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Learnings From a Novel Virtual Care Planning Intervention Targeting Registered Practical Nurses in Long-Term Care Homes During COVID-19

Leçons apprises d'une nouvelle intervention de planification de soins virtuels ciblant les infirmières auxiliaires autorisées dans les foyers de soins de longue durée pendant la COVID-19

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Keywords

older adults; families; long-term care; care planning; responsive behaviors

Abstract

Introduction: The PIECES approach has been utilized for over 25 years across various Canadian healthcare settings, including long-term care (LTC). PIECES fosters a team-based, person-centred approach to addressing responsive behaviors–such as yelling and restlessness–often linked to unmet personal needs. **Objective**: This study aimed to explore, with implementation of the virtual version of PIECES: (a) the experiences of LTC staff, focusing on challenges, facilitators, and recommendations; and (b) resilience and interprofessional collaboration among LTC staff. **Methods**: A convergent mixed method approach used focus groups with registered practical nurses (RPNs), managers, PIECES-trained RPN champions and PIECES mentors to gather their experiences. Surveys at baseline and post-intervention assessed individual and workplace resilience, and team collaboration. **Results**: Themes identified through reflexive thematic analysis included increased team collaboration and efficacy to manage responsive behaviors through PIECES care planning. Formalized processes supported by leadership with input from family/care partners enhanced nurses' ability to provide the needed care for responsive behaviors. Primary challenges to PIECES implementation were unfamiliarity with technology and staff shortage. Recommendations included embedding technology in usual care, ongoing support with referral process and continued virtual PIECES training. Standard outcome measures revealed reduced personal and workplace resilience, and team collaboration. **Discussion and Conclusion**: The RPN-led referral algorithm for the virtual PIECES approach invested the LTC staff together during the difficult COVID period and challenged their existing skills and knowledge of technology.

Mots-clés

personnes âgées; familles; soins de longue durée; planification des soins; comportements réactifs

Résumé

Introduction : L'approche PIECES est utilisée depuis plus de 25 ans dans divers milieux de soins de santé canadiens, y compris dans les foyers de soins de longue durée (SLD). PIECES favorise une approche d'équipe centrée sur la personne pour apaiser les comportements réactifs (ex. : cris, agitation) souvent liés à des besoins non satisfaits. **Objectif** : Cette étude visait à explorer, avec la mise en œuvre de la version virtuelle de PIECES : (a) les expériences du personnel en SLD, en particulier les défis, les facilitateurs et les recommandations; et (b) la résilience et la collaboration interprofessionnelle au sein de ce personnel. **Méthodes** : Une approche convergente de méthodes mixtes a été utilisée. Des groupes de discussion (infirmières auxiliaires autorisées (IAA), gestionnaires, championnes IAA formées à PIECES, mentors PIECES) ont permis de recueillir leurs expériences. Des questionnaires avant et après l'intervention ont évalué la résilience individuelle et organisationnelle, et la collaboration en équipe. **Résultats** : L'analyse thématique réflexive a montré une collaboration d'équipe et une efficacité accrues envers les comportements réactifs. Des processus formalisés ont amélioré la capacité des IAA à prodiguer les soins nécessaires aux comportements réactifs. Les principaux défis : la méconnaissance de la technologie et le manque de personnel. Les recommandations incluaient l'utilisation de la technologie dans les soins courants, un soutien continu au processus, ainsi qu'une formation continue en PIECES virtuelle. Les mesures de résultats standards ont révélé une réduction de la résilience personnelle et organisationnelle ainsi que de la collaboration en équipe. **Discussion et conclusion** : L'approche virtuelle PIECES a réuni le personnel en SLD pendant la période difficile de la COVID, mettant à l'épreuve leurs compétences et connaissances de la technologie.

INTRODUCTION

Responsive behaviors (e.g., yelling, restlessness, hitting) among older adults living in long-term care (LTC), typically indicating unmet needs such as boredom, thirst, hunger, and pain, are highly prevalent and often underreported (Song et al., 2019). Responsive behaviors increased among older adults in LTC with the health and safety restrictions imposed during COVID-19, likely due to reduced stimulation secondary to the strict isolation protocols (Oliveira et al., 2021), fewer staff, unfamiliar caregivers, and reduced presence of family and care partners (Stall et al., 2021). Before the pandemic, family members contributed up to 30% of care, including assistance with personal care, meals, social stimulation, and emotional support (Qudrat-Ullah & Tsasis, 2017). Despite their critical role and valuable knowledge of their loved ones' needs and preferences, family members are often not included as active participants in care planning and delivery models (Tupper, Ward, & Parmar, 2020).

The PIECES approach guides holistic, evidence-informed collaborative family-centered, team-based care planning to support the complex physical, social, emotional, and psychological needs of older adults (Hamilton, 2020). The PIECES approach emphasizes optimal health and the prevention of unnecessary disability by considering the person's Physical, Intellectual, and Emotional health; strategies to support individual Capabilities, the social and physical Environment, and Social self, including life story, beliefs, culture, spiritual, sexuality, gender identity (Hamilton). PIECES has been used across Canada for over 25 years to address responsive behaviors of patients/residents in acute care, LTC, home and community care, complex continuing care, and mental health settings. The COVID-19 pandemic made it imperative to adapt PIECES for virtual delivery in LTC where restrictions prevented in-person presence of family/care-partners to contribute, with the LTC staff, to care plans.

This research aligns with three of the six promising practices outlined by the Canadian Foundation for Healthcare Improvement (2020): enhancing pandemic preparedness (planning for COVID-19 and non-COVID-19 care); developing a clear workforce strategy for integrated resident care (engaging staff effectively); and safely engaging family in care partnerships (presence of the family). Registered Practical Nurses (RPNs) and a behavioral support lead (clinicians focused on supporting residents with responsive behaviors) attended virtually a two-day PIECES Learning and Development Program (Hamilton, 2020), facilitated by PIECES mentors. RPNs served as PIECES champions within LTC homes, preparing and leading videoconferences with the family/care partners, the resident and other healthcare team members (on- or off-site) to develop an integrated care plan. This virtual PIECES approach provided the LTC home with care plans to maintain high-quality care practices during the COVID-19 pandemic and include family and care partners in care reviews and decisions.

OBJECTIVE

Given the ongoing challenges of the COVID-19 pandemic, recurring outbreaks and the risk of future contagions, it is crucial to have evidence-based virtual strategies and clear policies to guide LTC staff in providing high-quality care to residents regardless of outbreak status. Therefore, the purpose of this study was to explore, with implementation of the virtual version of PIECES: (a) the experiences of LTC staff, focusing on challenges, facilitators, and recommendations; and (b) resilience and interprofessional collaboration among LTC staff.

METHODS

DESIGN

A convergent mixed methods study design was used, collecting qualitative data through focus groups and quantitative data via surveys, both before and after implementation of the virtual version of the PIECES approach to address responsive behaviors in residents of the two LTC homes.

SETTING

Two LTC homes in Ontario, Canada, participated in implementing the virtual PIECES approach. While some nurses and an administrator were familiar with the research team and the PIECES mentors, there was no prior relationship between the principal investigator and the LTC homes. Both LTC homes supported the PIECES training and several nurses had completed it. However, PIECES was not integrated into day-to-day practices before the study. Both LTC homes are mid-sized, privately owned with 138 and 146 beds, and have been operated for over 30 years. One is for-profit venture, the other non-profit. Both facilities provide a range of medical and non-medical services to meet the residents' needs, including family physicians, nursing and personal care aides, housekeeping, dietary, custodial, leisure and activities, nutritional services, physiotherapy, and social work.

SAMPLE AND RECRUITMENT

Participants in the focus groups (n=15) included a convenience sample of RPNs, managers, PIECES mentors, and PIECES-trained RPNs and behavioral support leads. They were key stakeholders in supporting and/or leading the implementation of the virtual PIECES approach. Participants were recruited by a research team member (MLY) via email or phone after being identified by the LTC home administrators. Survey participants were LTC staff members involved in leading, delivering, and/or supporting the PIECES intervention. All 50 RPN staff members from both LTC homes, including full-time, part-time and casual, were invited to participate; 18 and 11 responded to the baseline and post-intervention surveys, respectively. Due to the limited number of available staff, a sample size calculation was not feasible (Arain, 2010). All participants were fluent in English.

INTERVENTION

At each LTC facility, a PIECES-trained RPN was appointed as RPN champion to lead PIECES referrals for residents experiencing responsive behaviors. The RPN worked with a manager/nurse supervisor and other staff, including personal support workers, social workers, and recreational therapists. Upon a PIECES referral, the RPN champion contacted family members to schedule a virtual care conference to discuss the resident's responsive behaviors and develop a care plan. The conference, held via PHIPA (Personal Health Information Protection Act)-approved Zoom, included the RPN champion, PIECES-trained RPNs, family members, and the resident. Follow-up was done by phone with the PIECES-trained RPN or the RPN champion or in-person to update families about the outcomes of strategies used. PIECES mentors provided training, debriefing, and support during implementation.

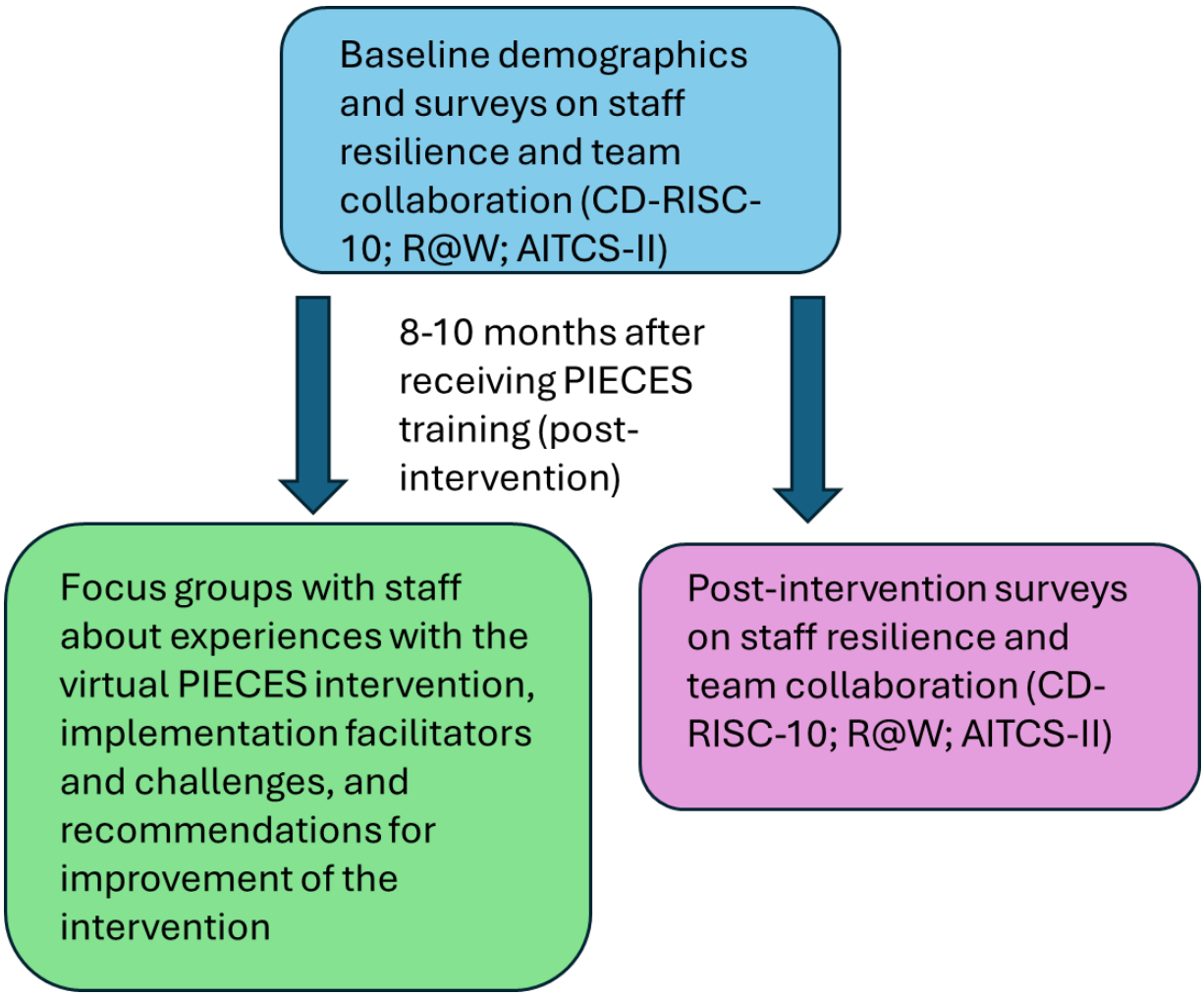
DATA COLLECTION

Data were collected from April 2021 to February 2022. Demographic characteristics (e.g., age, gender, role, household income), quantitative survey data related to COVID-19 influences and standardized outcome measures of resilience and team functioning were collected from participants using Qualtrics XM (2024) software (baseline). RPNs and behavioral support leads were invited by email to complete open online surveys via Qualtrics XM prior to (baseline) and approximately 8 to 10 months later, after receiving virtual PIECES training, and having completed virtual PIECES care planning meetings with residents and their families (post-intervention). The survey could be accessed and completed using a desktop computer, laptop, tablet, or smartphone. The survey was available in English only. Responses were safely contained on a firewall- and password-protected computer. Valid and reliable scales of individual (personal) and workplace resilience, and team collaboration were used. See Figure 1 for an overview of data collection.

Qualitative data were collected through focus groups with PIECES-trained LTC staff, including RPNs and a behavioral support lead across both sites, RPN champions, managers, and PIECES mentors at the end of the study period. A total of six virtual focus groups were held via Zoom videoconferencing, each consisting of two to three participants. Multiple sessions were held to accommodate varying work schedules of participants and COVID-19 outbreaks.

Figure 1

Data collection activities



The focus groups were conducted by two postdoctoral associates (MLY, MH) with training and experience in conducting qualitative data collection. Each session lasted between 45 to 90 minutes with participants grouped by similar disciplines and roles in implementing the virtual PIECES approach (Kitzinger and Barbour, 1999). Focus group guides were developed based on a review of the literature on implementation science, PIECES, virtual care conferences, responsive behaviors, older adults, LTC, along with the feedback of the research team (see Table 1 for sample questions). Participants were asked about their experiences with the virtual PIECES approach, implementation facilitators and challenges, and recommendations for improvement. Interviews were recorded, de-identified and transcribed verbatim by an experienced transcriptionist. Additionally, field notes and reflexive memos were taken (MLY, MH) during the focus groups.

To measure intervention impacts, individual (personal) resilience was quantified using the 10-item self-rated Connor Davidson Resilience Survey (CD-RISC-10) (Campbell-Sills & Stein, 2007; Connor & Davidson, 2003). Scores ranged from 0 to 40 with higher scores indicating greater resilience (Campbell-Sills & Stein). The Cronbach's alpha value was 0.85, indicating the scale had good reliability and construct validity (Campbell-Sills & Stein). Workplace resilience was measured using the Resilience at Work scale (R@W) (McEwen, 2018). This scale is composed of 20 items and

scores ranging from 0 to 140 with higher scores indicating greater resilience (McEwen; Winwood et al., 2013). The scale has good reliability and validity with a Cronbach's alpha value of 0.84 (Winwood et al.). The Assessment of Interprofessional Team Collaboration Scale (AITCS-II) was used to measure the outcome of team collaboration (Orchard et al., 2012). This scale has 23 items and scores range from 23 to 115 with higher scores indicating better team collaboration (Orchard et al.). The overall reliability of the scale was 0.98, demonstrating that it is a reliable and valid instrument (Orchard et al.).

Data Analysis

Demographic and survey data are presented as frequency and percentages for categorical variables and means and standard deviations for continuous variables (SPSS® version 28.0.1; IBM, 2021). Statistical analysis by comparison methods was prevented, as not all participants at baseline also completed post-intervention data collection.

We conducted a reflexive thematic analysis using a directed approach (Braun and Clarke, 2019). Data from the interview were categorized based on the research objectives to organize participants' experiences with the virtual PIECES approach, including i) learning and using the approach; ii) facilitators; iii) challenges; and iv) recommendations for implementation in a multidisciplinary LTC team. Focus group transcriptions were analyzed to identify themes (Braun and Clarke, 2021) related to the use of the virtual PIECES care planning approach in daily practice. Transcripts were read and re-read to increase familiarity, and open coding was used to identify key aspects of the participants' experiences. Preliminary inductive codes were generated individually by research team members (MLY, DC) and refined through regular discussions. This iterative process of comparing and refining codes and themes continued until no new information emerged from coding of transcripts (Guest et al., 2021).

Ethical Considerations

Ethics approval was provided from the local University Ethics Boards (#118629 and #H21-01428). All participants received a written introduction to the study and an informed consent form written in plain language. Participants provided verbal or written informed consent. A $25 gift card was provided to all RPNs and the behavioral support lead in recognition of their participation.

Results

Survey

A total of 18 and 11 participants completed surveys at baseline and following implementation of the virtual PIECES approach in a care planning meeting, respectively. At baseline, all surveys were complete and therefore no data collected were excluded from data analysis (completion rate of survey=100.0%). At post-intervention, survey completion rates ranged from 81-100%; all post-intervention surveys were included in the analysis.

Focus Group

A total of 15 professionals involved in delivering the virtual PIECES approach participated in focus groups: two LTC managers, two RPN champions involved in leading the virtual PIECES approach, three PIECES mentors, seven RPNs and one behavioral support lead. All focus group participants were women.

Demographic Characteristics

At baseline there were a total of 18 participants, with women comprising 75.0%. The most common age groups were 35-44 years (38.9%) and 45-54 years (33.3%), working full-time (44.4%) or part-time (44.4%), with 1 to 3 years of experience (50.0%) (see Table 2). None of the survey respondents worked outside of the LTC sector.

Post-intervention, that is, using the virtual PIECES approach in a care planning meeting, a total of 11 participants, 90% women, completed the survey.

Self-Reported Individual and Workplace Resilience and Team Collaboration

Scores out of a maximum of 40 for the CD-RISC-10 were lower post-intervention, 31.8 (4.2) at baseline versus 26.9 (10.6), indicating lower

personal resilience among the participants. Resilience at work (R@W) total score for the baseline and post-intervention groups of participants were the same. However, subscale scores for living authentically, interacting cooperatively, building networks, finding your calling, staying healthy, managing stress and maintaining perspective were all lower by 0.1 to 0.5 points at post-intervention. Total score at baseline on the AITCS-II, assessing self-reported team collaboration, was 67.1 at baseline compared to 42.4 at post-intervention. However, scores on the AITCS-II subscales of partnership, cooperation, and coordination remained similar between measurements, with a difference of less than 0.1. Group mean and range values for CD-RISC-10, R@W and AITCS-II are presented in Table 3.

Perception of the Virtual PIECES Approach

Themes identified from the findings were organized within four main categories to address the objectives: (a) experiences with the virtual PIECES approach, (b) facilitators supporting the virtual PIECES approach; (c) challenges to implementing the virtual PIECES approach; and (d) recommendations for delivering and sustaining the virtual PIECES approach. See Table 4 for a summary of the themes within the four categories of data findings.

Experiences With the Virtual PIECES Approach

Increased Team Collaboration. The virtual PIECES approach helped LTC staff to apply a holistic lens when delivering person-centered care for older adults experiencing responsive behaviors. Staff reported that through PIECES they realized all members of the team have valuable information, which can help inform care delivery. One RPN noted the importance of involving all members of the team:

> We're not working all alone. We can use all the members of the team and work together and figure out physical symptoms. Team collaboration and getting the frontline staff involved and sharing information. Everyone knows that they have an important part of care for this resident. (Site 1_RPN)

Care team membership became better defined as a result of the implementation of the virtual PIECES approach. For example, when guided by the PIECES model, LTC staff were found to collaborate more with external partners, such as Behavioral Supports Ontario (i.e., an organization offering services to support the care of people living with complex mental health issues) and families in care planning. One RPN noted that she sought the input of families to better care for a resident, "She [resident] did not speak English, there was a language barrier. With PIECES, it taught me how to collaborate, I learned some key words from her daughter to calm her [resident] down." (Site 1_RPN)

LTC staff perceived that, with inconsistent staff working on the units in LTC homes, it is sometimes difficult to ensure information is well communicated. One RPN reported that huddles as part of the virtual PIECES approach promoted collaboration and consistency in adhering to care plans.

> Just the collaboration is sometimes difficult because there is inconsistent staffing. The same with care planning, that's not necessarily followed through with either so there are some difficulties with that in that sense but it's nice to have those huddles where you can collaborate with all the different aspects of the team for approaches to care. (Site 2_RPN)

Built Capacity of LTC Staff to Address Responsive Behaviors. PIECES mentors, managers, and RPN champions noted that LTC staff were becoming more confident and knowledgeable in supporting older adults experiencing responsive behaviors as the program progressed. RPN participants also developed leadership skills in leading multidisciplinary rounds labelled as 'huddles'. "I definitely feel that it [virtual PIECES] helped me grow and develop as a nurse and my leadership skills I would say in leading the huddles." (Site 2_RPN) As a result of the virtual PIECES approach, LTC staff became better equipped to recognize when a behavior displayed by an older adult was concerning. One RPN stated that they could identify abnormal behaviors more easily: "Of course, if you see the behavior, you know that there's something wrong with that person." You can recognize it easier now." (Site 1_RPN)

Table 1

Example of focus group questions

Question
1. What has been your experience in being a part of the implementation of virtual PIECES? a. What worked well? b. What could have been done differently or better? c. What new learnings did you gain in being part of the project?
2. To what extent has the use of the PIECES approach with virtual team collaboration (videoconferencing) changed staff practice? a. Engagement of family members? • How does involving family members in the care of residents fit into staff's daily work experience? • What were the benefits of using virtual technology? • What were the detractions of using virtual technology? b. Collaboration of team members? • How does the virtual team collaboration aspect of PIECES fit into the staff's daily work experience?
3. What did you think of the training and mentoring component of the PIECES project?
4. How do you see virtual PIECES being used in the LTC home after the study is completed?
5. How would you describe the level of success of the virtual implementation of the PIECES approach in the LTC home?
6. How complicated is the implementation process of the PIECES approach with virtual care conferences?
7. What do you think will continue to be put in place (e.g., huddles, algorithms, referral processes, PIECES shifts) so that staff can use the PIECES approach?

Table 2

Summary of survey respondent demographic information

	Baseline-Survey		Post-Survey	
Demographic characteristic	N	Percentage of Respondents	N	Percentage of Respondents
Age (years)	n=18	Sum (100%)	n=11	Sum (100%)
<25	2	11.1%	0	0.0%
25-34	3	16.7%	4	36.3%
35-44	7	38.9%	2	18.2%
45-54	6	33.3%	4	36.4%
≥65	0	0.0%	1	9.1%
Marital Status	n=18	Sum (100%)	n=11	Sum (100%)
Married/ Long-term relationship	10	55.6%	5	45.5%
Single	5	27.8%	2	18.2%
Widowed	0	0.0%	1	9.1%
Prefer not to say	3	16.6%	3	27.2%
Gender	n=16	Sum (100%)	n=11	Sum (100%)
Female	12	75.0%	10	90.9%
Male	3	18.7%	0	0.0%
I prefer not to say	1	6.3%	1	9.1%
Status in Canada	n=9	Sum (100%)	n=11	Sum (100%)
Canadian Citizen	9	100.0%	9	81.8%
Permanent Resident	0	0.0%	1	9.1%
Prefer not to say	0	0.0%	1	9.1%
Primary Language	n=19	Sum (100%)	n=13	Sum (100%)
English	14	73.7%	9	69.2%
Other	5	26.3%	4	30.8%
Ethnicity	n=10	Sum (100%)	n=12	Sum (100%)
White/Caucasian	7	70.0%	6	50.02%
Filipino	0	0.0%	1	8.33%
South Asian	0	0.0%	1	8.33%
Latin American	1	10.0%	1	8.33%
Chinese	2	20.0%	1	8.33%
Southeast Asian	0	0.0%	1	8.33%
Prefer not to answer	0	0.0%	1	8.33%
Employment Status	n=9	Sum (100%)	n=11	Sum (100%)
Full-time RPN	4	44.4%	8	72.7%

	Baseline-Survey		Post-Survey	
Demographic characteristic	N	Percentage of Respondents	N	Percentage of Respondents
Part-time RPN	4	44.4%	1	9.1%
Casual RPN	1	11.2%	1	9.1%
Working but not as an RPN	0	0.0%	1	9.1%
Years of Registration as an RPN	n=10	Sum (100%)	n=12	Sum (100%)
<1	1	10.0%	1	8.3%
1-3	5	50.0%	0	0.0%
4-7	1	10.0%	5	41.6%
8-12	1	10.0%	2	16.7%
13-20	1	10.0%	2	16.7%
≥21	1	10.0%	0	0.0%
I am not an RPN	0	0.0%	2	16.7%
Household Income	n=8	Sum (100%)	n=11	Sum (100%)
< $5,000	0	0.0%	1	9.1%
≥$75,000	6	75.0%	7	63.6%
Prefer not to say	2	25.0%	3	27.3%
Unionization LTC employment status	n=18	Sum (100%)	n=11	Sum (100%)
Unionized	18	100.0%	10	90.9%
Nonunionized	0	0.0%	1	9.1%
Type of LTC facility	n=7	Sum (100%)	n=11	Sum (100%)
For profit	3	42.9%	1	9.1%
Non-for-profit, public/municipality	4	57.1%	8	72.7%
Non-for-profit, private	0	0.0%	2	18.2%
LHIN	n=13	Sum (100%)	n=6	Sum (100%)
Erie St. Clair	10	76.9%	5	83.3%
Southwest	3	23.1%	0	0.0%
Toronto Central	0	0.0%	1	16.7%
Hours per week working in LTC	n=7	Sum (100%)	n=10	Sum (100%)
20-40	6	85.7%	5	50.0%
>40	1	14.3%	5	50.0%
Role/Job Title	n=18	Sum (100%)	n=15	Sum (100%)
Staff nurse	15	83.3%	6	40.0%
RAI-MDS Coordinator	1	5.6%	1	6.67%
Infection Prevention and Control	0	0.0%	2	13.32%
Manager	0	0.0%	1	6.67%
Clinical Resource Nurse	0	0.0%	1	6.67%
Quality Lead	1	5.55%	3	20.0%

	Baseline-Survey		Post-Survey	
Demographic characteristic	N	Percentage of Respondents	N	Percentage of Respondents
Other	1	5.55%	1	6.67%
Current Living Situation	n=11	Sum (100%)	n=12	Sum (100%)
With Partner	3	27.3%	3	25.0%
With Children <18 years of age	3	27.3%	3	25.0%
With other family members	2	18.2%	3	25.0%
With Children ≥18 years of age	2	18.2%	0	0.0%
Prefer not to answer	1	9.0%	3	25.0%
Caregiving Responsibilities Unrelated to Employment	n=9	Sum (100%)	n=12	Sum (100%)
I take care of my children	5	55.6%	4	33.3%
I take care of a parent or extended family	1	11.1%	2	16.7%
None	2	22.2%	6	50.0%
Prefer not to answer	1	11.1%	0	0.0%
Years since previous PIECES training	n=9	Sum (100%)	n=11	Sum (100%)
<1	0	0.0%	4	36.36%
1-3	0	0.0%	4	36.36%
4-7	1	11.1%	1	9.1%
8-12	2	22.2%	0	0.0%
Never	6	66.7%	2	18.18%

Notes. LTC: Long-term Care; LHIN: Local Health Integrated Network; RAI-MDS: Resident Assessment Instrument - Minimum Data Set. Examples of "other" for Role/Job Title included Behavioral Supports Lead. Examples of "other" for language included Russian, Cantonese, Spanish and Vietnamese. The n is not always consistent across categories because there were different participants who completed the demographics, focus groups, and/or surveys at pre-and post-intervention. Participants were also allowed to skip questions.

Table 3

Group data for respondents to an Online Survey including self-reported personal resilience (Connor–Davidson Resilience Scale), personal resilience at work (Resilience at Work Scale), and the Assessment of Interprofessional Team Collaboration Scale

	Baseline				Post-Intervention			
	N	Mean	SD	Min-Max	N	Mean	SD	Min-Max
CD-RISC-10 Score	17	31.8	4.2	25-39	11	26.9	10.6	0-38
AITCS-II Total	17	67.1	4.0	56-74	10	42.4	2.0	38-46
AITCS-II Total (Likert)	17	4.2	0.3	3.6-4.8	9	4.3	0.5	1.4-3.6
AITCS-II Subscales								
Partnership	17	4.3	0.4	3.6-5.4	9	4.3	0.5	3.5-5.0
Cooperation	17	4.2	0.4	3.4-4.9	10	4.3	0.6	3.5-5.0
Coordination	17	4.2	0.4	3.6-5.0	10	4.2	0.6	3.6-5.0
	N	Likert-scale Mean (/7)	Likert-scale SD	Min-Max (%)	N	Likert-scale Mean (/7)	Likert-scale SD	Min-Max (%)
R@W Total	17	4.5	0.5	59-89	10	4.5	0.7	56-90
R@W Subscales								
Living Authentically	17	4.9	0.7	44-55	11	4.8	1.7	0-100
Interacting Cooperatively	17	4.9	0.6	58-100	11	4.5	1.6	0-100
Building Networks	17	4.8	0.7	41-58	11	4.3	1.9	0-100
Finding Your Calling	17	4.6	0.7	54-95	11	4.3	1.7	0-100
Staying Healthy	17	4.4	1.5	0-100	10	4.2	1.9	8-100
Managing Stress	17	4.3	0.6	45-95	11	3.9	1.5	0-92
Maintaining Perspective	17	3.5	0.9	27-83	11	3.4	0.9	38-94

Notes. CD-RISC-10: Connor-Davidson Resilience Scale Score 10-item version (Campbell-Sills & Stein, 2007) represents a 10-item questionnaire scored 0-40 on a 5-point Likert scale (0=never to 4=always); R@W: Resilience at Work Scale (Winwood, Colon & McEwen, 2013) represents a 20-item questionnaire scored on a 7-point Likert Scale (1=strongly disagree to 7=strongly agree); AITCS-II: The Assessment of Interprofessional Team Collaboration Scale (Orchard et al., 2012) has 23 items and scores range from 23 to 115 with higher scores indicating better team performance; Standardized scores are Likert-scale scores converted according to the Resilience at Work Research Manual (McEwen, 2019); Scores of 0 in the Min-Max column indicate Likert scores of 0 (strongly disagree) converted to percentages (i.e., at least one respondent indicated they strongly disagreed with items in that subscale); *p<.05.

Table 4

Overview of four main categories and themes

Category	Theme
(a) Experiences with virtual PIECES	• Increased team collaboration • Built capacity of LTC staff to address responsive behaviors
(b) Facilitators supporting virtual PIECES	• Formalized and structured processes • Leadership support • Engagement of family/Care partners
(c) Challenges to implementing virtual PIECES	• Staffing shortages • Unfamiliarity in Using Technology to Support Clinical Care
(d) Recommendations for delivering and sustaining virtual PIECES	• Extensive virtual PIECES training for all staff • Continuing to support formal processes • Embedding technology in the usual care processes

FACILITATORS SUPPORTING THE VIRTUAL PIECES APPROACH

Formalized and Structured Processes. Findings of qualitative focus groups suggest that RPN champions, managers, PIECES mentors, and LTC staff perceived that formal structures and processes facilitated the delivery of the virtual PIECES approach. These procedures were created in consultation with the managers of LTC homes and individuals responsible for delivering PIECES. Integral were specific algorithms to guide PIECES referrals and to outline a chain of contacts (e.g., behavioral support lead, RPN champions, families). One manager stated the importance of involving LTC staff in designing the algorithm for PIECES:

> Drawing up the initial algorithm and creating an understanding helps. Once that basic algorithm was created, it was the group that recommended changes. I was more of the person that created the starting base and then from there it was the collaborative team. (Site 1_Manager)

PIECES mentors similarly perceived that the success of the virtual PIECES approach was due to embedded processes into existing LTC home infrastructure. “The other thing that helped with the success of the implementation is they built processes into their infrastructure, so it was online, in their records, and they celebrated successes.” (PIECES Mentor) Celebratory processes, including formal staff recognition at team huddles, were integral to enhancing motivation for staff for the continued implementation of PIECES.

Leadership Support was Key. The implementation of the virtual PIECES approach was further facilitated by the leadership support provided by the LTC managers. The managers worked collaboratively and closely with LTC staff to ensure that PIECES met their needs and expectations. One PIECES mentor noted that managers provided motivation and support for LTC staff to help them build capacity in delivering the virtual PIECES approach:

> Part of the success was related to the leadership support and the willingness of the managers in both homes to walk alongside staff, to build confidence and skill when staff weren’t really sure about how to engage the person in the family. (PIECES mentor)

Managers provided ongoing support throughout the study through frequent staff debriefings, and an ‘open door’ policy to staff.

Supported by Engagement of Family/Care Partners. Participants perceived that the involvement and engagement of family/care partners supported the delivery of the virtual PIECES approach and led to multiple benefits. RPNs and managers perceived that connections between staff, residents, and family/care partners were more positive because of videoconferencing.

Residents were found to smile and be more relaxed during conversations. One RPN noted that "[videoconferencing] brought him [resident] a lot of joy. It was much better than just a phone call where it is hard to participate with everyone and it kept the resident more engaged too using the PIECES approach." (Site 1_RPN) RPNs were involving family/care partners in contributing to care planning and sharing knowledge, which was not done as often prior to the virtual PIECES approach. One manager reported that families were sought for their knowledge in care planning:

> Often there is more telling the family members, the resident had a fall, this is what we're doing. I think this approach [virtual PIECES] involved the family members in a way where they became the knowledge, the person with knowledge versus the staff with the people with knowledge. I think that that's important for them [staff] to really realize that there's a two-way street here that really the family members can offer valuable knowledge. (Site 1_Manager)

Participants perceived that family/care partners were sometimes underutilized in LTC. There was a recognition that family/care partners have a wealth of knowledge that should be incorporated in care planning for residents with responsive behaviors.

Challenges to Implementing the Virtual PIECES Approach

Staffing Shortages. LTC staff, RPN champions, and managers reported staffing shortages as a major barrier to optimal implementation of the virtual PIECES approach. RPNs sometimes felt overwhelmed with referrals and found themselves only being able to put in place certain strategies. LTC staff held high hopes for the greater impact that the virtual PIECES approach could have for families and older adults experiencing responsive behaviors. To sustain an ideal delivery of PIECES, the staffing model had to change. A behavioral support lead noted that there was a need to ensure that the same team of staff was involved in delivering PIECES.

> If we had a consistent staffing model, this program could soar. I loved leading the program and yes, I think that it is sustainable as long as you have management to understand the value of the program and having consistent staff to support the program. (Site 2_Behavioral support lead)

Management was seen as needing to recognize the merits of the virtual PIECES approach and change staffing structures to accommodate the program.

Unfamiliarity Using Technology to Support Clinical Care. Implementation of the virtual PIECES approach necessitated the use of videoconferencing via Zoom for family care conferences, and therefore LTC staff and families needed to have basic proficiency in technology use. The introduction of virtual meetings was a new format for participating LTC homes. Despite offering training and IT (Information Technology) support, some family/care partners and even LTC staff experienced challenges in using technology. One RPN noted, "I'm not computer savvy, we are always calling someone to come and help us." (Site 1_RPN) RPN LTC staff were quick to adapt to technological challenges and often had back-up solutions in place, such as phone-in options for care conferences.

Recommendations for Delivering and Sustaining the Virtual PIECES Approach

Extensive Virtual PIECES Training for all Staff. PIECES mentors, RPN champions, managers, and RPN LTC staff all recognized a need to continue using the virtual PIECES approach beyond study completion. In order to upscale the virtual PIECES approach, site-wide training was required for all staff, including those who were senior and newly hired staff. One RPN reported the importance of site-wide training:

> I know the management they're talking about doing education sessions for some of the new staff so they know about PIECES and how the process of getting the referrals and the short form so hopefully that happens soon so everyone can be on the same page. (Site 2_RPN)

Having more staff receive training was perceived as creating a common language when discussing care planning for older adults experiencing responsive behaviors. Participants reported that with the hiring splurge related to

increased funding in LTC as a result of COVID-19 impacts, many new staff are hired on a frequent basis. Participants perceived a need to keep track of these individuals so that they may be made aware of the virtual PIECES approach and benefit from those collaborations.

Continuing Support for Formal Referral Processes. LTC staff, RPN champions, and managers created unique tools and resources to support the implementation of the virtual PIECES approach based on their local context. Participant recommendations to sustain PIECES were to continue to put in place formal processes. One manager reported that they will ensure that at least one RPN will spend one day a week to complete the PIECES assessment. "Hoping to sustain having an RPN one day a week to continue with the PIECES assessment so that's part of the going forward." (Site 2_Manager) Another manager similarly reported that they will assign one staff member to complete PIECES when referrals are made as well as partnering with other resources such as Behavioral Supports Ontario.

> We are still pulling the staff to do a PIECES day if a referral comes in so that we're still continuing with that framework. Our goal is to integrate it with the behavioral supports that we have in the building who are already dealing with behaviors and just making sure that they have the knowledge to look at it in a different perspective. (Site 1_Manager)

Embedding Technology in Usual Care Processes. Using technology in clinical practice was a new approach for the two LTC homes; however midway through the study, it was evident to participants that technology was a necessary method for sustainable care delivery. The study provided funding for technological infrastructure such as reliable Wi-Fi, large flat screen televisions, and computer tablets. LTC home staff often benefited from the use of technology for care processes such as family care conferences and consults with specialists that used to be conducted over the phone or in-person. The virtual PIECES approach inspired LTC staff and managers to come up with creative strategies to involve families in care planning. One manager reported that they are now able to offer more options for families:

> So we've already implemented based on the study that we actually do virtual care conferences, we offer for either Zoom, a phone call if they can't be there or even if it's in person, that we're doing it resident bedside with resident participation. We offer all three options when we send out our invites for care conferences. (Site 1_Manager)

DISCUSSION

The intended outcomes of PIECES were successfully replicated in this virtual implementation. Although significantly lower post-intervention, AITCS-II total scores suggested the innovation of virtual PIECES presented challenges as staff adapted to team-based practices. However, qualitative findings revealed increased collaboration, with participants highlighting improved communication during virtual PIECES care conferences. Staff valued opportunities to collaborate with the external Behavioral Supports Ontario organization and with families in care planning. Team huddles were seen as beneficial for gathering input from different disciplines. Findings align with three of six promising practices - People in the workforce, Presence of the family, and Planning for COVID and non-COVID care (Canadian Foundation for Healthcare Improvement, 2020).

People in the Workforce. A culture of learning and leading emerged with PIECES-trained RPNs eager to share their knowledge of the virtual PIECES approach and demonstrated increased capacity to lead and support their peers. These behaviors in the LTC RPNs were significant evidence of an empowered and re-engaged workforce within the milieu of pandemic burnout and high workloads (Connelly et al., 2022). Lower Resilience at Work and individual resilience in the second sample may reflect the cumulative effects of COVID-19 on the LTC sector. Research in the LTC RPN workforce during the pandemic relayed stories of frayed resilience (Connelly et al.), job dissatisfaction and burnout (LoGiudice & Bartos, 2021; Ou et al., 2021), isolation from family and fear of spreading infection (Lorente, Vera, & Peiro, 2021), and emotional exhaustion (Altintas et al., 2022).

Leadership from management was a significant positive factor to 'push' the mandate for new videoconferencing skills and knowledge in RPNs for virtual PIECES. RPNs were provided 'alongside' support from managers, PIECES mentors and other PIECES-trained RPNs to embed virtual communication in the day-to-day practices with family/care partners for residents demonstrating responsive behaviors. Previous research supports the importance of nurse managers' positive, open attitudes and nurturing a proactive approach to events as they occur (Vazquez-Calatayud et al., 2022).

Presence of the Family. Central to the findings is a broadening and deepening of the 'team' by formalizing the presence of family/care partners for holistic care of residents. Virtual PIECES drew in families' expectations of care and sustained person- and relationship-centred care within the context of infection prevention control (Iyamu et al., 2023; Stein, Goodwin, & Miller, 2020). Engaging family was helpful to RPNs because they learned about the residents so they could calm residents or provide companionship when families were prevented from visiting. Findings are supported by residents of LTC who reported video calls as a suitable alternative for in-person visits (Gao et al., 2023), and greater satisfaction with video calls to communicate with their relatives (14/15, 93%) versus telephone calls (6/12, 50%; p=.02) (Sacco et al., 2020).

Planning for COVID and Non-COVID Care. Unintended positive outcomes emerged with the whole of both LTC homes' staff interested and aware of the new technology infrastructure and implementation of virtual PIECES. Similar to the experiences of 10 LTC homes in Alberta, Canada, staff and families needed training in the use of videoconferencing technology to keep connected (Ickert et al., 2020). New learnings from the research suggests ways to plan and embed strategies to maintain communication going forward during COVID and non-COVID situations, such as surveying families as part of the move-in process about their technology skills and knowledge, so that the use of videoconferencing by families, often older adults themselves, can be learned and maintained. Ickert et al. suggest that LTC homes can promote the use of technology among family/care partners by engaging them in technology-based activities, conducting online Resident-Family Councils and care conferences, or providing electronic newsletters via email.

After the research project, the LTC homes implemented PIECES workshops for all nursing staff. They also incorporated the referral algorithms for responsive behaviors developed during the research project into day-to-day clinical practice. These findings of major changes in nursing practice and process suggest significant success achieved within the height of the difficult COVID-19 pandemic. The findings demonstrated a high level of commitment and dedication by both the RPNs and LTC managers to the research aim of implementing the virtual PIECES approach for engaging family/care partners and supporting personal and professional resilience of RPNs at point-of-care for high quality care practices.

LIMITATIONS

The inclusion of PIECES mentors may have introduced bias due to favoring the intervention. However, the intervention was perceived as the best model of care to support a holistic and multidisciplinary approach to care, including residents and families. The study was limited to the small sample size and the inconsistency of participants between two measurement occasions. The small sample size affects the ability to make firm conclusions about the quantitative results. Only two LTC homes in one region of Ontario were included. Future research should include a larger sample size and sites across Canada, using mixed method designs with quasi-experimental pre-and post-intervention measures and qualitative interviews. In a future study, evaluation of the virtual technology by the naïve and trained users may provide further insight into what aspects of the technology should be emphasized in staff training.

CONCLUSION

Implementing the virtual PIECES care planning framework posed challenges, including applying technology within care practices and limited time for staff training due to staff

shortages. Sustainability was supported by embedding referral algorithms for responsive behaviors in daily point-of-care activities. Facilitators included leadership, peer support, and family engagement in virtual team-based care planning. Recommendations included PIECES training for all staff and integrating virtual technology into daily care. Although resilience scores reduced over time, participants reported renewed engagement in providing high-quality care. The discrepancy between team-based care experiences and measured scores suggested that they valued their peers and aspects of care not reflected in the quantitative measures. These RPN staff were re-energized by learning and professional growth opportunities.

Authors' contribution: DC, AG, LH, and NS designed the study. DC supervised data collection and analysis. MLY and MH collected and analyzed the data. DC was also involved in analyzing data. DC and MLY organized the article and prepared the first draft. All authors revised and approved the final version of the manuscript.

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