracts relevant to the research topic were identified, and then full-text papers were retrieved for further review. In the absence of the abstract, full-text papers were retrieved and reviewed for prospective inclusion. The reference section of each article was also reviewed for potential articles.

A total of 13 articles were finally selected from the pool of articles that met the screening criteria. These articles were then reviewed repeatedly to identify contents relevant to the phenomenon of interest. The analysis was thematic in nature, where similar contents from various articles were clustered and meaningfully interpreted. The final set of articles were analyzed to identify the key findings, common themes, and research gap to evaluate the role of WBRT in supporting dementia care and its impact on HCPs experiences with the delivery of RT. The list of reviewed articles with data extraction details is presented in *Appendix A*.

Literature review themes:

The literature review identified four major themes that illustrates the impact of technology in dementia care. The four themes are- 1. Positive impact on memory and cognition 2. Reduction of behavioral and psychological symptoms 3. Perceived Acceptability and Satisfaction 4. Positive relationship with carers.

1. Positive impact on memory and cognition:

Studies report that web-based application in general has positive impacts on memory and cognition for PWD. From the literature review it was found that four studies evaluated the possibility of using a web app to advance RT and examined the impact on PWD's

memory and cognition (Astell et al.; 2018, Manav and Simsek, 2019; Rehm et al., 2016; Upton et al. 2011). Upton et al. (2011) conducted a study and interviewed PWD (n=10) and healthcare staff (n=11) using a multimethod approach. For the study, WB applications (through iPad) were utilized for both individual and group activities with PWD. The study explored staff and residents' experience of touchscreen technology. Using a combination of topic guided interviews, focus groups, case studies and field observations the study suggested the feasibility of use of WBRT and its potential in improving quality of life among PWD (Upton et al., 2011). Another study by Astell, Smith, Potter, and Preston-Jones (2018) examined the effect of CIRCA (computer interactive reminiscence and conversation aid) on cognition for PWD. A group session was conducted among PWD (n=161) in the day program and homecare settings using CIRCA, and a survey was conducted at 3-time intervals (pre, post, and 3-month follow-up). CIRCA is an interactive multimedia application delivered through a touchscreen interface in which generic photographs, videos, and music have been used to support communication between PWD and their caregivers. Besides, a CIRCA-WB was developed as a WB application with similar interaction and navigation content to that of CIRCA. In the CIRCA-WB, photographs, music, and video could be uploaded to the centralized database, and the contents can be stored in a streaming service. The study reported that CIRCA group sessions could improve cognition, memory, and quality of life among PWD (Astell et al., 2018). Alternatively, Manav and Simsek (2019) conducted a randomized controlled experimental study among PWD in a nursing home using internet-based videos (YouTube) to assess the effects of RT. A total of 32 people participated in this study, 16 individuals were in the intervention group and 16 individuals were in the control group. The data were collected using a Personal Information Form, the

Standardized Mini-Mental State Examination (SMMSE) test, and the Apathy Rating Scale (ARS) Self-assessment Form. The individuals in the intervention group received group RT involving internet-based videos for 60 minutes once a week for 3 months. During this period, 25 to 30 minutes of unstructured interviews were carried out with individuals in the control group. The study findings suggested that the group-based RT with YouTube videos improved cognitive functions among its users (Manav & Simsek, 2019). Similarly, a case study by Rehm et al. (2016) was conducted to identify the impact of WB applications (such as Youtube, google map, internet searches of the content/topics based on PWD preferences) among older adults (n=2) in residential aged care facilities on RT and PWD's cognition. Both cases show significant improvement in cognitive behavior and reminiscence experiences (Rehm et al., 2016). To summarize, a wide range of WB application were attempted to be used as RT. Though evidence in favor of any particular application was limited, all the studies did indicate that WBRT has the potential to improve memory and cognition among PWD.

2. Reduction of behavioral and psychological symptoms:

WBRT application has a positive influence on PWD's behavioral and psychological symptoms. Moon and Park (2020) conducted a pilot randomized controlled study among PWD (n=49) of daycare centers to compare the impact of both traditional (story telling) and digital RT. An android app with personalized content was developed to examine the effect of digital RT. The study found that depression symptoms decreased, and patient engagement increased among PWD in the digital RT group compared to those in the storytelling group. (Moon & Park, 2020).

Similarly, Gilson, Dodds, Kaur, Potteiger, and Ford (2019) conducted a pilot intervention study among PWD (n=1089) at institutionalized and home settings. They used a tablet computer with various applications for providing digital RT based on patients' personal preferences. More specifically, the study used tablet computer (iPad) with apps such as YouTube, google, etc., or used a personalized music or video playlist to provide RT. Patient mood was analyzed using eight-point mood visual analog scale, which show improvement in the mood of PWD after the session (Gilson et al., 2019).

Moreover, Davison et al. (2016) performed a mixed-method study among PWD (n=11) in nursing home settings. They developed a memory box by preloading digitalized materials using a personal computer as part of the RT. The study results suggest a reduction in depression, anxiety, and agitation after the RT session (Davison et al., 2016). Besides, Tyack, Camic, Heron, and Hulbert (2017) conducted a mixed-method study with PWD (n=12) and their informal caregiver (n=12). These researchers noticed an improvement in PWD's mood and behaviors and increased positive interaction among PWD and their caregivers (Tyack et al., 2017). Rehm et al. (2016) case study also suggested that WB applications could reduce depression and anxiety, along with adjustment and adaptation in residential aged care facilities (Rehm et al., 2016). The results were congruent with Manav and Simsek's (2019) RCT where they identified that internet-based videos (YouTube) could reduce the levels of apathy among PWD (Manav & Simsek, 2019).

Overall, digital RTs, have been found to reduce BPSD such as depression, anxiety, agitation, and apathy among PWDs.

3. Perceived acceptability and satisfaction:

WBRT has been found to be widely accepted and tolerated with satisfaction among PWD. From the literature review, it has been identified that studies have examined the feasibility of this technology among PWD.

Sarne-Fleischmann, Tractinsky, Dwolatzky, and Rief (2011) lead a pilot study with PWD (n=5) to explore the WB application's acceptability for utilization in a psychogeriatric institute. They used a personalized WB application with the support of a caregiver for two interactive sessions. Participants' behavior was observed and videotaped during the session and followed up by interviews with patients and their caregivers. The study result revealed higher satisfaction related to WB application among PWD and their willingness to use the application on an ongoing basis. The study also indicated preferences for using personalized content over generic material (Sarneck-Fleischmann et al., 2011), however, it does not specify the reasons for preference of one type of content over other. A pilot study by O'Rourke, Tobin, O'Callaghan, Sowman, and Collins (2011) with PWD (n=6) explored the feasibility of using a website such as YouTube in a group RT session. They found that group RT increased engagement and personalized RT had a positive impact on mood and communication. (O'Rourke et al., 2011).

Alternatively, Davison et al. (2016) study identified that adopting WB application to facilitate RT among PWD, their family members, and nursing home staff was feasible and acceptable among them. Along with the feasibility of the WB application, Rehm et al. (2016) demonstrated that this type of application could assist with establishing a therapeutic alliance, improving therapeutic engagement, and accommodating the needs of vulnerable populations. Overall, many studies have examined the feasibility and

acceptability of using WB application as RT. They found that PWD and their caregivers are generally satisfied with the session and have noticed improvement in moods among patients. It was found to be acceptable both in group and individual session, however one study in particular noticed that personalized content had better result than generic content.

4. Positive relationship with carers:

Several studies were conducted to explore the relationship between PWD and their carers by using the WB application. For instance, Laird et al. (2018) performed a Quasi-experimental study with PWD (n=30) and their carers (n=30) to evaluate PWD wellbeing, mutuality (level of closeness between PWD and their CG), and also the quality of relationship following the utilization of app-based RT. These authors developed a personalized iPad/ tablet app named InspireD to aid home-based RT. The app enabled PWD and their care givers to select and store personalized contents (photos, videos) so that they can be easily accessed for reminiscence. The study found statistically significant increases in mutuality and positive relationship among PWD and their carers (Laird et al., 2018).

Samuelsson and Ekstrom (2019) conducted a study in residential homes with PWD (n=6) and their formal caregiver (n=3). They developed two WB applications: CIRCUS (Computer Interactive Reminiscence and Communication University of Sheffield) - using personalized content and CIRCA (Computer Interactive and Communication Aid) -using generalized content. They used pictures, videos, and music as media content. The study identified that both WB applications could improve communications and interactions between PWD and their HCP. (Samuelsson & Ekström, 2019). Similarly, Damianakis, Crete-Nishihata, Smith, Baecker, and Marziali (2010) performed a qualitative

observational study with PWD (n=12) and their family members (n=12) in a geriatric care institution. They created personalized multimedia biographies based on PWD and their family member's feedback. The study results illustrated an improvement in communication and social interaction among PWD and their family members (Damianakis et al., 2010). Regardless of differences in study designs and number of participants, both Gilson et al. (2019) and Sarne -Fleischmann et al. (2019) revealed the possibilities of improving patient-staff relations using the web-based application in both institutional and home care settings.

It is apparent from the literature that various forms of WB application have been tested to provide RT among PWDs. The above illustrated studies acknowledge the significance of such application in dementia care. They highlight the positive influence of WB application on PWD's emotional health and how they improve the relationship between PWDs and their carers. However, the technology used in the studies varied. Each had their own distinct app with specific features. Some worked with generic content, other worked with both generic and personalized contents. The place of RT delivery also varied. One study was in residential care, other in institutionalized setting. Hence it is difficult to generalize the findings and determine if a customized web-based application would result in similar outcomes.

Overall, based on this literature review, it is apparent that WB application has been tested for RT in several studies. The above studies acknowledge the significance of such technologies in dementia care, highlight the positive influence of technology on PWD's emotional health and its impact on the relationship of PWD and their carer. The technology used in these studies is varied and unable to specify the effects of web apps in

dementia care. Besides, the subsequent studies did not solely examine the efficacy of web apps during the COVID-19 pandemic. Also, there was a lack of studies that solely examine HCPs experiences and caregiving responsibilities using web app technology among PWD. Hence, the efficacy of web app as RT in dementia care and its impact on HCPs caregiving responsibility during the pandemic require specific assessment and research.

Knowledge gap

The literature review was intended to focus on the application of WB technology. But, due to a limited number of studies in the field of WB application, the scope of the review was expanded. Of the 13 articles reviewed, only 5 of them discussed the use of WB applications, which signifies that the technology is yet to be further explored to advance dementia care. It is also noted that, WB applications were seldom discussed in grey literature highlighting that this area of research is yet to be prioritized.

Most of the studies (n=6) identified from our literature review were pilot studies, with wide range of study design ranging from case studies to randomized controlled trials.

These studies examine use of WB application however the RT application varied across the studies. Each study developed their customized set of device or app that differed in application and functionality making it difficult to reach conclusions.

Due to the variations in technology use across these studies, it is difficult to identify the effectiveness of WB applications in the management of dementia care. The outcomes of these studies also varied significantly, with each of them exploring different outcomes related to its effects on cognition, emotional status, or user experiences.

Furthermore, COVID-19 being a recent public health problem, and managing PWD with BPSD during the social distancing is a newly emerging problem. Therefore, COVID-19 literature in this field is minimal. A limited amount of literature was found, which examined the importance of technology use during the social distancing of COVID-19 (Pachana et. al., 2020, Padala, 2020). To our knowledge, there has been no studies that solely studied the application of WB as RT to manage BPSD during the COVID-19 pandemic.

Solid evidence is not currently available related to the impact of WBRT on the management of BPSD, nor sufficient qualitative research studies were identified. The studies that have been identified during the literature searches were mostly case study, randomized controlled trials, quantitative, and mixed-method studies. There is a noticeable knowledge gap in this field, especially in terms of WBRT application as a treatment option for managing BPSD. Further research needs to be carried out to explore formal caregivers' perceptions on the utilization of WB application among vulnerable groups and to what extent this type of technology could increase the caregiver's ability to manage BPSD. The reason behind including only formal caregivers such as HCPs in the research study was that the focus of current research to obtain an in-depth understanding of HCPs' perception about the utilization of this new innovation in an institutionalized setting, and they will be the primary users of the technology and will be responsible for conducting dementia care through WBRT.

Furthermore, to our knowledge, no research has been found that has yet investigated the potential of a WB application for RT in managing BPSD in the institutionalized settings during social distancing of COVID-19. One reason for this gap might be the lack of digital resources and literacy among HCPs in institutionalized settings (MacLure &

Stewart, 2018). Another reason could be that since COVID-19 is a recent public health issues studies exploring potential solutions for dementia management during pandemic are yet to be published.

Overall, it is identified from the literature search that there is a knowledge gap in relation to the qualitative exploration of this phenomenon of interest. The adoption of qualitative methods is crucial to determine the feasibility of such novel technology and explore the HCPs perceptions about their usefulness in enhancing dementia care. Besides, the qualitative approach aids participants to describe their experiences more profoundly. Thus, further research needs to be conducted to examine the perceptions of HCPs about the potentials of WBRT and how it augments the caregiver's ability in managing BPSD, particularly when complying with social distancing amid the COVID-19 pandemic.

Chapter 3: METHODOLOGY

Chapter overview

This chapter provides a comprehensive description of the methodology of the proposed research, including research study design, study recruitment, sampling process, data collection methods, and data analysis process. The background and role of the researcher and the ethical considerations of the research study are also presented in this chapter.

Research design

Research method

This research study adopted a qualitative descriptive phenomenological approach (Christensen, Welch, & Barr, 2017). Qualitative methods aim at achieving a greater understanding of people's experiences, beliefs, behavior, attitudes, and interactions (Maxwell, 2008). It allows the participants to share their experiences and perceptions about the phenomenon. Husserl (1931) proposed the philosophical underpinning of phenomenology. Phenomenology focuses on the commonality of the lived experiences of the participants (Wojnar & Swanson, 2007). Moreover, descriptive phenomenology refers to the description of the phenomenon being studied (Christensen et al., 2017), discouraging any deduction or induction to find meaning.

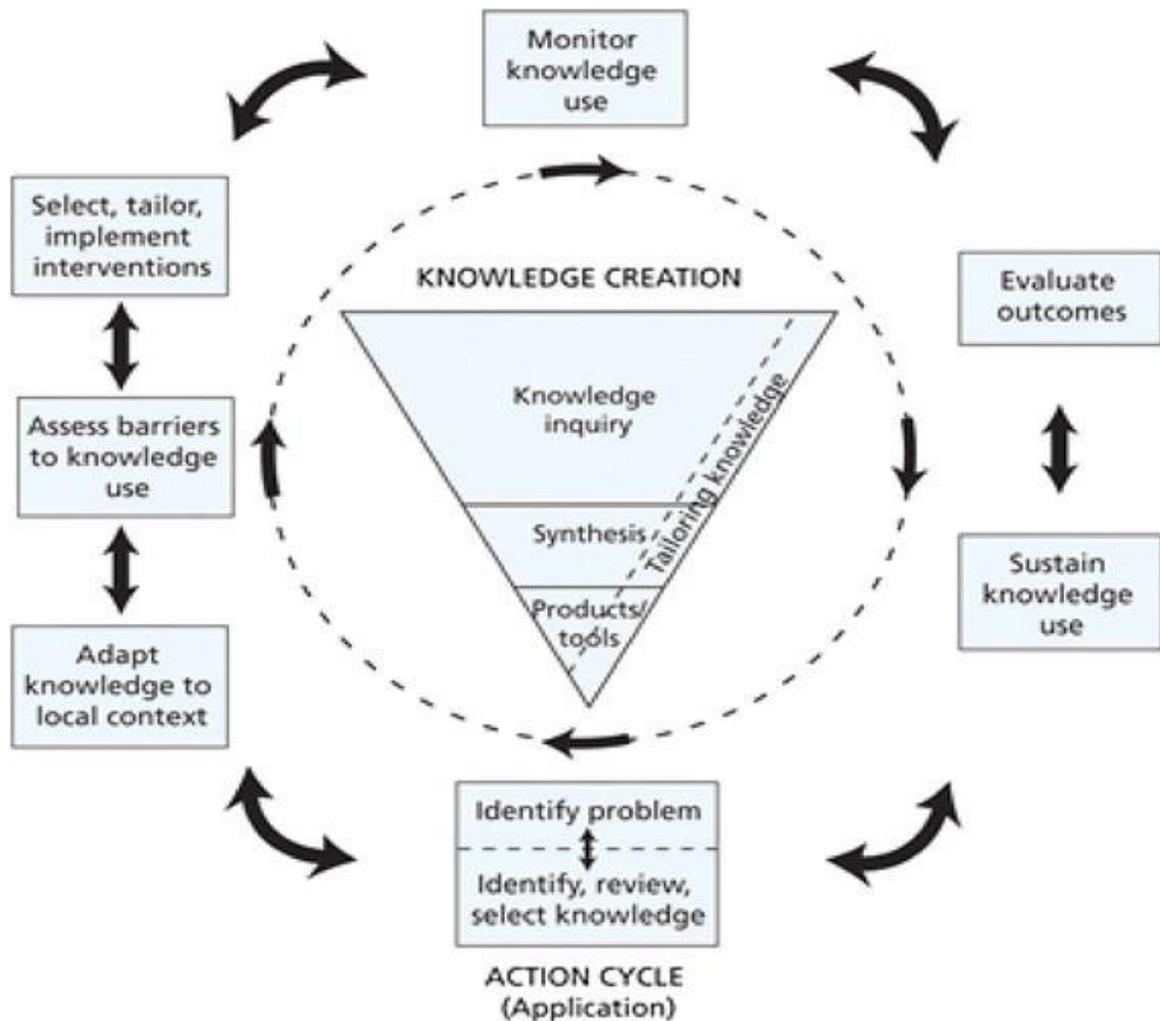
As the purpose of the study was to explore the lived experiences of HCPs regarding the applications of using WBRT for the management of BPSD, a qualitative descriptive phenomenological approach was suitable to address the study purpose.

Research framework

The key purpose of this research was to explore the HCPs experiences and perceptions about its use for BPSD management. To achieve this purpose, the research study was

grounded in the knowledge to action (KTA) framework, proposed in 2006 by Graham et al. (2006). The KTA framework is adopted by CDKTN (Canadian Dementia Knowledge Translation Network) for transferring research into practice. It suggests that research findings can be transferred to practice by breaking them down into two concepts: knowledge creation and the action cycle. KTA is an iterative process, which means one can move between the knowledge creation and the action cycle phase.

Figure 1.1 : Knowledge to Action (KTA) Framework, Source: Graham et al., 2006-
<https://pubmed.ncbi.nlm.nih.gov/16557505/>



Overview of the Knowledge to Action framework

Knowledge creation illustrates the production and synthesis of knowledge. It is represented as a central funnel in Figure 1.1. Knowledge creation consists of knowledge inquiry, knowledge synthesis, and the creation of knowledge tools/ products. Knowledge inquiry refers to first-generation knowledge that is obtained from primary studies (e.g. randomized controlled trials); knowledge synthesis defines as second generation knowledge that includes synthesizing and interpreting results from individual research studies and also within the context of the global evidence. Knowledge synthesis can be obtained from systematic reviews, scoping reviews, and meta-analysis. The third-generation knowledge defines as knowledge tools/ products is the most refined form of knowledge. It refers to synthesized knowledge in a user-friendly format and it aids health professionals and patients in making evidence-based decisions (e.g., Clinical practice guidelines, decision aids, and videos).

Action cycle represents activities needed for the effective implementation of knowledge. The seven steps of the cycle are not sequential and can start at any phase. The first phase involves the identification of the problem and comparing the current practice in order to determine the knowledge gap that needs to be addressed. The gap can be identified by using administrative data, questionnaires or chart audits. The second phase is to adapt the knowledge to local context by considering the population, political climate, and available resources. The next step is to identify potential barriers and facilitators to implement the knowledge. Surveys, interviews, focus groups, observations and review of records are the methods that can be used for assessing barriers and facilitators. Planning and executing

the knowledge translation (KT) strategy to promote awareness and use of the knowledge is the next step.

Knowledge use should be monitored by tracking and recording uptake of the KT strategy. In this phase, reassessing the barriers and facilitators can be done to determine if uptake or adoption has been low. The next step is to evaluate the impact of knowledge used to determine whether the KT strategies have achieved the desired outcomes. Sustaining the use of the knowledge is the final step, which refers to the maintenance of the KT strategies to sustain the desired outcomes. Factors in sustaining knowledge use can include perceived benefits and risk, leadership, resources, policy integration, and politics.

Application of KTA framework

In this research study, the KTA framework was used to describe the application of WB to advance RT for PWD (Knowledge creation/KC) and explore the potential impact of this technology on reducing BPSD (Action cycle/AC).

An extensive literature review has been conducted and research question has been developed following the literature review, which represented the production and synthesis of knowledge (*Knowledge inquiry and synthesis-KC*) and aid in identifying the problem and 'knowledge to action gap' (*Identification, review, and selection of knowledge-AC*). An educational and online training about the utilization of web-based applications were provided to HCPs of institutionalized settings (*Adapting the knowledge to local context-AC*).

Detail information about the research study and appropriate training of WBRT were provided to HCPs. Any discomfort during online training by HCPs was identified before

and over the course of conducting the study to ensure that there were minimal barriers to knowledge use (*Assess barriers/facilitators to knowledge use-AC*).

HCPs were provided with one-on-one online training by the researcher (Select, tailor, Implement interventions-AC). Additional information and support about the WBRT were also offered to HCPs on demand through phone or online (*Monitoring of knowledge use*).

To evaluate the impact of the knowledge used to determine if the desired outcome has been achieved (*Evaluation of outcomes-AC*), a qualitative interview with the HCPs post-training was conducted where their perceptions about the application were explored, and thematic analysis of identified key themes were generated. Feedback from the HCPs about the application of WBRT and their perceptions about the utilization of this technology in facilitating dementia care will help provide insight into the sustainability of knowledge use in the future. (*Sustain knowledge use-A/C*).

Finally, a master's thesis was developed by the graduate student researcher; in addition, a journal will be published to present synthesized knowledge based on the evidence generated from the research study (*Knowledge Tools and products-KC*). Overall, the purpose of choosing the KTA framework was to outline the process of generating new knowledge about the potential application of WBRT by HCPs to support the management of BPSD during the social distancing of the COVID -19 pandemic and beyond.

Methodology

Study settings and sample

The study was conducted in the Geriatric Dementia Unit (GDU) and Geriatric Transitional Unit (GTU) in Ontario Shores Center for Mental Health Sciences (Ontario

Shores), Whitby, Ontario. GDU and GTU are an inpatient unit at Ontario Shores that provide specialized care services to PWD dealing with mental health issues and challenging behaviors. An interprofessional healthcare team provides a variety of services, including assessment, diagnosis, management, and transitional care needs of PWD. The target population of this research study was HCPs who provide dementia care. Inclusion criteria consist of HCPs who directly worked with PWD and have experience managing BPSD. HCPs may consist of Registered Nurses (RN) and Registered Practical Nurses (RPN), Recreational Therapists (RT), Occupational Therapists, Behavioural Therapists, and Personal Support Workers (PSW) in the partnered institution. The employment status of HCPs could be Full-time, Part-time, or Casual status. The participants must be over the age of 18 years and capable of providing informed written consent and who can speak and understand English in order to be eligible to participate in this study. HCPs who do not work at GDU and GTU of Ontario shores, have no experience working with PWD, and cannot speak or understand English were excluded from the study. Physicians were excluded as their role in dementia care primarily focuses on prescribing medications rather than delivering RT.

Participant recruitment:

Participant recruitment was supported by assistance from the designated Ontario Shores staff members in the Geriatric Dementia Unit. Participants were made aware of the study by the staff members (recreational therapists/nurse practitioners) using the recruitment flyer (Appendix- B). Furthermore, the researcher reached out to the potential target populations and explained the purpose, procedure, and significance of the research study using a virtual platform during the scheduled staff meetings (Appendix- C1) or through

Email (Appendix C2). The letter of information (Appendix- D) was distributed to the Ontario shores staff by email prior to the research briefing to facilitate informed written consent from the potential participants. Interested and eligible participants were then contacted through their contact number or email for follow-up (Appendix E). There were no reportable challenges faced by researcher during the recruitment as the Ontario Shores staff were supportive of the research work. The participants were enthusiastic and cooperative throughout the data collection process.

Sampling strategy

Since the purpose of this research study was to understand the diverse perceptions of the target populations, purposive maximum variations sampling (Shaheen & Pradhan, 2019) was used to achieve a balanced sample of HCPs. Purposeful sampling is a technique used widely in qualitative research to identify and select information-rich cases for the most effective use of limited resources (Patton, 2002). These aid in identifying and selecting a participant or group of participants who have experienced the phenomenon of interest (Cresswell & Clark, 2017). Crouch and Mackenzie (2006) recommend a sample size of less than 20 study participants is appropriate in qualitative research as this allows for a close association between the researcher and the participants; therefore, it would enhance the validity of in-depth inquiry while obtaining meaningful phenomenological data (Crouch & McKenzie, 2006). This research study aimed to achieve at least a sample of 6 to 9 participants and may recruit additional participants as guided by data saturation. The sample included 2-3 nurses, 2-3 recreational therapists, behavioral therapists, and occupational therapists, and 2-3 social workers with the goal of having data saturation to determine the final sample size. In qualitative methods, data saturation is crucial to obtain

a comprehensive understanding by continuing data collection until no new significant information is acquired (Miles, Huberman, Huberman, & Huberman, 1994).

Data collection

Data collection commenced in the summer of 2021 upon receiving approval from the Research Ethics Board (REB#19-011-B) of Ontario Tech University and the Ontario Shores Center for Mental Health Sciences. The researcher provided training to the eligible participants about the use of the WBRT application. This WB application was created by a team of researchers from Ontario Tech University in collaboration with the community partners from Ontario Shores Centre for Mental Health Sciences in Whitby, Ontario (Sun et al., 2020). HCPs of Ontario shores were involved in co-designing the WB application. During the early stages of web-app development, research team from Ontario Tech University sought the feedback from HCPs on the user interface. Their feedbacks and suggestions were later incorporated in the development of the web-app. Studies have shown that involving members of the healthcare community helps in the creation of better healthcare products and services. Their knowledge and creativity enrich the product intended to be used among patients (Bird et al., 2021).

Upon the participant's expression of interest in the research study and completion of informed written consent, the HCPs were provided with online education and training on WBRT using an online (zoom) platform at a mutually agreed time. During the online training HCPs had the opportunity to explore the technology virtually. Due to time constraints, shortage of devices, and physical restrictions during the pandemic, it was not possible for HCPs to try the app physically and independently. However, they were actively involved throughout the training session. After the initial demonstration of the

web-app, the researcher requested the HCPs to ask questions and explore webapp interface. During this stage the researcher navigated the app based on HCPs command. This provided an opportunity for HCPs to explore the app features and functionality. After the virtual session, HCPs were interviewed about their lived experience with the web-app and inquired about their perceptions on the use of this application in supporting dementia care. The estimated duration for the interview was approximately 30-45 minutes and was guided by an interview guide (Appendix- F) comprised of semi-structured open-ended questions. A socio-demographic data form (Appendix- G) was completed before the interview, which includes a brief questionnaire about the participant's age, gender, occupation, educational background, year of work experience, etc. The interview was audio-recorded using a zoom platform embedded with an audio recording system.

Descriptions of the technology: The WB Application can be accessed by the HCPs through the link (<https://ontarioshores-webapp.herokuapp.com/log-in.php>) and log-in page using individual username and password (Figure 1 & 2).

The HCP will then be directed to the photo album containing generic/personalized pictures or videos suitable to supporting the RT for PWD(Figure 3). There will be a wide range of pictures and videos in an album format to choose from. A sample webpage is being displayed below (Figure 4). HCPs can select one of the photo albums and deliver WBRT. A generic picture has been shown below as an example (Figure 5).

Figure- 1.2: Web-based Application

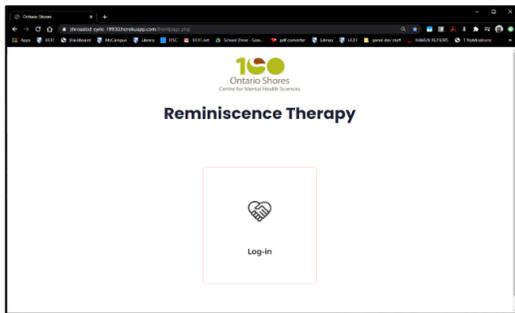


Figure 1: Website homepage

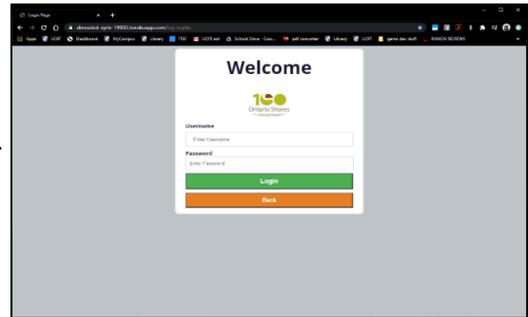


Figure 2: Log-in page

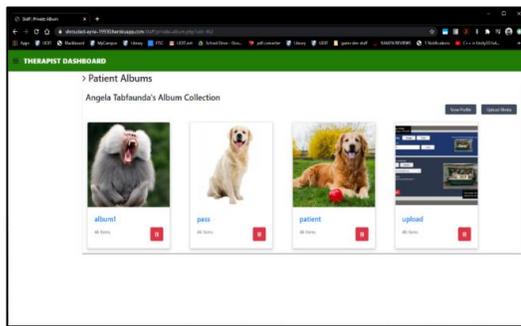


Figure 4: photo album

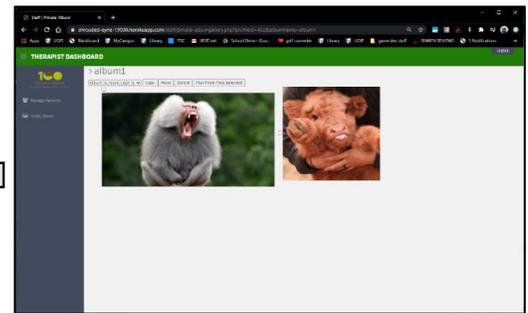


Figure 3: photo album



Figure 5: sample picture

The WB application can be exhibited via external monitors (TV, desktop, laptop, tablet, iPad). HCPs can upload password-protected, generalized/ personalized content about their patients according to their preferences and descriptions of patient profiles. Additionally, HCPs can download the archived contents by logging into their individual accounts and album can be transferred via email or save as a PDF file. These downloaded contents can then be shared among direct care providers when patients are discharged/transferred to an external setting.

Interview guide

Data was collected through one-on-one, open-ended, semi-structured, in-depth interviews using an interview guide to explore the experiences and perceptions of HCPs regarding the benefits and limitations of using WBRT to support BPSD management. The researcher developed and pilot-tested the interview guide with another graduate research assistant, and the graduate supervisor and the committee members reviewed the interview guide for final approval. Pilot testing of the interview guide is essential to ensure that the questionnaire accurately addresses the research question. Besides, it can ensure whether the questionnaire is appropriate, understandable, well-defined, and presented clearly and consistently (DeJonckheere & Vaughn, 2019).

Data analysis

Verbatim transcripts of the study data were prepared by the graduate student researcher concurrently while the data collection process continued. This approach ensured the consistency of the data collection and analysis process while preparing and organizing each transcript (Schneider, Coates, & Yarris, 2017). Transcripts were then compared by the researcher with the corresponding recordings to confirm details of the interview data.

To ensure anonymity, the transcript was numerically identified. All data audio and transcripts were stored securely in the encrypted folders inside the personal laptop of the researcher and were only accessible by the researcher. Data collection and simultaneous data analysis were continued until data saturation was achieved (Polit & Beck, 2020).

The process of qualitative phenomenology descriptive data analysis was grounded within Braun and Clarke's (2006) thematic analytical model using an excel codebook.

As guided by Braun and Clark (2006), researcher utilized the following six steps of data analysis. For the first step, researcher read each interview transcript several times to familiarize with the data and to develop a strong understanding of the lived experience of the participants. In the second step, researcher assigned an initial code by reviewing the transcripts and generating code for each transcript. The third step was to develop a codebook for organizing the code, including a description of the codes and direct quotes from the transcripts. The fourth step was generating potential themes by collating the codes. For the fifth step, the identified themes were reviewed to verify if the themes were coherent, and they were cross-referenced with the code extracts and supporting quotes using a thematic map. The themes were then be named and described, accompanied by the data extracts to ensure the validity and reliability of the study findings. The final step was to develop an exploratory summary report about the study findings for the research study.

Scientific rigor

Scientific rigor is crucial in qualitative research and involves credibility, transferability, confirmability, and dependability (Lincoln & Guba, 1985). Credibility refers to the phenomenon that is identified and described appropriately. In this study, credibility was

ensured by the process of member checking (Appendix- H). As the purpose of this research study was to explore and explain the lived experiences of HCPs, they were asked to review the transcription of collected data. They were also provided with a detailed description of the report to ensure that the study data faithfully represent their experiences as a measure of the validity of the research findings.

Transferability involves the application of research findings from this study to a larger study population. The focus of this study was to explore the perceptions and experiences of HCPs regarding the use of WBRT, as well as the contextual factors that influence its use, so the knowledge and findings will be meaningful to the target users. Although data was collected from one institution involving HCPs, the outcomes of the study will have implications to other healthcare settings involving the target populations of PWD (such as acute care, home care, and informal caregivers of PWD).

Confirmability includes the aspects of neutrality. In a phenomenological study, confirmability can be achieved by bracketing the researcher's pre-existing knowledge to see the phenomenon through the participant's eyes. The analyzed data were then verified by the graduate supervisor to confirm the accuracy of the results.

Dependability refers to the aspects of consistency. In this research study, dependability was obtained through the external audits conducted by the supervisory committee to evaluate the study findings and accuracy of the research study and to examine if the data supported the study interpretations and conclusions.

Role of the researcher: As a researcher, I performed the literature review, developed the study design and conducted the research study, facilitated the interviews, analyzed the data, and developed the final study report, which might have been influenced by my

background as a researcher and my past lived experiences. I did bracket my prior knowledge and expertise throughout the study, as suggested by Fisher (2009). To develop the relationship with my research participants, I virtually introduced myself through the online platforms, and described my research study, distributed the electronic recruitment flyer, contacted the HCPs through phone or email (following the interested participant list provided by a staff member, who the facility assigned to support the recruitment process), provided a letter of information, and conducted the online interviews.

Reflexivity of the researcher: I am an international medical graduate from Bangladesh and was involved with clinical practice for three years. From my clinical background and knowledge, I understand that dementia is a non-curable disease and causes great suffering for patients and their caregivers. I believe that pharmacological treatment has adverse side effects for PWD while nonpharmacological treatment has fewer side effects with promising potentials for the management of BPSD. I have completed a certificate in Health Informatics at York University, which enriches my knowledge of web-based applications. I have learned and realized that WB applications might have more potential benefits on BPSD in comparison to the traditional RT. Thus, I was mindful of the potential biases and kept my assumptions, knowledge, and experiences in place. I was engaged in reflexivity, which is a self-reflection process that researchers need to practice with the goal of developing a consciousness of their feelings, perceptions, and actions, which improved the transparency of the researcher's role (Darawsheh & Stanley, 2014). While engaging in reflexivity, I pursued bracketing to ensure the integrity of the study findings. For instance, I practiced bracketing during the coding of interviews to ensure the

credibility of thematic findings is not influenced by the findings from the literature nor my previous background and experiences

Ethical Considerations

A brief description of the ethical considerations, e.g., potential benefits, associated risks, methods of data storage, confidentiality, and participant's rights to withdraw, are described below. Since this study involves human participants (HCPs) and interviews were collected from the staff of Ontario shores, ethical approval was obtained from both the Ontario Tech University and Ontario Shores.

Potential benefits: The anticipated outcome of this study was to educate HCPs about the possible utilization of WBRT among PWD in institutionalized settings during the current pandemic and beyond. This study identified the barriers and facilitators about the application of WBRT technology by HCPs and its potential to promote the caregiving ability and reduce their workload. Thus, the purpose of this study was to explore the effects of a WB application to advance RT among PWD to manage BPSD and reduce the burden of HCPs in the institutionalized settings during the current pandemic and beyond.

Potential risks or discomforts: There were minimal risks associated with this study. HCPs were asked about their experiences managing dementia care for PWD and their viewpoint on utilization of the web-based application to conduct RT. There was a potential for emotional distress that could arise while sharing their patient's experiences. If needed, the participant may decide to take a break from the interview and may resume the interview if HCP wishes to continue. Also, they had the right to withdraw from the interview at any point if they were not comfortable continuing with the study.

Storage of data: All the data collected were stored in a personal, password-protected laptop kept in a secure location, accessible only to the researcher. A pseudonym was assigned to correspond with the collected data; thus, any direct identifiers were destroyed and disposed of through secure deletion to be non-recoverable.

Confidentiality: Before the interview, the participant was asked to complete a demographic questionnaire. Examples of demographic questions include age, gender, and caregiving role, etc. This information was paired with the interview data to allow the researcher to understand the questionnaire data better. After a pseudonym had been developed for this data, any direct identifiers were destroyed. Throughout the study, this information was only be accessed by the researcher. To safeguard the participant's rights to confidentiality and anonymity, both verbal and written information about the objectives of this study were available to them throughout the study period. They were asked to provide explicit signed informed consent before participating in this study and a copy of the consent form was provided to the participant.

Right to withdraw: Participation in the research study was completely voluntary, and the participants were given the option to answer only those questions they were comfortable with. The shared information was held in strict confidence and discussed only with the research team (Graduate supervisor and research committee). Participants had an opportunity to withdraw from the research project at any time, and they need not offer any reason for making this request. Participants can contact the researcher to withdraw via the email address and/or phone number provided on the consent form.

Chapter 4: RESULTS

This chapter illustrates the findings of the research work. It outlines the description about the demographic information of the study sample along with the various themes and sub-themes that have emerged from the qualitative analysis.

A total of four themes have emerged from the interview data, which along with their subthemes, have been summarized below. In addition, perceived barriers and suggested solutions have been identified during the interview, which are described at the end of the chapter.

Demographic information of study sample:

A total of ten (10) HCPs were recruited from both GTU) and GDU of Ontario Shores Center for Mental Health Sciences for this research study. HCPs consisted of occupational therapist (n=2), behavioural therapist (n=2), recreational therapist(n=2), social worker(n=2), and nurse (n=2).

Table - 1: Descriptive summary of demographic data:

Participant	Age range	Gender	Education	Experience working (in years)			
				as HCP	in institutionalized settings	with PWD	With traditional RT
OT1	18-29	Male	Graduate program	3	3	3	No
OT2	18-29	Female	Graduate program	3	2.5	2	No
BT1	30-39	Female	Graduate program	5	2	1	No
BT2	40-49	Female	University (BscN)	22	22	15	Yes
RT1	30-39	Female	University (BscN)	7	6	2	Yes
RT2	40-49	Female	College diploma	25	25	20	Yes
SW1	30-39	Female	Graduate program	8	3	4	No

SW2	50-59	Female	Graduate program	20	20	7	Yes
N1	40-49	Male	University (BscN)	12	12	12	No
N2	30-39	Female	University (BscN)	14	14	14	No

Among the ten participants who agreed to be trained and interviewed, the majority (80%) were females. The age of the HCPs ranged from 18-59 years, and all of them worked full-time at Ontario Shores. All the participants had experience working in an institutionalized setting and with PWD. The education level of the HCPs differed widely, with one participant having a college diploma, 4 completed bachelor's degrees in nursing, and the remaining 5 participants held a graduate degree (MSc or Ph.D.). Most participants pursued at least one formal training in the care of PWD, such as Gentle Persuasive Approaches (GPA), Performance, Information, Economics, Control, Efficiency, Service (PIECES), Montessori, Canadian Gerontological Nursing Association (CGNA).

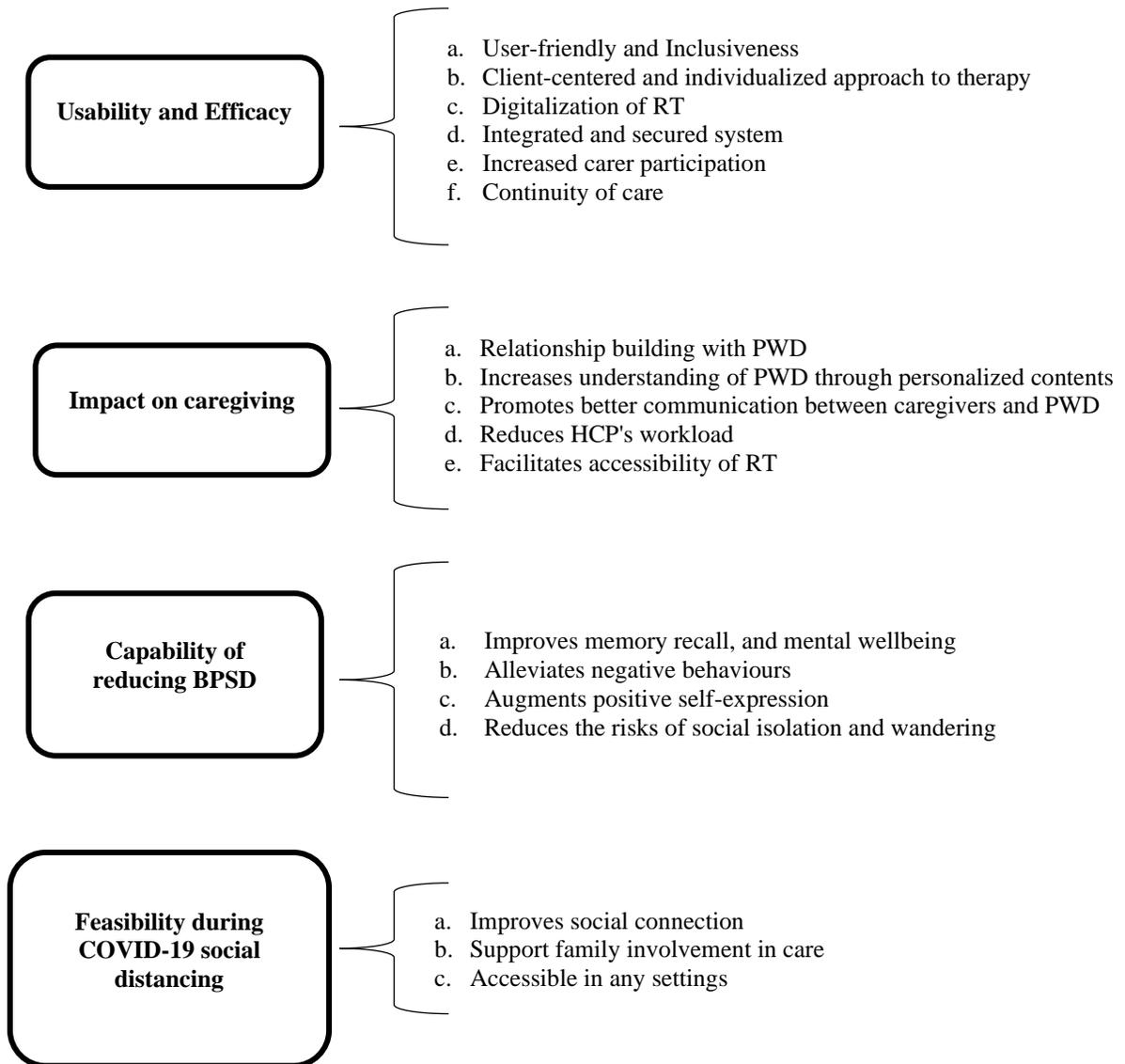
By interviewing a variety of HCP's experiences, such as OT, BT, RT, SW, and nurse's perceptions, the potentials of WBRT on dementia care during the COVID-19 pandemic, has been identified. In the last two interviews, most information was repetitive of previous interviews and did not add any new ideas to the interview data. This was an indication that I could stop further data collection as data saturation has been achieved.

Qualitative thematic findings:

A total of four major themes were identified related to the application and usability of the WBRT application. The participants identified some perceived barriers towards implementing the WBRT and provided some solutions to overcome these challenges.

The summary of qualitative findings is presented in the thematic tree below (Figure 1).

Figure 2.1: Thematic tree



1. Usability and efficacy of WBRT:

The HCPs described the usability and efficacy of web apps among PWD HCPs in the institutionalized settings. During the interview, several subthemes have been identified: (a) User-friendly and inclusiveness, (b) Client-centered and individualized approach to therapy, (c) Digitalization of RT (d) Integrated and secured system, (e) Increased carer participation, and (f) Continuity of care, which have been summarized below.

a) User-friendly and inclusiveness

HCPs found the WBRT to be easy to learn and user-friendly. They found that the user interface was simple and could be easily navigated by people who knew how to use the internet. A highlighted feature of the WBRT was both family members or loved ones and HCPs could access the patient profile. Family members can be more engaged with the caregiving process by uploading customized content to facilitate RT for their loved ones. In the absence of a family members the HCPs can create the account in the web app and load the reminiscence contents with generic pictures. The HCPs believe that the WBRT's user interface provides an opportunity for both HCPs and family members to participate in the implementation of RT.

HCPs repeatedly narrated that during the interview-

"I think it's (WB) very user-friendly. I thought to have a whole page of instructions (on how to navigate the app). But it seems pretty straightforward." [N2]

"I think it's (the web-app) good. I think especially when you're dealing with family members, and you have to remember that they're geriatric....So many of these family members may be spouses, children who may be older as well, so you want to make sure that the technologies are user-friendly, and I think it is. It's quite simple from what it looks like to understand." [OT1]

"I think it's incredibly user-friendly. I think it's super well thought out. I think it certainly meets the needs of our patients here at Ontario shores, and I really like the fact that not only can an account be made through a staff, but a caregiver can also participate in that form of engagement, and then if patients don't have caregivers or families at least staff still have the opportunity to be able to make an account for the patient and include things that are maybe more public based pictures like you were showing.... .. So, I like that they're not leaving out everybody. It's kind of inclusive to everybody." [OT2]

"It's pretty user-friendly. I would say anyone can sort of navigate the internet. I think it would be very easy for them to learn." [BT1]

b) Client-centered and individualized approach to therapy

The study participants believe that PWD needs individualized care and providing them with memory triggering content is of immense importance to their well-being.

Management of BPSD can be facilitated through WBRT.

One HCPs echoed that-

" I think you can certainly be more in touch with families if the families are technically savvy and have the ability to draw on personal experiences, memories, preferences, and individuality. I think it is important, and it's more meaningful for them when they go through something like that, and it speaks to them. Like I said, diversion and distraction are critical when it comes to managing BPSD, and if you can catch the person's attention and maintain it for any length of time, then that's a success. So, and I do think that use of this kind of technology would certainly work towards that goal." [BT2]

HCPs agree that WBRT provides a platform to upload customized content (photo, video, music, etc.) tailored to each individual's needs. This approach adds value to their care and increases engagement, and PWD may connect more with the content than traditional methods.

"What I see and what I've seen so far, it (WBRT) looks really good. So, I would recommend the use of it because it's just so much easier for the caregiver to have the ability to upload photos. We can also upload images, videos, whatever they provide us. It's very client-centered, so it's definitely a great tool to use." [OT1]

"Yeah, I think it's (WBRT) absolutely helpful, especially with people with dementia. A lot of times, they remember things from the past. And so, if...there is personalized information, it can potentially, you know, memories that are comforting to them." [SW1]

c) Digitalization of RT

HCPs agree that digitalization provides an opportunity to store more information and keep materials needed for RT organized. They tend to believe that the application of WBRT would reduce their need for paper copies and would help them keep all client information in an accessible and secure place. Participants also agree that RT needs digitalization to make the process more efficient and accessible to them.

The participant stated that-

"Definitely. You'd have a lot more at your fingertips potentially once you start to build a client profile. I know that one of the problems on the unit is that paper copies of things go missing all the time. So I think having it in a computer system could be really beneficial for this team. Also, I can see that you could hold a lot of information in a person's chart that you couldn't necessarily keep track of on a unit. So I think that could be beneficial". [SW2]

"I think that (WBRT) definitely an advancement, because currently we're going more digital on how I'm performing my reminiscence therapy, and our patients are able to connect on the larger screen with that, so it will support, especially when you look at a lot of our aging population now is at a younger age where they connect with technology anyway, so it would be accessible for them" [RT1]

d) Integrated and secured system

The WBRT includes pictures, music, and videos under one platform for each patient profile. HCPs can upload multiple images, videos, audio recordings in patient profiles, which saves their caregiving time. Besides, HCPs can access all the content of an individual patient without the need to navigate multiple platforms and places. This

integrated feature reduces the hassle for HCPs the need for arranging RTcontents before every session.

The following quote of two HCPs reflected this-

"I'm all for it, I think it's a better idea because it's much easier to be able to bring somebody on an iPad or a computer that everybody shares. That's kept in the same spot but has everybody's information in separate folders. Rather than having multiple pieces of paper, or multiple books lying around, so I think it will be much more organized and you know the videos, the pictures, everything will all be there together. So it's not coming from different places." [RT2]

"Whether we use an iPad or we use a laptop, I think patients have become accustomed to seeing these types of technological devices, so I think it ...it would be helpful, especially the part where you can kind of play the music over the pictures or play videos and I don't have to run around and try to grab a video from my email and then a photo that I have printed out. It's all in one place. I think it's very effective or efficient, I should say." [BT1]

Alternatively, using a printed copy might not be safe in an institutionalized setting.

Printed copies can get lost if not kept in safe and secured places. Thus, using the integrated digital platform is more secure and maintains patient privacy and confidentiality.

During the interview, HCPs narrated that-

"You know, as being in a hospital setting, it's always preferred not to have things in print laying around with patient's personal information. So I think if it's all (information) just embedded within technology. ...it makes it a little bit more secure." [BT1]

"In being able to keep confidentiality and privacy of each patient and being respectful of where the material is being viewed so that it is showing respect to the family and also the dignity of the patients." [RT2]

e) Increased carer participation

Traditional RT is challenging and time-consuming for both family members and HCPs. The WBRT could help caregivers provide RT more efficiently. Once a patient account and content have been set in the WBRT, anyone who has access to the technology, such as family members, volunteers, or HCPs can view and deliver the RT. For instance, to provide the traditional RT using Snoezelen (multi-sensory therapy), one needs to be formally trained and certified before providing the therapy.

One HCPs mentioned that-

"I think it (WBRT) can save a lot of time ..., the patient will still require to have one on one person to be with them, and go through the information, but I think... somebody like volunteer for example, or a staff member or family member would be able to conduct and support being able to view the reminiscence therapy, whereas the more traditional methods like Snoezelen, for example, it does require people to be formally trained and certified before they're able to operate certain functions of this Snoezelen so that in some ways we'll be able to open up the opportunity for a lot more participation from various parties ."[SW1]

f) Continuity of care

PWD needs consistent and continuous support and care. The WBRT can facilitate continuity of care for PWD. Family member or loved ones can upload artifacts remotely and can update the album according to the needs of their loved ones. HCPs can access the personalized content and provide RT to their patients in real-time. HCPs no longer need to wait for the hard copies of pictures or videos to be delivered for the therapy, and this will promote the continuity of the caregiving process in a timely manner. Besides, the patient album could be transferred via secured email or downloaded and saved as a PDF file by authorized personnel on a password-protected laptop or USB. According to the HCPs, this feature would aid in sharing RT contents among facilities

and assist caregivers in continuing similar therapy for PWD in their own homes or other healthcare settings.

One of the HCPs stated that-

" One of the barriers is getting to know the person before their dementia. Because before, I relied so heavily on seeing the family weekly, where now there's that disconnect. ... On more of a personal level and with the content being able to be uploaded regularly, I can learn more what kind of interventions or images work best for them and what they connect to most and maybe what ones see a disconnect. I'm on a council where we're looking forward at what dementia care within our facility is going to look like, and one of the big things from a recreational therapy perspective is that I've realized there's a deficit in being able to pass on information and toolkits about a patient to their next facility. So when they're returning back to the long term care home, if I could give the caretaker that information to send along, they could continue to utilize that intervention for the patient." [RT1]

2. Impact on caregiving:

During the conversation with the HCPs, the impact of the WBRT on their caregiving responsibility was evaluated. The HCPs viewed the app as a significant component to support their caregiving role. Subthemes of the impact on caregiving include: (a) Relationship building with PWD, (b) Increases understanding of PWD through personalized content, (c) Promotes better communication between caregivers and, (PWD d) Reduces HCP's workload, and (e) Facilitates accessibility of RT.

a) Relationship building with PWD

During the interview with HCPs, the potential efficacy of WBRT in building a relationship with PWD was identified. The HCPs indicated that the WBRT could increase the connection between HCPs and PWD. Due to the personalized contents of the web app and client-centered features, this could help HCPs know their patients on a deeper level

and help to strengthen the therapeutic rapport. This was reflected from the following quote of HCPs-

"I think it (WBRT) will benefit our relationships. I think it will not only provide engagement for our patients, but it will also allow us as staff to get to know our patients on a deeper level, which can help with overall empathy and understanding of where the patient came from or what their background is about, so I think it'll strengthen therapeutic rapport." [OT2]

b) Increases understanding of PWD through personalized contents

If the HCPs have a clear understanding of the patients' lives, it could improve their caregiving process. WBRT could aid HCPs to know their patient better. By viewing individual albums with images, music and video will enhance HCP's understanding of the patient prior to the implementation of RT. HCPs would be able to connect better with PWD to facilitate dementia care. One HCPs narrated that-

"I think that a lot of times people with severe dementia, we are not able to get to know them in ways where they (PWD) can express themselves. So I think it (WBRT) allows a practitioner to be able to learn more about the patient through the media that they're viewing."- [SW1]

During the interview, HCPs were asked about their preferences between generic and personalized content for WBRT. All the HCPs preferred a personalized album over the public album, and they indicated that personalized content would be more relevant and meaningful to PWD than the generic content.

One HCPs described that-

"Yeah, I think it would be (private album) helpful. I think it's better than using generic stuff. I know generic at times it's OK, but for myself (it's better), when using pictures to try and get patients to relate. If I have a patient who doesn't have any personalized stuff, I've done it before by pulling things off Google. It's nice, but sometimes if it's not personal to them, they don't recognize it, and so it doesn't really help them feel

comfortable, 'cause it's just like showing them any other picture. So personalized...It's good because it helps us find out more about them. So, I think it (WBRT) would probably go a lot further than just using generic content."[BT1]

c) Promotes better communication between caregivers and PWD

Communicating with PWD is generally a bit challenging for HCPs. Due to the reduced receptive and expressive communication skills, PWD has difficulty interacting with other people. The HCPs indicated that the WBRT could generate conversation and improve communication with their carers. One HCPs stated that-

"Yes, I do think it (Personalized WBRT) would be helpful. I think both receptive and expressive communication is often impaired in dementia and any other use that you can use to augment what you're trying to say. So whether it's words and visual stimuli like pictures is going to help you get your meaning across."[BT2]

d) Reduces HCP's workload

The length of stay of PWD in an institutionalized setting varied from a few days to a month. HCPs need to have a clear understanding of their patients, their preferences, or dislikes prior to providing RT. Sometimes PWD demands extra time and attention, which would likely increase HCPs workload. The WBRT could reduce HCPs' workload as they can retrieve all the personalized contents of PWD in a single platform. HCPs indicated the simplicity and efficiency of the WBRT and how it could ease their caregiving responsibility by knowing their patients' preferences.

One of the HCPs reiterated-

"I think it's (WBRT) great as you're learning more about the patient because they're only technically here for 59 days. It does go by quickly. I know it does seem like a long time, but it goes by super quickly, so the quicker you know the patient their likes, hobbies, interests, and dislikes. You're building that therapeutic rapport to make treatment a lot easier hopefully, I really like that you get to learn more about the

patient, and I think that it really just speeds up the work.. and it makes your job a little bit easier too."[OT1]

e) Facilitates accessibility of RT

In a dementia-care institutional setting, each PWD could be managed by numerous HCPs throughout their stay. The WBRT could act as a repository of each patient, and staff can access the content whenever required. The HCPs don't have to collect the reminiscence contents each time before the therapy. Any staff could log in to the web app using any devices such as desktop, laptop, or tablet and instantly conduct the RT. HCPs expressed the following perspective: -

"I think this (WBRT) is helpful because everybody would have access to it at once. I could have it on a computer, and then if an additional staff had to view it, they wouldn't have to look for it. It would just be on the computer as well, and you wouldn't have to worry about losing it either."[N1]

"We are a multidisciplinary team, so I think anyone could set this (WBRT) up. I think the patient care attendants, such as personal support workers and social workers, could set it up. I mean, it's all within the circle of care, and you know we are not breaching any confidentiality when someone from the team, like any member of the team, are accessing WBRT" [N2]

3. Capability of reducing BPSD:

HCPs have indicated the significance of WBRT in reducing behavioral and psychological symptoms of dementia. Four subthemes emerged from the interview data: (a) Improve memory recall and mental well-being, (b) Alleviate negative behaviors, (c) Augment positive self-expression, and (d) Reduce the risks of social isolation and wandering.

a) Improve memory recall and mental well-being

The HCPs indicated that WB application could be used as RT to help recall the good memories for PWD. This could potentially boost PWD's mental well-being and enhance their quality of life.

A HCPs stated that-

" It (WBRT) will help... maybe recalling fond memories. I think that it can..., improve quality of life." [OT1]

When being away from home and in a familiar environment, PWD might get anxious and become disconnected from their family members or loved ones. By viewing personal images and videos, PWD could feel more connected with their family members, improving their mental well-being.

One of the HCPs narrated that-

". Sometimes they'll (PWD) be looking for their wife or worried about their kids at home or something of that sort. So having some pictures and things of that nature might make them feel more comfortable and deal with this anxiety that people (loved ones) aren't here right now... Yeah, I think I could help them feel somebody is looking out for them"[N1]

b) Alleviate negative behaviors

During the interview with HCPs, it was identified that WBRT could positively impact BPSD. The WBRT can alleviate negative behaviors such as anxiety, depression, restlessness, and exit-seeking behaviors among PWD. HCPs discuss the potential of WBRT in reducing irritability, physical and verbal agitation.

This has been reflected from the following HCPs quote-

" It (WBRT) can reduce anxiousness, possibly. depressive-like symptoms like behavior. Possibly agitation. Exit seeking."[OT2]

"Like it (WBRT)will help reduce physically responsive behaviors, verbal aggression .. I think it can also help with more, so just anxiety and anxiousness and then kind of reduce physical, verbal response behavior such as being anxious, restlessness and having psychomotor agitation."[OT1]

"I can see it being helpful in terms of reducing irritability and potentially slowing down some of the vocalizations and verbal tics. If someone engaged in an activity, you could use it as a distractionary measure while trying to provide care, so that wouldn't lead to resistance with care provision."[BT2]

c) Augment positive self-expression

PWD deals with restlessness and distress, which impact their confidence and impact the quality of life. During interviewing with HCPs, it has been identified that the WBRT can increase positive mindset and enhance positive self-expressions by connecting PWD with their loved ones and their familiar environment.

One HCPs mentioned that-

"So some of the symptoms that I notice most is exit seeking behavior, and I could see having the reminiscence therapy as a way to alleviate that, so if they're able to connect with something familiar, you would see a decrease in that behavior. And with that also comes distress, right? So a decrease in distress., such as wanting to be at home and being in an unfamiliar environment. If they were able to look at images from their house or images of their loved ones. We would see more of positive self-expression coming from patients."[RT1]

d) Reduce the risks of social isolation and wandering

Due to the decrease in interacting and communicating with others, PWD often feels lonely and isolated. HCPs stated that the WBRT could potentially reduce loneliness and risks of wandering and redirect and reassure PWD through reminiscing about their past lives.

A participant narrated that-

" It (WBRT) could potentially help with feelings of loneliness and the wandering as well. So if they are wandering, they might be looking for their mom or looking for their sister or brother or their son. Yeah, I think it could help redirect them. It could help also reassure them." [BT1].

4. Feasibility during COVID 19 social distancing

During the interview, HCPs suggested that the WBRT would be efficient and feasible during COVID19 social distancing. Three sub-themes have emerged based on these discussions: (a) Improves social connection, (b) Promote accessibility and family involvement in care, and (c) Accessible in any setting.

a) Improves social connection

COVID 19 social distancing has impacted the life of PWD and their informal caregivers, such as family members or loved ones by reducing the social connection. Due to visitor restrictions, family members were not allowed to visit their loved ones in the institutionalized settings. The WBRT has the features to connect families from a distance, enhance their social relations and reduce their sense of loneliness.

A HCPs indicated that-

"Absolutely, I think it's feasible because especially when we're looking at it being a web-based application where families from a distance can apply the personalized images or from their cellular devices, it allows for them to connect with their loved ones even from a distance. And I think with the added use of technology on our unit as well, if there was a loved one wanting to view how that reminiscence therapy is working for their loved one and see their reactions, we also would be able to use our other web-based connections with the family to connect them with that experience." [BT1]

b) Support family involvement in care

Due to COVID 19 social distancing protocol, it was challenging for family members to deliver contents in-person for RT and thus were unable to get involved in the care of their loved ones. WBRT has a feature where family member can upload personalized pictures remotely. HCPs indicated that this function would continuously allow family members to contribute and get involved in the care and treatment of their loved ones.

One of the HCPs provided the following perspective: -

I think it is super easy to use, and obviously with COVID-19, you're trying to social distance from one another, and you don't need to have family members directly coming in to drop off physical pictures, videos, whatever. It may be, like I said, they can upload it from home wherever they are and then you can get that and provide it to the client. So definitely very feasible for family members. [OT1]

c) Accessible in any settings

Dementia has no cure; the symptoms of dementia need to be managed on an ongoing basis. The WBRT can store the individual contents and be accessed remotely from any setting using the internet. Specifically, the WBRT can be accessible to any healthcare setting during the COVID -19 pandemic.

A HCPs narrated that-

"Yeah, I think that it will be more helpful during COVID because, with reminiscence therapy, caregivers can potentially be putting material together from the comfort of their own home and then being able to use it anywhere else. Once the material is put together, the staff members, either in a long-term care setting or on our current unit, would be able to provide the support in a socially distanced manner."- [SW1]

Perceived barriers about implementing WBRT

During the interview, HCPs identified several barriers in implementing the WBRT in institutionalized settings: (a) Lack of capacity for education and training of technology, (b) Availability of technology and technical support, (c) Need for increased multi-sensory features, (d) Limited attention span of PWD, and (e) Lack of time to learn due to workload.

a. Lack of capacity for education and training of technology

Some HCPs have stated that implementing the WBRT could be challenging for various reasons. HCPs might be busy, and institutionalized settings might not have the resources or capacity to train and educate HCP about the utilization of new technology.

One of the HCPs indicated that-

"I think one of the barriers would just be education to staff and our staff can be quite busy. So, I guess ensuring they have the proper education, ensuring that they're comfortable using this kind of technology and then having the proper devices to utilize it." [RT1]

b. Availability of technology and technical support

Availability of the internet and having proper access to a phone or computer could be challenging for the family members. In some cases, the family member might be an older adult and might not have the adequate technical skill to navigate the WBRT. Besides, offering any remote technical support to family could be extra work for HCPs. HCPs have highlighted those concerns through the following statements-

"I mean, the only thing I can think of is whether the Internet is available for the caregiver. If they don't have access to the Internet at home and it does require some level of competency in using the technology the Patient and their spouse might be older and are not tech-savvy." [OT1]

"Some of the barriers probably will be connecting with caregivers and being able to troubleshoot with them if they're not able to navigate on their end. Especially when doing it virtually and not having them sit side by side with me while we go through it." [SW1]

c. Need for increased multi-sensory features

Traditional RT tools such as memory books, pet therapy, and others can stimulate the audio, visual and tactile sense of the PWD. Digitalized technology such as web-app primarily focused on the audio-visual senses. Lack of tactile stimulation in WBRT was identified as a potential barrier for facilitating multi-sensory RT.

This concern was identified in the following quote by the HCPs-

"Well ..I think maybe one of the downsides to it would be that it's not tactile" [SW2]

" Most of our patients that are within their 80s may not be as familiar with technology, and depending on where they might be in their dementia, that's where you might see not as effective as a tool like a memory book that's more tactile." [RT1]

d. Lack of attention span of PWD

PWD has a short attention span and easily gets distracted due to their impaired memory function. The attention span depends on the stage and progression of dementia. As the disease progresses, their focus and concentration fluctuate. HCPs perceived that the attention span of PWD with the WBRT could be a potential barrier.

The HCPs articulated this issue in the following quotes-

"Sometimes with the digital, it's tougher for patients to stay involved. It's quite likely the patient walk away from the iPad. It all depends on what level of cognitive impairment they're experiencing" [N1]

" Some patients when they see a screen or a laptop or some form of technology, they don't really recognize what it does. And although the pictures show up on it. They may not really understand what's going on. Sometimes with patients and iPads, for

example. They get so distracted by the device and not really attending to what's playing on the device."[BT1]

e. Lack of time to learn due to workload

The workload of HCPs can be overwhelming, particularly with the management and care of the person with dementia. Although most of the HCPs were interested in exploring the use of WBRT for dementia care. Some indicated that learning a new technology might be time-consuming, and it depends on the HCPs level of interest and workload.

One of the HCPs stated that-

"It depends on the types of staff (you are targeting). I think for me, as a recreation therapist, it's going to be very helpful. If you're looking at nursing, which is more like providing hands-on care. It'll be a hit or miss. Some people would like to do it, and other people will not have the time or maybe not want to get involved in it." [RT2]

Solutions and suggestions

HCPs discussed some solutions to the barriers they identified above and provided several suggestions on successfully implementing the WBRT to support dementia care. The identified solutions and suggestions include: (a) Involvement from the younger generations, (b) Focus on technology training, (c) Complementary to other digital platforms, (d) Features to add narratives and descriptions, (e) Accessible through different platforms, (f) Scanning via QR codes, and (g) Combination of both digital and traditional methods.

a. Involvement from the younger generations

During the interview, HCPs highlighted the issue of the family member not being tech-savvy. The HCPs proposed that family members could request assistance from their

younger generations, such as children/ grandchild, who are more familiar and comfortable with the technology. This approach could improve their caregiving responsibility and promote intergenerational involvement.

One HCPs mentioned that-

" Some individuals and seniors don't have access to computers or phones or whatever it may be, so I think we might run into some troubles. ...This may not be appropriate if their caregiver doesn't have access to technology. And in that case, we hope that maybe a granddaughter or grandson and niece and nephew. .they can step up and maybe help them and be able to help us and upload some photos and whatever support they need." [OT1]

b. Focus on technology training

The web app is user-friendly and convenient for family member and HCPs. But HCPs identified the issues with navigating the technology family member and HCPs. They suggested that appropriate training regarding the use of WBRT could potentially increase the technology adoption by the users. HCPs agreed that an educational demonstration and training of the WBRT could be beneficial to support the caregivers in navigating the technology independently. HCPs revealed their perspectives in the following quotes:

"I know one of the challenges we may have with caregivers of older patients. They tend to be around the same age. So sometimes, you know, emails and texting and FaceTime and things like that are not things that they're accustomed. So I think if there are caregivers, for example, they can navigate like a browser or know a little bit about how to use social media. Anything like that... I can see that it would be very easy for them to learn how to use that." [BT1]

"I think one of the barriers would just be education to staff and our staff can be quite busy. I guess ensuring they have the proper education, ensuring that they're comfortable using this kind of technology and then having the proper devices to utilize it." [OT2]

c. Complementary to other digital platforms

One of the HCPs proposed using the WBRT in conjunction with other digital platforms. They indicated that connecting to the family members via a video call before using WBRT could enhance dementia care. A HCPs explained that-

" I think it would be effective in addition to things like being able to FaceTime, their family and then having the web-based application to help them connect to their past and things that they love, so I think it could be in complement with other things (platforms)."- BT1

d. Features to add narratives and descriptions

One of the HCPs highlighted the importance of adding features that allow the HCP to add narratives and descriptions about the images, videos, or audios they are uploading. This option will facilitate the therapeutic conversations between PWD and their HCP during RT.

The HCP explained:

"I would wonder whether or not in your app when people are uploading pictures, is their room for them to describe what's happening in the pictures or to add names such as ..here's Uncle John with your nephew and this was Christmas two years ago. And do you remember when? You know we dropped the Turkey or whatever, like some sort of cues so that the person who's doing their reminiscence with the individual would be able to prompt some questions " [BT2]

e. Accessible through different platforms

HCPs suggested accessing the WBRT through different platforms would be beneficial. They proposed that if a mobile app could be created with the same feature, it might help HCPs access the system more often anywhere and anytime.

One of the HCPs suggested that-

"If there are different ways of accessing the same web-based information. Having an app on an iPad or having an app on the cell phone might be something that would be beneficial as well." [SW1]

f. Scanning via QR codes

To increase accessibility and simply log into WBRT, HCPs suggested a QR code for the web app. Thus, staff can log in to the app by scanning QR codes using a mobile phone or tablet. A HCPs indicated that-

" my idea was to print off QR codes using a laser scanner or circuit machine ..And then post that QR code in the individual's bedroom in long-term care. So either on the wall or on the back of the door or perhaps on their night table and so anybody with a phone could then scan the QR code with the residents and do the reminiscence therapy in the same way that your app has..." [BT2]

g. Combination of both digital and traditional methods

HCPs indicated that digital RT via web app could be implemented in combination with traditional RT for dementia care. HCPs suggested that a combination of both traditional RT and WBRT would be more efficient as it could complement each other.

One of the HCPs proposed that-

"I don't think it (WBRT) needs to replace it altogether. I think there are definite benefits to both means. There's always the aspect of touch with physical reminiscence, so you know you bring in a dog. You talk about dogs. You talk about that person, and you know you can use all of the senses. When you're doing reminiscence, it doesn't have to just be the visual or hearing ones that you can get on an app. ". [BT2]

Chapter 5: DISCUSSION AND CONCLUSION

Chapter overview

This chapter aims to discuss the findings from the current research study and analyze them in light of available literature. Moreover, this chapter identifies the study limitations, highlights the significance of study findings, proposes future implications and recommendations for potential research, education, policy and practice.

Discussion of study results

The current research study examined HCPs' perceptions of using the WBRT to support dementia care in institutionalized settings. Following the analysis of the semi-structured one-on-one interviews with HCPs, four themes have emerged, -1. Usability and Efficacy 2. Impact on caregiving 3. Capability of reducing BPSD, and 4. Feasibility during COVID-19 social distancing. These themes primarily demonstrate the usability of WBRT, assess its potential impact on HCPs caregiving responsibility, the utilization of such technology on PWD with BPSD, and the feasibility of using WBRT during the COVID-19 pandemic. The HCPs also highlighted some perceived barriers and provided solutions on WBRT application for dementia care.

The implication of web app as RT: One of the primary outcomes from this study was HCPs' perception about the usefulness of web apps as RT in dementia care in institutionalized settings. Studies have found that innovative technologies can be used to provide RT (Lazar et al. 2014). In our interviews, HCPs acknowledged the significance of WB application as a RT. HCPs found the WBRT as user-friendly and easy to navigate. They expressed that anyone with access to the technology and reliable internet, along with fundamental technical knowledge, could successfully navigate the web app.

Moreover, HCPs agreed that digitalization of RT could reduce the need for paper copies and can facilitate the centralization and integration of patient information in one place.

There are several benefits of a paperless, centralized system in healthcare. For instance, the digitalized file offers availability and multi-user access to the patient file in real-time, which causes simplification and acceleration of healthcare processes. It also improves care coordination and optimizes health care management costs (Lamberg, 2008).

Besides, once the WBRT account has been made for a particular patient, staff, volunteers, family members could view the patient profile and deliver the RT. Such involvement is beneficial for RT as it boosts consistency and continuity of dementia care (Häikiö, Sagbakken, & Rugkåsa, 2020). Continuity of care for PWD has been found to bring improvements in patient- providers trust, communication, and patient satisfaction (Fan, Burman, McDonell, & Fihn, 2005). Also, HCPs no longer have to wait to gather physical contents ; once media has been uploaded, they can deliver the RT in real-time or even remotely if needed (such as during social distancing).

Tominari, Uozumi, Becker, and Kinoshita (2021) conducted a study to evaluate the efficacy of digital RT(using VR) over the use of traditional RT(using still color photos). They performed a randomized controlled trial among PWD. Their study indicates that digital RT could stimulate cognitive function better than traditional therapy (Tominari et al. (2021). Our current study also suggested similar findings as the HCPs perceive that digital RT might be better for PWD and they support the digitalization of RT.

In addition, WBRT's feature to create a private and public viewing profile of the patient was well-received by HCPs. They believe this will allow them to use both generic and personalized contents to support RT. If the family members or loved ones are not able to

provide customized contents, HCPs can create an album and upload generic content based on individual preferences. The generic content would allow HCPs to facilitate group RT with patients who have similar interests. However, HCPs unanimously agreed that a personalized album is far more beneficial for RT as it would enhance the development of personal connection among HCPs and their carer. Previous studies have found similar outcomes related to the benefits of using personalized content for RT (Subramaniam & Woods, 2012).

A study was conducted by Sarne-Fleischmann et al. (2011) to assess the effectiveness of digital RT using both generic and personalized content. The results suggest the preference for personalized content over generic content among HCPs and their caregiver (Sarne-Fleischmann et al., 2011). Our study found similar preferences among HCPs, where they expressed their choices for personalized content over generic content. In addition, HCPs appreciated the user authentication function of WBRT as a measure to protect the privacy and security of patients' information. Patient information privacy and security are crucial as they promote patient confidence in healthcare services and build trust between patients and HCPs. Besides, patients are more likely to share health information if they trust their HCPs, allowing HCPs to gather more accurate information about their patients and provide the patient with quality healthcare services (Damschroder et al, 2007).

Improve HCPs' caregiving responsibility: Digital technology targeting RT allows HCPs to understand their patients' needs deeply, enhances communication, and improves social interactions among PWD (Lazar et al., 2014). It acts as a conversational platform by serving as an ice breaker to initiate dialogue. Using personalized content for RT permits HCPs to gain insight into their patients' lives and helps understand where the

patients came from, their past experiences and their background. Knowing a patient life history, lifestyle, and preferences help to increase the duration and frequency of social interaction, which will strengthen their mutual relationship and ease caregiving responsibility (Navarro, Rodríguez, & Favela, 2016). Laird et al. (2018) conducted a quasi-experimental study examining the effect of personalized tablet app (inspireD) among PWD and evaluated the perception of both PWD and their carers. They found that such technology increases social interactions between both groups (Laird et al., 2018). Similarly, our current study found HCPs could connect better with PWD through WBRT, by developing a therapeutic rapport with them and delivering quality healthcare services. The personalized album options of WBRT could aid HCPs in knowing their patients' personal lives and preferences quickly, which will facilitate client-centered care. Client-centered is significant for dementia care as it prioritizes PWD's well-being, promotes the strengths of PWD's, and honors their choices and values (Webster, 2011). Additionally, client-centered care also focuses on the unmet needs of PWD and creates positive patient outcomes, including better quality of life and reduced agitation and challenging behaviors (Terada et al., 2013).

During the interview, HCPs also perceived that WBRT would reduce the time and effort needed to collect and organize tools for RT. Once the family member has uploaded the media, a caregiver could log into the patient profile and display it in a presentation mode.

An earlier study by Samuelsson and Ekström (2019) examined the application of personalized versus. generalized content through WB applications in a residential home facility. They video recorded and analyzed the interaction between PWD (n=6) and nurses (n=3) and conducted a semi-structured interview with PWD to evaluate their WB

application experience (Samuelsson & Ekström., 2019). Our study expanded the scope of previous research by including HCPs from multiple disciplines, including recreational therapist, occupational therapist, behavioural therapist, social worker and nurse and found similar results which underscores the significance of using webapp to facilitate RT.

Ability to decrease BPSD among PWD: Digital technology can support PWD to combat their disease progression. It also has a significant influence on their mental health and well-being by decreasing BPSD symptoms. A case study by Rehm et al. (2016) has identified that WB applications would be feasible among PWD in residential aged care facilities. It would improve cognitive behavior and reduce depression and anxiety (Rehm et al., 2016). Our present study recognized that WBRT could improve mental health and positivity among PWD. It also provides further insight into utilizing WBRT in institutionalized healthcare settings.

Similarly, O'Rourke et al. (2011) conducted a study to examine the effectiveness of digital technology (YouTube) among PWD. A videoclips through YouTube was displayed on a TV monitor and examine its effects on PWD's mental wellbeing. The study identified that YouTube could positively impact wellbeing, mood, and communication among PWD (O'Rourke, 2011). Besides, Davison et al. (2016) found that preloaded digital materials could reduce depression, agitation, and anxiety (Davison et al., 2016). Padala, Jendro and Orr (2020) suggested that technology could enhance social connectedness among PWD and cause a positive impact on the health of PWD by reducing agitations and anxiety in an institutionalized setting during a pandemic (Padala et al. (, 2020). It was identified from HCP's interviews that delivering personalized WBRT could potentially reduce behavioral and psychological symptoms of dementia

among PWD (Moon & Park, 2020). Our findings also suggest that WBRT could alleviate negative behaviors such as anxiety, depression, restlessness, and wandering. According to the perceptions of HCPs, the memories and mental well-being of PWD could potentially be enhanced through WBRT, by decreasing BPSD symptoms such as depression, anxiety, restlessness and increase positive self-expression by connecting PWD with their loved ones and familiar environment. WBRT may potentially reduce loneliness and exit-seeking behaviors and enhance the quality of life through ruminating about their past lives. A systematic review by Liu et al. (2021) highlighted that RT significantly increased PWD remission from depression and quality of life immediately after the therapy. The present study identified that WBRT may potentially reduce loneliness and exit-seeking behaviors and enhance the quality of life through ruminating about their past lives (Liu et al., 2021).

Feasibility during COVID-19 social distancing: The necessity of digitalization of RT to improve dementia care in healthcare settings became more critical when the COVID-19 pandemic hit, and social distancing protocols were implemented. The COVID-19 public health measures, such as social distancing had led to the necessity for increased utilization of digital technology in healthcare (Budd et al., 2020). Our study suggests that the WBRT can be a technological innovation to advance the delivery of RT among PWD, particularly during the pandemic. Cuffaro et al. (2020) proposed that digital technology such as smartphone apps could support dementia care during the pandemic. Our current study confirmed Cuffaro et al. (2020) 's study findings and further indicated that WBRT has the potential to improve social connection, promote accessibility, and family involvement in care during the current pandemic. Our HCPs also highlighted that because

of the accessibility, portability and transferability of the WBRT contents, this technology could possibly be used in other healthcare settings such as acute care hospitals, long-term care, home healthcare, and retirement home. Our study also acknowledged the feasibility and usability of using WBRT for HCPs, family members, and PWD during the COVID - 19 pandemic. HCPs suggested that WBRT can improve the social connection between PWD and HCPs. The feature of WBRT to allow pictures being uploaded remotely can enable family members or loved ones to support and participate in dementia care. Additionally, WBRT could store all the media in a single platform and be navigated through multiple devices such as laptops, desktops, and tablets using the internet, which promotes the accessibility of using the web app in any healthcare setting.

The necessity of accessibility of technology in healthcare services is definite, as it provides consistency and continuity of care and better patient management. It decreases human errors, increases clinical outcomes, facilitates care coordination, and improves practice efficiencies (Alotaibi & Federico, 2017).

Perceived barriers and proposed recommendations of WBRT application: The HCPs highlighted a few challenges in executing the WBRT application while working with individuals with cognitive impairment.. One of the potential barriers is the lack of attention span among PWD. PWD suffers from a short attention span due to impaired memory function (McGuinness et al., 2010). Our study recommends using WBRT with another digital platform to increase the attention of PWD during the therapy. For instance, one of the HCPs suggests that connecting with the family members or loved ones via facetime or video call before the therapy session could boost patient interest, such approach could reduce their levels of confusion (Korczyn, 2020).

Another barrier, though not identified by our study participants, is the generic issue around using technology. Any new application or technology might get updated over the years. There is also a possibility of retention of training among HCPs. There might be power failures, connectivity issues or bugs. Our suggested technology is also not immune to such threats. However, none of these issues were raised during the HCP interview. This could be because, HCPs are sensitive to such threats, or the user-interface of the WB application did not trigger such concerns among HCPs. Also, there is a possibility that the benefits of WBRT outweighs the generic risks of technology usage. All these concerns can be further explored once the technology is actually implemented in health care settings.

Although the positive impact of technology in dementia care is undeniable, it is unfortunate that there is still a lack of large-scale, systematic studies evaluating their effectiveness (Boots et al., 2014). Our study acknowledged the importance of using technology to support family members and HCPs in dementia care. Some HCPs were concerned about learning such new technology amidst their busy schedules and proposed the use of a combination of digital and traditional RT to overcome the barrier around learning new technology. However, the effect of combining the use of both traditional and digital RT on patient outcomes is yet to be studied.

Lack of tactile sensation was perceived by HCPs as a limitation of the WBRT. Touch sensation can enhance physical and psychological relaxation. Suzuki et al. (2010) conducted a study with PWD and examined the impact of tactile feel on mental function and reduction of BPSD. They identified that stimulation of touch sensation reduced stress

and aggressiveness among PWD. Our study thus recommends that incorporating tactile features within the WBRT application could be valuable for enhancing dementia care.

Strengths of the study

The use of a qualitative descriptive phenomenological methodology is appropriate in this context because the aim of this study was to evaluate HCP's perceptions and experiences towards the potential utilization of WBRT in dementia care. Adopting the qualitative methodology allows for an in-depth semi-structured interview with individual HCPs to examine their perceptions about the feasibility of the application. Thus, it allowed the researcher to illuminate the lived experiences of the HCPs about the potential utilization of WBRT.

Moreover, the current study included HCPs from different disciplines and incorporated their perceptions of utilizing the web app for managing dementia care during the pandemic. Based on the literature review findings, the current research is the first study involving HCPs from various disciplines to identify the possibilities of advancing RT using WBRT and to explore their potential impact on caregiving burden. Additionally, there were methodological strengths involved with this qualitative study. For instance, the researcher pursued both descriptive and interpretive validity during the course of the qualitative study, which included participants sampling, data collection, and data analysis. The researcher adopted a maximum variation sampling approach and used the peer debriefing technique, thus enhancing the descriptive validity during data collection and analysis. Moreover, adopting the Braun and Clarke thematic analytical approach allowed the researcher to move back and forth throughout the six phases of data analysis, which resulted in interpretive validity during the data analysis. This analytical approach also

aids the researcher in achieving a deeper understanding of the dataset and assist in identifying and extracting the main themes and subthemes of the study results.

The co-designing of web-app with the HCPs is one of the strengths in this study. The web-app was developed in collaboration with the HCPs who are the target users of this application. As for data security, the web-app has its own cloud server to store patient data in an encrypted fashion. Researcher could have opted for free and readily available drives such as google drive, or social media platforms like Facebook, to display photos for RT. However, there has been concern with privacy around the usage of such platforms. Google provides encryption, but any content uploaded on google drive become proprietary to them. Similarly, there has been concern how Facebook uses client data. Since RT would require uploading of personal photos and videos from the patients, it was necessary to create an independent and secured platform to house the application for data privacy and security purposes.

Meeting the scientific rigor criteria for the qualitative study (such as credibility, transferability, confirmability, and dependability) was a also a significant study strength. Before conducting the interviews, the researcher pilot-tested the interview guide to ensure that she asked the right questions, and the interview guide was revised based on feedback from another graduate students who had expertise in qualitative methodology. After the interview, participants were contacted for member checking to review the transcription of collected data to ensure that the study findings can faithfully represent their experiences and perceptions. The researcher also provided an oral presentation to describe her thematic findings to the HCPs of Ontario Shores as another way of implementing member-checking.

Limitations of the study

The current study evaluated the potential use of WBRT from a small sample of HCPs (n=10), which can be considered a study limitation. Although the data has been collected from a variety of HCPs such as nurses, occupational, recreational, behavioral therapists, and social workers, it did not include the perceptions from the physicians and the family members, who may be able to offer additional perceptions regarding the utilization of WBRT to support dementia care during the COVID-19 pandemic.

Besides, the study was conducted in only one healthcare setting; therefore, the transferability of study findings can be limited. Future research would profit from expanding the sample size to include HCPs from diverse healthcare settings to better understand the various HCP's perceptions regarding the applications of WBRT in dementia care.

The researcher conducted the interview immediately after the technology training; thus, HCPs didn't have the opportunity to explore and navigate the application by themselves. Future research should focus on assessing user experiences once HCPs adopt WBRT as part of their routine dementia care.

Moreover, there was a possibility of social desirability bias as the HCPs were asked to provide personal perceptions on applying web applications to support the delivery of RT and its potential benefits on facilitating caregiving responsibilities. HCPs might have answered the interview questions in a way they assumed was more socially acceptable rather than the way they really felt.

There was also the possibility of researcher bias due to her background and previous patient management experiences. The researcher was mindful during the data collection and analysis, exercised self-reflexivity, and bracketed her professional experiences throughout the study to evaluate the phenomenon of interest through HCP's point of view. In addition, the researcher's academic supervisor reviewed the coded data to prevent potential biases, which helped to validate the study results.

Study implications and Future research

Implications of research findings

Our findings examined the need to utilize a web app to support RT delivery to PWD in an institutionalized setting. We find that a mixture of traditional and digital RT could be beneficial in supporting dementia care as both techniques would complement each other. The WBRT could potentially benefit PWD, their family member or loved ones and HCPs. It is simple to use and can be accessed through any types of digital device. Our findings suggest that WBRT can be accessible and could potentially be used by any HCPs in any healthcare setting. The research findings highlighted the need for improving the accessibility of WBRT and the implementation of appropriate educational training among HCPs to enhance better reach and adoption of the technology. Overall, findings from this research could provide lessons learned and future directions to the improvement of the delivery of RT and dementia care.

Future education and practice direction

This study suggests that digital technology such as web-app has the potential to advance dementia care through RT applications. In the future, the uptake and implementation of

such digital technologies will continue to advance. Hence, academic institutions should start considering the inclusion of exploring the application of digital technologies in their curriculum. HCP's exposure to such digital technologies in their academic training would provide them with the knowledge and skills for their future utilization of these tools to facilitate client-centered care.

Future policy direction

Stakeholders and policy makers could refer to these findings to rethink technology around dementia care. They can rethink the mode of RT delivery in institutionalized settings and take initiatives to implement digital RT as recommended by this study. Supporting vulnerable population amidst this pandemic has been challenging with limited in-person contact and staff shortages; thus, it is the most fertile period for health leaders to bring changes to traditional practices and increase the uptake of digital solutions.

Future research directions

The current research included formal caregivers such as HCPs from one institutionalized setting as interview participants. Future research should consist of HCPs from diverse healthcare settings to promote the transferability of study findings.

The study illustrates HCPs opinion on the importance of WBRT on managing BPSD. In the future, larger studies need to be conducted to explore the impact of WBRT on the reduction of BPSD for PWD with varying stages of dementia. Besides, data needs to be collected from PWD and their family members to evaluate their experiences with WBRT. From the qualitative interviews, it has been identified that PWD might suffer from a short attention span due to cognitive impairment. This could lead to PWDs becoming irritated

or being anxious during the digital RT. Future studies should take this finding into consideration and examine the impact of using both traditional and digital RT separately and simultaneously. Research could explore the factors that enhance PWD's attention and interest during RT.

HCPs highlighted the importance of adding tactile sensation to enhance RT. Thus, incorporating tactile features into the web app technology to support RT has been identified as a future research directive. Kim, Park, and Lim (2021) developed a customized VR including tactile sensation and a familiar environment to determine the impact of VR in PWD and to examine its impact on alleviating BPSD among dementia patients in nursing facilities. The study revealed positive outcomes and supported the potential use of VR- based BPSD technology while incorporating enhanced tactile experiences for PWD.

Findings from the current study will be carried forward to the next iteration of KTA cycle where it will be further implemented and evaluated in relation to patient outcomes. As part of a future project, it has been planned that WBRT would be carried out among PWDs, and their responses/reactions would be studied by analyzing their facial cues (facial tracking) to evaluate the user experiences, as well as comparing the effects of WBRT on patient outcomes in comparison with traditional RT.

Conclusion

This study used qualitative descriptive phenomenological methodology to evaluate the perceptions and lived experience of HCPs on WB applications as digital RT in dementia

care at institutionalized settings amidst the COVID-19 pandemic. This approach provides the researcher with a better understanding about the potential utilization of WB applications to enhance dementia care. Additionally, the application of the KTA framework guided the study in addressing the research question

Our study results suggest that the proposed WB application can be used as a potential RT in dementia care. HCPs perceived that WBRT has the potential to reduce the caregiving burden and improve BPSD. They also highlighted that WBRT could play an important role in dementia care during and post pandemics. Moreover, this study identified HCPs' perceived barriers of utilizing WBRT and suggested recommendations for future refinement of the application.

This study provides a starting point for future large-scale intervention research to understand the impacts of WBRT in patient outcomes. It also attempts to provide guidance to policy makers on factors that needs to be taken into consideration prior to implementing WBRT or similar technologies. The study also provides an opportunity for healthcare researchers who are developing tools for care provision in healthcare facilities to identify features useful to PWDs or their HCPs. Future research should examine the benefits of integrating both web apps and VR technology to enhance the reminiscence experiences for PWD to support dementia care in diverse healthcare settings. Our study outcome provides suggestions to stakeholders and policy makers on transforming traditional to digital technology in dementia management and the feasibility of using digital technology (WBRT) during a pandemic and beyond.

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APPENDICES

Appendix A: Table of articles that were analyzed for the literature review

Author	Country	Type of study	Sample Size	Type of technology	Institution	Outcome
Rehm et al (2016)	Australia	Case study	2 older adults	Tablet devices, Web-based Applications	Residential aged care facilities	Feasible among older adults in RACF Reminiscence Enhance cognitive behavior. Enhance therapeutic engagement. Improve individualized treatment delivery Reduced depression, anxiety, and adjustment related issues in RACF
Astell et al (2018)	UK	Quantitative	161 PWD	CIRCA and CIRCA- WB (Group)	Day program and care home	Improve cognition Improve QoL
Upton et al (2011)	UK	Multi-method approach	Interviews- 10 PWD 1 staff FG- 10 care home staff and care home managers.	Touch screen such as iPad (Web-based applications)	Home care settings	Residents- Increased reminiscence, positive mood and facilitate social interaction. Improve QoL Easy to use. Staffs- Improved engagement, communication and more positive staff-resident relationships.
O'Rourke et al (2011)	Ireland	Pilot study	6 PWD	Youtube	Acute care hospital	Suitable tool for RT Group RT is feasible (engagement) Personalized computerized RT had a positive impact on wellbeing, mood and communication.

Author	Country	Type of study	Sample Size	Type of technology	Institution	Outcome
Samuelsson & Ekstrom (2019)	Sweden	Video recording/ semi structured interview	6 dyads older women and 3 HCPs	Web-based application (CIRCA & CIRCUS)	Residential home	Increase communication between PWD and HCPs. CIRCUS- personalized content CIRCA-generalized content
Moon and Park (2020)	Korea	Pilot RCT	49 PWD	Android application (Personalized content)	Daycare centre	Compared traditional and digital RT- Decreased depression Increased engagement Decrease BPSD Increase cognition
Manav and Simsek (2019)	Turkey	Randomized controlled experimental study	32 PWD	Internet based videos (Youtube) (?)	Nursing Home	Improve cognition Improve apathy
Gilson et al. (2019)	USA	Pilot intervention study (Quantitative)	1089 participants	Table computer with variety of apps based on individual preferences	Institutional and in home settings	Improve mood Improves interaction(socialization) between PWD and their carers
Laird et al. (2018)	UK	Quasi experimental study	30 PWD 30 carers	InspireD (ipad/tablet app) (Personalized)	Dyads	Increase mutuality, Quality of carer and patient relationship
Sarne - Fleischmann et al. (2011)	Greece	Pilot study	5 PWD	Flash web-based application (Personalized)	Psychogeriatric institute	Higher satisfaction Willing to used repeatedly Promote conversation Evoke personal memory Facilitate patient-caregivers interaction.

Author	Country	Type of study	Sample Size	Type of technology	Institution	Outcome
Davison et al. (2016)	Australia	Mixed method randomized single-blinded crossover trial	11 PWD	Memory box (Personal computer with preloaded digitalized materials)	Nursing home	Reduction in depression, agitation and anxiety Feasibility and acceptability by participants, staff and family
Damianakis et al. (2010)	Canada	Qualitative observational study	12 PWD and their family members	DVD-multimedia biographies	Geriatric care institution	Improved social interactions between PWD and their caregivers Reminiscence Enhanced communication
Tyack et al. (2017)	UK	Mixed method study	12 PWD and their informal caregivers	Tablet computer: viewing art	Dyads	Improve QoL Improve cognition, mood and behavior Improve relationship between PWD and their caregivers

Appendix B: Recruitment Flyer



ARE YOU INTERESTED IN EXPLORING TECHNOLOGY TO FACILITATE DEMENTIA CARE?

RESEARCH PARTICIPANTS NEEDED

We are exploring the potential use of a web-based application over traditional reminiscence therapy in managing behavioral and psychological symptoms of dementia during COVID-19.

We cordially invite you to participate in an online training and interview (about 90 minutes) to identify your experiences regarding the application of web-based technology among dementia patients.



This study has been reviewed by the University of Ontario Institute of Technology (Ontario Tech University) Research Ethics Board [insert REB assigned #] on [insert date]

YOU ARE ELIGIBLE IF YOU ARE:

- A healthcare professional employed in GDU and GTU of Ontario Shores Centre for Mental Health Sciences ((i.e., Registered nurse, registered practical nurse, recreational therapist or personal support worker etc.)
- Work directly with persons with dementia
- 18 years of age and older, and English-speaking

If you want to participate, please contact:

Rabia Akhter

MBBS, MHSc (Candidate)

Ontario Tech University

Phone: 416-XXX-XXXX

Email: rabia.akhter@ontariotechu.net

Appendix C1: Verbal Recruitment Script (Online)

Hello everyone,

My name is Rabia Akhter, and I am a graduate student at Ontario Tech University. I am currently working on my thesis research, for which I will be exploring the opportunities of web-based reminiscence therapy application for persons with dementia during the social distancing of the COVID-19 pandemic. I am here to invite you to participate in my thesis research study.

The purpose of this study is to explore the perceptions of healthcare professionals' utilization of web-based reminiscence therapy (WBRT) in institutionalized settings and their perception of how this intervention can support PWD's BPSD during COVID-19 social distancing. A 30-to-45-minute virtual educational training about the application of web-based technology will be provided to the healthcare professionals, followed by a one-on-one on-line interview, which will be conducted with the participants lasting take up to 45 minutes. You will be asked to complete a short socio-demographic questionnaire and informed written consent prior to the interview.

The anticipated outcome of this study is to explore the potential of using a web-based application to support reminiscence therapy for persons with dementia (PWD) in institutionalized settings during the social distancing of COVID-19. This study will also identify the barriers and facilitators about the application of web-based technology by healthcare professionals (HCPs) and its potential to increase the caregiving ability of HCPs and reduce their workload. If you are willing to participate, you can connect with me through my phone or email so that we can set up a time that works for you the best. My contact information is on the flyer provided.

Appendix C2: Email Recruitment Script

Project Title:

A pilot study to explore healthcare professionals' perception of using a web-based reminiscence therapy to support dementia care during the COVID-19 pandemic and beyond

You are invited to participate in a research study that is exploring the potential use of non-immersive web-based application as reminiscence therapy for persons with dementia (PWD) in managing behavioral and psychological symptoms of dementia in institutionalized settings during COVID-19 social distancing, conducted by Ontario Tech University.

Participants will first have a 30-to-45-minute virtual educational training on the web-based technology followed by a 45 minute one-on-one on-line interview. You will be asked to complete a short socio-demographic questionnaire and informed written consent before the interview.

Potential Benefits:

The anticipated outcome of this study is to explore the potential of using a web-based application to support reminiscence therapy for persons with dementia (PWD) in institutionalized settings during the social distancing of COVID-19. This study will also identify the barriers and facilitators about the application of web-based technology by healthcare professionals (HCPs) and its potential to increase the caregiving ability of HCPs and reduce their workload.

Attached is a consent form for further details. If you are interested in participating, please contact:

Researcher:

Graduate Student: Rabia Akhter

Departmental and institutional affiliation(s): Faculty of Health Sciences at Ontario Tech University

Contact number/email: 416-XXX-XXXX; rabia.akhter@ontariotechu.net

Appendix D: Letter of information and Participant Consent Form

Title of Research Study: A pilot study to explore healthcare professionals' perception of using a web-based reminiscence therapy to support dementia care during the COVID-19 pandemic and beyond



Name of Principal Investigator (PI): Sheri Horsburgh, Ontario Shores Centre for Mental

Health Sciences and Dr. Winnie Sun, Ontario Tech University

PI's contact number/email: SH: horsburghs@ontarioshores.ca; T: 905-668-5881 ext 6894

WS: winnie.sun@ontariotechu.ca; T: 905-721-8668 Ext. 5349

Graduate Student Lead and contact number(s)/email: Rabia Akhter, rabia.akhter@ontariotechu.net

Introduction

You are invited to voluntarily participate in a research study because you are a health care professional employed in an institutionalized setting for older adults (ie. recreational therapist; registered nurse; registered practical nurse or personal support workers etc), able to provide informed consent on your own and able to speak and understand English.

This consent form provides you with information to help you make an informed choice. Please read this document carefully and take time in making your decision. You may find it helpful to discuss it with your friends and family.

Taking part in this study is voluntary. You may choose not to take part and if you choose to participate you may leave the study at any time without giving a reason. Deciding not to take part or deciding to leave the study later will not impact your employment status at Ontario Shores. Approximately 6 people will take part in this study.

Purpose and Procedure:

Reminiscence therapy (RT) is a form of non-pharmacological treatment that uses all the senses — sight, sound, touch, smell, and taste to aid persons with dementia (PWD) to remember events, people, and places.

The purpose of this research is to understand healthcare professional's experiences and perceptions in the use of a web-based reminiscence therapy platform and its potential role in the management of behavioral and psychological symptoms of dementia (BPSD).

You will be asked to participate in a 30-to-45-minute online training session on the web-based reminiscence therapy platform. You will need to use a desktop/laptop/tablet for this. During the training session, you will be able to add reminiscence therapy content to the web-based application, such as music, pictures and videos available from Google. You will then be scheduled for a 30–45-minute one-on-one videoconference (Zoom) interview at a mutually agreed upon time. You will be asked to complete a questionnaire that includes your age, gender, and caregiving role before the start of the interview. During this interview, you will be asked open-ended questions about your experience with the online technology. Interviews will be audio-recorded using the internal audio-recording mechanism of the online platform (Zoom), and you may ask to review a verbatim transcript of the interview once it has been completed.

Potential Benefits:

If you agree to take part in this study, the study will not be of direct benefit to you. The results of this study may help provide better technology solutions for use in reminiscence therapy.

Potential Risk or Discomforts:

There are minimal risks associated with this study. You might feel exhausted from the online training and interview process. If so, we will take a break and will resume the interview if you wish to continue. Also, you have the right to withdraw from the interview at any point if you are not comfortable doing so.

You may refuse to answer any question you do not want to answer, or not answer an interview question by saying, 'pass'.

Confidentiality:

Your confidentiality will be respected. However, research records or other source records identifying you may be inspected in the presence of the Investigator or his or her designate by representatives the Research Ethics Board overseeing this research for the purpose of monitoring the research. No information or records that disclose your identity will be published without your consent, nor will any information or records that disclose your identity be released without your consent unless required by law.

You will be assigned a unique study number as a participant in this study. Only this number will be used on any research-related information collected about you during the course of this study, so that your identity as a participant in this study will be kept confidential. Information that contains your identity will remain only with the Principal Investigator and will be stored in a personal, password-protected folder within an Ontario Tech google drive, accessible only to the study team. The list that matches your name to the unique study number will not be released without your consent unless required by law.

Your rights to privacy are legally protected by federal and provincial laws that require safeguards to insure that your privacy is respected. Please note that confidentiality cannot be guaranteed while data are in transit over the Internet. The non-identifiable data may be kept beyond the length of this study, in the event that your data to become secondary use in future related research. We will archive the data for a maximum of 10 years after which we will delete the data.

Right to Withdraw:

If you withdraw from the research project at any time, you need not offer any reason for doing making this request. You may withdraw from the study before we have anonymized and aggregated your data, which would be 3 months after you have been interviewed. After that data will be anonymized. Please note it is not feasible to withdraw your results once your data has been anonymized and aggregated as it will be impossible to trace it back to you after the elimination of direct identifiers. It will also be difficult, if not impossible, to withdraw results once they have been published or otherwise disseminated. Participants can contact the researcher to withdraw via email address and/or phone number provided on the consent form.

Conflict of Interest:

There are no conflicts of interest present in this study.

Compensation, Reimbursement, Incentives:

There is no compensation for participating in this study. However, the result generated from this study will benefit persons with dementia, their informal caregivers, and healthcare professionals about the potential of web-based application as reminiscence therapy to support social connectedness during the COVID-19 social distancing.

Debriefing and Dissemination of Results:

The results from this study will help lead the future development of web-based application as reminiscence therapy in different healthcare settings and will reduce healthcare professionals care burden and increase their competence in managing BPSD. If you wish to be informed of the results of this study, please feel free to contact the researchers named above at the given email addresses up to 6 months after the interview.

Participant Rights and Concerns:

If you have any questions concerning the research study or experience any discomfort related to the study, please contact the researcher **Rabia Akhter** at rabia.akhter@ontariotechu.net.

Any questions regarding your rights as a participant may be addressed to Natascha Kozlowski, the Chair of the Ontario Shores Research Ethics Board (REB) at 905.430.4055 x. 6996.

Appendix E: Email for an invitation to the training session

Dear X,

Thank you for your interest in participating in our research study, titled- A pilot study to explore healthcare professionals' perception of using a web-based reminiscence therapy to support dementia care during the COVID-19 pandemic and beyond.

We would like to set up a zoom training session with you on (date/time) to educate and train you on the web-based reminiscence therapy application. The training session will take approx. 30-45 minutes.

Please click the zoom link below to get access to the meeting-

<https://us02web.zoom.us/meeting#>.

If you have any technical difficulties or would like to reschedule the zoom meeting, please contact me through email at rabia.akhter@ontariotechu.net or by phone at 416XXXXXXX.

I am looking forward to seeing you in the training session.

Regards,

Rabia Akhter

Graduate Student

Ontario Tech University

Appendix F: Interview Guide

Title of Research Study:

A pilot study to explore healthcare professionals' perception of using a web-based reminiscence therapy to support dementia care during the COVID-19 pandemic and beyond

Introduction

Thank you for meeting with me today. My name is Rabia. I would like to talk to you about your perceptions of using web-based applications as reminiscence therapy among Persons with Dementia (PWD) and its possibilities on managing behavioral and psychological symptoms of dementia (BPSD) during COVID-19 social distancing. The interview should take approximately 30-45 minutes. I will be audio recording the session with your permission, so I don't miss out on any of your answers to the questions. Even though I'll be taking notes during the interview, I won't be able to write everything down. Because we'll be audio recorded, please make sure to speak up, so we don't miss anything when putting your responses into the paper copy. Your answers will be kept confidential. They only will be shared with research team members, and we will make sure that whatever information we include in our report does not identify you in any way. You do not have to talk about anything you don't want to, and you may end the interview at any time. Here is a consent form that provides the details of the study. I will read through each part of this consent with you to ensure you understand before you sign this form. You will be provided a copy of this signed consent form. If you have any questions, please feel free to ask me at any time. Please feel free to contribute your perceptions at any time, remembering there are no right or wrong answers.

Before we begin the interview, I will ask you a few questions to assist us in understanding your experience better (Socio-demographics Questionnaire).

The information provided here will help us identify relevant background information in understanding your experiences in managing persons with dementia. Please only answer the questions you are comfortable providing information about.

(Completion of Socio-demographic questionnaire) Thank you. We will begin the interview. Do you have any questions before we start?

Interview prompt Questions

1. What prompted you to agree to this interview?
2. Tell me about your experience of reminiscence therapy in managing BPSD? (Types of RT you have been using? Advantages and disadvantages of it.)

3. Did you have experienced using technologies for reminiscence therapy before? If yes, what is your preferred method of delivering reminiscence therapy among PWD (traditional/digital)?
4. What is your overall impression of using web-based reminiscence therapy application?
5. How far do you think using the web-based application may affect your relationship with PWD? Why?
6. What impacts do you anticipate with the use of web-based reminiscence therapy on your caregiving responsibilities?
7. Do you think using this digital technology during COVID-19 social distancing is feasible? Why or why not?
8. What are your thoughts on substituting the web-based application with traditional RT at institutionalized settings? Why?
9. Do you think PWD could use this technology for self-management? Why or why not?
10. Did you experience any difficulties in using web-based applications? What were the challenges?
11. What are your perceptions of potential facilitators in implementing web-based applications in dementia care?
12. What are your perceptions of potential barriers in implementing web-based applications in dementia care?
13. What is your opinion on using personalized content (picture/ video) as RT for PWD? Do you think this would be helpful? Why or why not?
14. Will you recommend others to use this web-based technology as reminiscence therapy? Why or why not?
15. Is there anything else you would like to say that I have not asked about?

Conclusion:

(End audio recording.) Okay, I'll be making this audio recording into a printed record, which I will review with you to ensure we were able to record your answers accurately (if you would like to do this). This data will be used to develop a report on the research findings. If you're interested in remaining updated with this study, feel free to get in touch with me using the contact information provided. We are keeping a list of people who are interested and will present the findings to them.

Thank you so much for your time!

7. How many years of working experience in institutionalized care settings do you have? _____

8. Do you have any formal training in working with patients with dementia? If yes, please define: (ie. certification in gerontology; cognitive rehabilitation etc)

9. How many years of working experience with persons with dementia do you have? _____
10. How many years of experience do you have with traditional reminiscence therapy? -----

Thank you very much for your time!

Appendix H: Member Checking Sample

Hello X,

I am Rabia Akhter, a graduate student from Ontario tech University. Today, I am calling you to update you about our research project titled – “A pilot study to explore healthcare professionals perception of using a web-based reminiscence therapy to support dementia care during the COVID-19 pandemic and beyond” that you have participated a few weeks back. As you have requested to do the member checking of your interview, I will spend this time to go over the interview transcript with you over the phone to check for accuracy of the data transcription. The goal is to ensure that the presenting information resonates the description of your experiences

(After getting permission):

I will start going through the transcript with you. Please do not hesitate to stop me anytime if you have any questions and ask me to repeat any information as needed. Please also feel free to inform me if you are satisfied with the information and do not wish to proceed with the transcript checking further.

(After the completion of transcript checking.):

Do you have any questions about the data transcript? Would you like to make any further changes to the existing information? Do you have anything else to add to or remove from the interview content?

Thank you for your time and support of our research study.