Intervention Research Report

Western Journal of Nursing Research
2021, Vol. 43(11) 1034–1042
© The Author(s) 2021

Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/0193945920982599
journals.sagepub.com/home/wjn

Educating Homecare Nurses about Deprescribing of Medications to Manage Polypharmacy for Older Adults

Winnie Sun[1], Farah Tahsin[1], Jennifer Abbass Dick[1], Caroline Barakat[1], Justin Turner[2], Dale Wilson[1], Cheryl Reid-Haughian[3], and Bahar Ashtarieh[1]

Abstract

The purpose of this study is to evaluate the acceptability, appropriateness, and effectiveness of educational intervention with homecare nurses about deprescribing of medications among older adults. An evaluation research study was conducted using survey design to evaluate deprescribing education with a total sample of 45 homecare nurses from three homecare organizations. Post-training evaluation data were evaluated using Likert scale and open-ended questions were analyzed using descriptive statistical analyses and qualitative thematic analysis. Post-intervention questionnaire responses provided descriptions about homecare nurses' perspectives related to deprescribing education, as well as the effectiveness of training in addressing their knowledge gaps. The pilot-testing of deprescribing learning modules and educational training revealed acceptability and suitability for future scale-up to expand its future reach and adoption by other homecare organizations. This study provided important implications into the barriers that impact the effectiveness of deprescribing education, and facilitators that support the future refinement of learning modules.

Keywords

deprescribing, education, homecare nurses, community health, geriatrics, polypharmacy, medication management

Polypharmacy, defined as the use of multiple medications, has become a growing concern in health care, particularly among vulnerable elderly populations (Maher et al., 2013). The use of multiple medications can be harmful to the physical and mental well-being of older adults as it may increase the risk of health complications due to drug interactions, reduce cognitive, and functional abilities, increase the risk of falls as well as negative pharmacological side effects (Boyd et al., 2005). Studies found that older adults have reported medication side effects as one of their main health concerns as 89% of the participants in these studies reported having chronic conditions which prompted the need for multiple medication regimens (Tannenbaum, 2011; Tannenbaum et al., 2005). Despite the existence of practice guidelines about safe medication management, researchers found that at least 25% of community dwelling, non-hospitalized, older adults experienced inappropriate prescriptions of medications from their health care providers (Reeve et al., 2013). Current literature highlights the risks of polypharmacy among older adults which necessitate the need for medication optimization and interprofessional collaboration to raise awareness about safety in medication management in the community (Sun, Tahsin, Barakat-Haddad et al., 2019). Deprescribing is an important way of optimizing medication management and reducing polypharmacy for older adults, which involves the process of tapering, adjusting or discontinuing medication when it is deemed inappropriate or is considered no longer medically necessary (Bruyere Research Institute & Ontario Pharmacy Research Collaboration, 2017; Sun, Tahsin, Barakat-Haddad et al., 2019).

Deprescribing Education in Homecare

Deprescribing is not the sole responsibility of the physician or pharmacist as nurses are key advocates in medication optimization, particularly homecare nurses who have frequent

[1]Ontario Tech University, Oshawa, ON, Canada
[2]Université de Montréal, Montréal, QC, Canada
[3]ParaMed Home Health Care (Past), ON, Canada

Corresponding Author:
Winnie Sun, Faculty of Health Sciences, Ontario Tech University, 2000 Simcoe Street North Oshawa, Ontario L1H 7K4, Canada.
Email: winnie.sun@ontariotechu.ca

direct contact with the older adults and their informal caregivers in the community (Sun, Tahsin, Lam et al., 2019). Homecare nurses play a critical role in the administration of medications based on professional and clinical judgment, as well as the assessment of ongoing medication interactions, monitoring for adverse side effects of medications, evaluating therapeutic effectiveness, and engaging in comprehensive medication reviews with interdisciplinary team members (Registered Nurses Association of Ontario, 2006). Previous studies indicated that educational training for nurses about deprescribing has the potential to reduce the use of harmful medications and improve the quality of life among clients residing in assisted living facilities (Pitkälä et al., 2014). However, little is known about the perspectives of homecare nurses related to their educational needs regarding appropriate deprescribing of medications for community-dwelling older adults. Given this knowledge gap, our current project focuses on the development and implementation of educational training to address the learning needs of homecare nurses regarding deprescribing.

Purpose

This project is the final phase of a larger research initiative related to educating homecare nurses about deprescribing of medications through raising awareness and scaling up approaches (Milat et al., 2016). The purpose of the final phase of this research initiative is to evaluate the acceptability, appropriateness, and effectiveness of the educational intervention about deprescribing of medications for the management of polypharmacy among homecare clients in the community among homecare nurses. The main goal of this research initiative is to scale-up the implementation of training modules targeted for nurses in homecare to address their knowledge gaps in deprescribing, as well as facilitating the appropriate use of non-drug therapies and promoting medication optimization. The objective of this study was to pilot-test the deprescribing educational training modules with homecare nurses. Older adults are frequently prescribed five or more medications due to multi-morbidities (Masnoon et al., 2017). Nearly 50% of older adults take one or more medications that are medically unnecessary, thus requiring a clinical medication review (Barnett et al., 2012). Therefore, this study focuses on the recruitment of homecare nurses who take care of older adults with the goal of improving medication management and promoting medication optimization for this vulnerable populations.

Methods

Study Design, Setting, and Sampling

Our larger research initiative consisted of three phases: Phase 1, a scalability assessment which involved conducting focus group sessions to assess homecare nurses' learning needs about deprescribing of medications for older adults in the community; Phase 2, the development of a scale-up plan, including developing deprescribing learning modules based on focus group findings from Phase 1 to address homecare nurses' educational needs; and Phase 3, implementation of the scale-up educational plan to pilot-test the deprescribing learning modules with homecare nurses in Ontario, Canada. The study findings from Phase 1 and 2 were presented together and have been published (Sun, Tahsin, Barakat-Haddad et al., 2019).

For the final phase of this project, an evaluation research study was conducted using survey design to collect both quantitative descriptive statistics and open-ended qualitative descriptions to evaluate nurse deprescribing education in homecare. After ethics approval from the Research Ethics Board at the University, recruitment was conducted with one designated homecare organization in three different office locations across Ontario that already had pre-existing research and clinical partnership with the University. To facilitate the recruitment effort, the researchers attended the regularly scheduled staff meetings to meet with the home care nurses at the designated partnered organizations. The researchers promoted the research study and recruited study participants at the end of the staff meetings. Potential participants indicated to the researchers about their interest to participate after the staff meeting. All potential participants were assessed for their eligibility using the participant screening form that clearly outlined the inclusion and exclusion criteria. Homecare nurses who met the following inclusion criteria were invited to participate in the deprescribing educational training. These criteria included: a registered nurse or registered practical nurse with a casual/part-time/full-time status who has direct clinical contact with patients, having experience in working with older adults in homecare settings, being over the age of 18 years, and having the ability to understand and speak English. Eligible study participants were provided with informed consent via face-to-face meeting with the research assistant. The informed consent included information about the study purpose, procedure, potential risks and benefits, rights of the participants, and confidentiality. All potential participants were asked to provide the researchers with their contact information, and they were followed-up by the researchers via their preferred mode of contact to confirm the location and schedule of educational training sessions. Purposeful sampling was guided by maximum variation sampling with the aim of recruiting a diverse sample of nurses in relation to age, gender, years of nursing/homecare experiences, educational background, and employment status.

Deprescribing Educational Intervention

The educational modules were developed based on the study findings from Phase 1 of our project through two focus group sessions consisting of a total of 11 homecare nurses,

from one designated homecare organization in three different office locations across Ontario, Canada. The focus group sessions examined content areas such as causes of polypharmacy among older adults in homecare, challenges to the management of polypharmacy in the community, meaning of deprescribing, importance of deprescribing, potential barriers to raising awareness about deprescribing in homecare, potential facilitators to promote deprescribing in homecare, educational topics about deprescribing, and learning tools and resources about deprescribing. While developing the deprescribing educational modules during Phase 2 of our project, the research team analyzed the focus group findings and integrated the proposed contents into the educational intervention. An educational package with PowerPoint presentation was developed by the researchers, which contained the following educational contents: Best practices about medication reconciliation to promote safety in medication management; raising awareness about available community resources on deprescribing; basic principles and approaches about deprescribing for the commonly used medications, such as deprescribing algorithms; learning tools and resources for nurses, older adults, and their informal caregivers about deprescribing; family education about behavioral and symptoms management; and non-drug therapies and non-pharmacological measures (Sun, Tahsin, Barakat-Haddad et al., 2019).

The Entry-to-Practice Gerontological Care Competencies for Baccalaureate programs in Nursing (Canadian Association of Schools of Nursing [CASN], 2017) was used as the guiding principles for the development of educational module about the management of polypharmacy and deprescribing. The guiding principles emphasized the importance of collaborating with the older person and family to optimize their well-being in the context of complex acute and chronic conditions. This includes the need to conduct a critical analysis of the older person for potential polypharmacy and interactions of over-the-counter medications that may compound acute and chronic conditions. Therefore, our educational module focused on providing useful tips and processes of collaborating with older person and family about how to engage in conversations with them about medication management and deprescribing. The educational intervention also emphasized the utilization of resources to help homecare nurses and older adults to critically analyze the potential impact of polypharmacy through medication reconciliation, as well as the exploration of non-drug therapies with older adults to support the management of their acute and chronic conditions.

The deprescribing educational training was provided to a total of 45 homecare nurses from three homecare organization offices in Ontario, Canada. Each deprescribing educational session lasted approximately 90 minutes in length. There was a total of five training sessions to five different groups of participants to accommodate the scheduling needs of homecare nurses over a period of 3 months. All in-person educational sessions took place in the meeting room of the partnered homecare organizations. There were approximately 10 participants in each educational session, with two facilitators who led the educational training. The principal investigator was the lead facilitator who developed the training module and she provided training to her assistant facilitator prior to the educational sessions. Study participants were provided with lunch, snacks, and drinks to compensate for the time spent during their educational training sessions.

The educational sessions were delivered using a mixture of online webinars and in-person presentations with printed materials, interactive discussions and case studies. The deprescribing educational intervention involved the following training elements: An introductory knowledge quiz to assess participants' existing understanding and misconceptions regarding medication management, polypharmacy and deprescribing; explanation about the impact of polypharmacy, including physical, emotional, social and financial implications; discussion about Beers Criteria for potentially inappropriate medication use in older adults; providing real-life examples of older adults with polypharmacy in homecare settings; examining the role of homecare nurses in deprescribing; role-playing how to start deprescribing conversations with patients, families, and other health care professionals; overview of deprescribing decision-support tools and learning resources for nurses, older adults, and families; exploration of non-pharmacological measures and non-drug substitutes; and case studies and scenarios to identify deprescribing needs and strategies to promote medication optimization. The intervention is currently available online for other homecare nurses in the partnered homecare organizations to review and our plan is to further disseminate this training modules to additional homecare organizations in Ontario.

Data Collection and Analysis

Following each training session, an evaluation questionnaire was provided to each study participant to obtain feedback about the deprescribing education and content modules. The approximate duration to complete the questionnaire was 15 minutes, in which all study participants completed the post-educational training questionnaire. The post-training questionnaire was designed using a 5-point Likert-scale to collect quantitative descriptive statistics to assess homecare nurses' level of awareness in relation to the following areas: risks and harmful effects associated with polypharmacy in older adults; importance and rationale of deprescribing in older adults; identifying clients who are at risk and in need for deprescribing; engaging in a conversation with clients/their families about deprescribing, utilization of tools and resources about deprescribing approaches (i.e., Eliminating Medications thorough Patient Ownership of End Results [EMPOWER] brochure); understanding the role of Canadian Deprescribing Network (CaDeN), strategies to support

deprescribing in the community, and exploration of non-drug therapies as alternative to pharmacological measures. Open-ended questions were included to capture the qualitative descriptions of homecare nurses' perspectives about the deprescribing education, including the appropriateness and acceptability of each content presentation and facilitation of the discussion, as well as recommendations for future improvement. Descriptive statistical analyses were conducted to provide quantitative descriptive statistics (i.e., mean and standard deviation) derived from the Likert scale questions. Qualitative descriptions from the open-ended questions were analyzed using thematic analysis (Braun & Clarke, 2006). Nvivo 12 software was used for the qualitative data analysis. The themes and the data extracts were reviewed by the research team where the supporting quotes were selected to provide the qualitative descriptions of the themes.

Results

Descriptive Statistics

Of the 45 participating homecare nurses, the majority were female (98%). The age range of the participants was 26–68 years, with a mean age of 47.07 years. The number of years of experience in home health care was between 1.5 and 50 years, with a mean of 12.74 years. The number of years working with older adults ranged from 1.5 to 40 years, with a mean of 17.34 years. The majority of the participants' education level was college (55%), followed by university (39%), and graduate level (5%). Most of the participants were employed full-time (75%), or casual (14%), with a small number working part-time (9%). Specifically, a casual employee is one that does not have guaranteed hours of work or a firm commitment in advance from the homecare organization as to how long they will be employed for, or the days or hours they work.

Quantitative Descriptive Findings

Major findings, as outlined in Table 1, were emerged from the 5-point Likert scales of the post-educational training questionnaire. A summary of description about the major findings are presented as perceived acceptability and appropriateness of the deprescribing education, and perceived effectiveness of training in addressing the knowledge gaps.

Perceived Acceptability and Appropriateness of Deprescribing Education. Homecare nurses reported that the knowledge about deprescribing was highly relevant to their work (86%), and the facilitator of the educational training provided clear explanation about the importance and key concepts about deprescribing (92%). Homecare nurses expressed high levels of interest and motivation in supporting the implementation of deprescribing activities in their clinical practice after participating the educational intervention (89%). After the educational training, homecare nurses indicated that they became more receptive to adopt deprescribing practices in the management of polypharmacy for older adult populations, as well as becoming "somewhat aware" to "moderately aware" (81%) about their critical role in initiating deprescribing conversations with their clients, families, and other health care professionals. In particular, study participants expressed satisfaction in the availability of diverse modes of delivering the deprescribing education, including a mixture of online and in-person training modules with printed educational packages and interactive discussions using case studies and real-life scenarios to support learning and application (95%).

Perceived effectiveness of training in addressing knowledge gaps. The post-training questionnaire highlighted the opportunities to address the knowledge gaps in deprescribing education. For instance, homecare nurses reported "somewhat aware" (61%) of the relevant tools and resources needed to support safe deprescribing practices, and they indicated the need for more education about the use of patient educational tools, such as the EMPOWER brochure to educate older adults about medication optimization. Similarly, homecare nurses reported that they were "somewhat aware" (47%) of the critical role of the Canadian Deprescribing Network (CaDeN) as a national advocacy group in deprescribing of medications. They indicated the benefits for increased education about the opportunities to collaborate with CaDeN to advocate for safer medication management, as well as creating awareness and practice change in homecare about appropriate deprescribing. Homecare nurses identified additional opportunities to address their knowledge gaps in deprescribing, with emphasis on promoting their level of awareness about the risks and harmful effects associated with polypharmacy (95%); the role in facilitating deprescribing approaches for older adult populations, such as the process of tapering, adjusting or discontinuing of medications (69%); the guidelines about identification of at-risk clients for polypharmacy (61%); and the availability of non-drug therapies as alternatives to pharmacological measures (65%).

Qualitative Study Findings

The open-ended questions from the post-training questionnaire revealed homecare nurses' perspectives about the deprescribing educational intervention, as well as their current knowledge gaps and future recommendations. Three overarching themes were generated from the qualitative descriptions: Deprescribing is a novel concept in homecare, advancing the learning of evidence-based deprescribing, and optimizing medication management through deprescribing education.

Deprescribing is a novel concept in homecare. Homecare nurses indicated that they did not have previous knowledge and

Table 1. Evaluation of Deprescribing Educational Training.

Variable	Mean	Standard Deviation (SD)	Number of Participants Reporting the Highest Score [n = 45]	Percentage of Participants Reporting the Highest Score
The risks and harmful effects associated with polypharmacy in older adults[a]	4.27	0.720	35	94.59
Discussion about the importance and rationale of deprescribing in older adults[a]	4.00	0.747	31	86.11
The role of homecare nurses in identifying clients who are at risk and in need for deprescribing using the sample case study[a]	3.84	0.949	25	69.44
Understanding of how to engage a conversation with clients/their families with the goal of getting their "buy-in" about deprescribing[a]	3.88	0.662	29	80.56
Examination of relevant tools and resources about deprescribing approaches for the homecare providers and their clients in the community (i. e., EMPOWER brochure etc.)[a]	3.33	1.169	22	61.11
Understanding about the CaDeN[a]	3.07	1.203	17	47.22
After today's educational session, my willingness to support appropriate deprescribing is. . .[b]	4.16	0.843	32	88.89
Exploration of non-drug therapies with older adults to support their participation in daily living in the community[a]	3.89	0.784	24	64.86
The facilitators gave clear explanations of the topics[c]	4.40	0.618	34	91.89
The educational package was relevant and informative to homecare nurses[c]	4.56	0.624	35	94.59
The speed of the educational session was appropriate[d]	3.24	0.773	10	27.03
The length of the educational sessions was appropriate[e]	3.00	0.853	7	18.92

Note. [a] 1 = not at all aware; 2 = slightly aware; 3 = somewhat aware; 4 = moderately aware; 5 = extremely aware. [b] 1 = decreased; 2 = no changes at all; 3 = slightly increased; 4 = moderately increased; 5 = extremely increased. [c] 1 = not at all; 2 = not well; 3 = neutral; 4 = well; 5 = very well. [d] 1 = too slow; 2 = slow; 3 = perfect; 4 = fast; 5 = too fast. [e] 1 = too short; 2 = short; 3 = perfect; 4 = long; 5 = too long.

understanding about deprescribing prior to the deprescribing educational training: "I (the nurse) was not aware about the concept of deprescribing and that there was a Canadian Deprescribing Network that exists" (P25). There was a general consensus that deprescribing is a novel concept in the field of home health care: "All of this deprescribing knowledge is interesting as this is relatively new to me" (P10). During the educational training, homecare nurses valued the use of interactive group discussions to help identify older adults' needs for medication management, as well as highlighting the similar concerns and challenges about deprescribing experienced by their colleagues in clinical practice. The use of success stories and case studies encountered in real-life client situations were viewed as the best approach to facilitate problem-solving about polypharmacy and critical analysis of lessons learned about deprescribing.

Advancing the learning of evidence-based deprescribing. To support the future learning of deprescribing, homecare nurses indicated the need for accessing appropriate evidence-based resources by health care providers, clients, and their family caregivers: "More guidelines, strategies and case studies are needed to support learning" (P5). Homecare nurses explained that the education about decision-support tools such as deprescribing algorithms and best practices in medication reconciliation are examples of required strategies to advance their learning about evidence-based deprescribing practices. The utilization of client educational tools, such as the EMPOWER brochure developed by the CaDeN was identified as an important resource to help raise awareness about the risks of certain medications, as well as knowledge about non-pharmacological therapies such as sleep hygiene, pain, and symptoms management: "We need to learn about strategies on how to empower clients and their families about medication management. We need to educate GPs (general practitioners) and other medical professionals about best practices in prescribing and deprescribing." (P10)

Optimizing medication management through deprescribing education. Homecare nurses indicated that addressing the current

knowledge gaps about deprescribing will help optimize the medication management of their clients. For example, knowledge about the pharmacology in older adults, such as pharmacokinetics, pharmacodynamics and pharmacotherapeutics were identified as critical knowledge gaps in nursing: "Maybe go through common drug dosages, effects, interactions and examples of medications that can be commonly deprescribed for older persons." (P15) Education about the American Geriatrics Society's Beers Criteria (American Geriatrics Society 2015 Beers Criteria Update Expert Panel, 2015) for potentially inappropriate medication use in older adults was considered a content area that needs to be addressed in future deprescribing education: "Further education is needed about other potentially harmful drugs to make nurses more aware and knowledgeable about safe medication use." (P31).

Engaging in deprescribing conversations was identified as an important competency that homecare nurses must develop. Open communication and collaboration with members of the health care team were highly valued by homecare nurses as contributing factors to medication optimization: "Educating about communication techniques between patients, family, doctors, and professionals would aid deprescribing approaches." (P27) In particular, homecare nurses indicated the need for future educational training that focus on examining their critical role in medication reconciliation, and overcoming challenges in initiating deprescribing conversations with their clients, families, and physicians to promote their buy-in for deprescribing of medications: "A clearer role of community nurse is needed in medication review and who should be involved in deprescribing. How do we get permission or buy-in from the specialists, physicians or pharmacists? Getting access to medical doctors for follow-up can be very difficult in homecare. Also, clients may not want to get into trouble by offending their physician and going against their orders" (P39).

Discussion

The purpose of this project is to evaluate the acceptability, appropriateness, and effectiveness of the educational training with homecare nurses about deprescribing of medications for the management of polypharmacy among older adults in the community. The findings from the questionnaire indicated acceptability and suitability of the educational intervention to address homecare nurses' learning needs about deprescribing, including content areas proposed from Phase 1 of this project.

To promote the effectiveness of future deprescribing education, homecare nurses highlighted the importance of learning about the opportunities to collaborate with community partners to advocate for increased awareness and practice change in homecare about appropriate deprescribing, such as the CaDeN. In particular, as mentioned in the study findings, homecare nurses valued the learning related to the utilization of evidence-informed deprescribing resources and tools as part of their client teaching about medication optimization[1] (Bjerre et al., 2018; Bruyere Research Institute & Ontario Pharmacy Research Collaboration, 2017; Farrell, Black et al., 2017; Farrell, Pottie et al., 2017; Pottie et al., 2018). Homecare nurses indicated that one way of increasing the effectiveness of deprescribing education is to place stronger emphasis on learning about the step-by-step approaches of becoming an effective deprescriber, such as the guidelines about identification of at-risk clients for polypharmacy; the process of tapering, adjusting or discontinuing of medications; and the availability of non-drug therapies as alternatives to pharmacological measures. Previous studies about deprescribing education with clinicians in primary care settings indicated similar concerns about the lack of having timely access to best practice guidelines and protocols to assess the necessity of specific medications within the context of client's situations (Pitkälä et al., 2014). For instance, having access to deprescribing tools that facilitated the tapering of psychotropic medications was deemed to be important to decrease the potential withdrawal side effects and health complications for older adults (Schuling et al., 2012). Our current findings are congruent with the previous literature where homecare nurses revealed similar learning needs about having increased access to the appropriate evidence-based deprescribing guidelines and accompanying algorithms to support effective deprescribing, while collaborating with members of the health care team to make effective decisions about when and how to safely stop specific classes of medications in the management of polypharmacy (Sun, Tahsin, Lam et al., 2019).

As deprescribing is considered to be an emerging and novel concept by homecare nurses, they underscored the critical importance of advancing the evidence-based educational training with greater emphasis on how to manage the ever-increasing complexity of polypharmacy in older adults. In coming years, the trend towards nurse prescribing continues to increase as a result of the College of Nurses of Ontario in Canada's upcoming initiative for registered nurses in general class to prescribe certain types of medications (College of Nurses of Ontario, 2019). When nurses become prescribers, they must be cognizant of their actions and responsibilities to deprescribe unnecessary or potentially harmful medications by developing the required knowledge, skills and competencies in prescribing and deprescribing (Sun, Tahsin, Lam et al., 2019). Previous literature indicated that clinicians in primary care settings have expressed their concerns over the multiple prescribers, fragmented pharmacy visits, and contradicting treatments orders for individuals with comorbidities (Kouladjian et al., 2016). Homecare nurses from our current study identified similar concerns about the challenges of over-prescribing from multiple prescribers, and this finding highlighted the need for future optimization of medication management through education of deprescribing competencies including the knowledge, skills, judgment, and

attributes a nurse requires to facilitate deprescribing safely in a designated role and setting (CASN, 2017).

Previous studies indicated that nurses' collaboration with physicians and pharmacists contributed to safer medication administration and the prevention of medication errors (Dickson & Flynn, 2011; Eisenhauer et al., 2007; Popescu et al., 2011). Therefore, learning about how to engage in effective communication and shared decision-making among health care providers and clients are considered to be the key factors in mitigating the risk for medication errors and promoting medication optimization (Sun, Tahsin, Lam et al., 2019). As homecare nurses often act as the key contact persons for older adults in the community, learning about the utilization of communication tools such as decision-support aids, deprescribing pamphlets, and infographics is essential to promote open dialogue with clients and members of the health care team to initiate deprescribing conversations (Sun, Tahsin, Lam et al., 2019). As indicated by our current study findings, communication was identified by homecare nurses to be a key competency included in the future educational training of deprescribing education. Additional literature also indicated that effective collaboration and communication with clients and their caregivers about the harmful effects of polypharmacy, benefits of deprescribing, and potential use of non-drug alternatives will likely increase their buy-in for deprescribing of medications (Dwamena et al., 2012; Elwyn et al., 2000). In relation to opportunities for non-pharmacological alternatives, the homecare nurses in Phase 1 of our study reinforced the need for developing an increased understanding about the appropriate substitution of non-drug therapies for pharmacological measures, such as learning about the strategies to promote sleep hygiene, and pain and symptoms management using hydrotherapy, music therapy, aromatherapy, therapeutic touch, acupuncture, and reminiscence therapy (Sun, Tahsin, Lam et al., 2019).

As part of the future scale up of our research initiative, the plan is to adopt the train-the-trainer approach. The goal is to support those who have already received the training to become the champions to promote and support the ongoing deprescribing education in their homecare organization. Guided by the RE-AIM implementation framework (Glasgow et al., 1999), an oversight committee will be established within our research team to examine R (reach of homecare nurses); E (effectiveness of deprescribing education); A (adoption by target homecare organizations); I (implementation: training adaption); and M (maintenance: sustainability plan) to evaluate the future scale-up opportunities to achieve greater reach and adoption by our target populations. The next step of this project is to conduct a cohort study to examine the deprescribing practices among homecare nurses who have completed the educational module. The cohort study will evaluate homecare nurses' deprescribing practices, including the number and types of discontinued and/or tapering medications, utilization of deprescribing tools and non-pharmacological measures. Evaluation of patient outcomes will be examined through the questionnaire that explore patient's knowledge about the risks of polypharmacy; importance of medication management; benefits of deprescribing and improvement in symptoms management.

There were several study limitations for this project. Study participants were provided with lunch, snacks, and drinks to compensate for the time spent during their educational training sessions. This could have led to selection bias where participants who attended the training could have been highly motivated by their interests in the study topic or by the compensation. Another study limitation is that the educational training module was only pilot-tested in one designated partnered homecare organization (in three different office locations) in Ontario. The future expansion of deprescribing educational training will benefit from including a diverse sample of homecare organizations to incorporate the cultural and organizational adaptations that address the specific learning needs and preferences of the target populations.

One important role of nurses in homecare is medication management, and therefore educational training must be developed to support them in developing an increased awareness of polypharmacy and understanding the necessity of deprescribing within the context of client's situation. Despite the study limitations, the pilot-testing of deprescribing learning modules and educational training in three homecare organizations in Ontario revealed acceptability and suitability for the future scale-up of educational interventions to expand its reach and adoption by a larger sample of Canadian homecare nurses. Our study findings provided insight into the barriers that impact the effectiveness of deprescribing education and the facilitating factors that support the future refinement of learning modules in addressing the diverse learning needs of homecare nurses. The implementation of deprescribing education must utilize multi-modal approaches and platforms to deliver the educational contents of deprescribing to support the engagement for learning. As the trend towards nurse prescribing continues to increase, future research about the development of deprescribing education must emphasize the development of knowledge, skills, and competency in different domains of deprescribing practice. This includes interprofessional practice, decision-support, evaluation of outcomes, professional development, and pharmacological measures and non-pharmacological alternatives to support medication optimization, as well as providing a consistent and seamless deprescribing approach among the health care team.

Author Statement

All authors (WS; FT; JAD; CBH; JPT; CRH; DW; BA) provided input into the development of the manuscript and have read and approved this manuscript.

Data Sharing Statement

Additional unpublished data may be available for review upon request made to the primary author.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by Social Sciences and Humanities Research Council grant number [#211005]

ORCID iD

Winnie Sun https://orcid.org/0000-0001-7616-5344

Note

1. https://www.deprescribingnetwork.ca/useful-resources/

References

American Geriatrics Society 2015 Beers Criteria Update Expert Panel. (2015). American geriatrics society 2015 updated beers criteria for potentially inappropriate medication use in older adults. *Journal of the American Geriatrics Society*, *63*(11), 2227–2246. https://doi.org/10.1111/jgs.13702

Barnett, K., Mercer, S. W., Norbury, M., Watt, G., Wyke, S., & Guthrie, B. (2012). Epidemiology of multimorbidity and implications for health care, research, and medical education: A cross-sectional study. *Lancet*, *380*(9836), 37–43. https://doi.org/10.1016/s0140-6736(12)60240-2

Bjerre, L. M., Farrell, B., Hogel, M., Graham, L., Lemay, G., McCarthy, L., Raman-Wilms, L., Rojas-Fernandez, C., Sinha, S., Thompson, W., Welch, V., & Wiens, A. (2018). Deprescribing antipsychotics for behavioural and psychological symptoms of dementia and insomnia: Evidence-based clinical practice guideline. *Canadian Family Physician*, *64*(1), 17–27.

Boyd, C. M., Darer, J., Boult, C., Fried, L. P., Boult, L., & Wu, A. W. (2005). Clinical practice guidelines and quality of care for older patients with multiple comorbid diseases: Implications for pay for performance. *JAMA*, *294*(6), 716–724. https://doi.org/10.1001/jama.294.6.716

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Bruyere Research Institute & Ontario Pharmacy Research Collaboration. (2017). *Deprescribing algorithms [Evidence-based guidelines]*. Canadian Deprescribing Network. https://www.deprescribingnetwork.ca/algorithms?rq=deprescribing%20guideline

Canadian Association of Schools of Nursing. (2017). *Entry-to-practice gerontological care competencies for baccalaureate programs in nursing*. Author. https://www.casn.ca/wp-content/uploads/2016/09/FINAL_CASN-GERONTOLOGY-COMPETENCIES-FINAL.pdf

College of Nurses of Ontario. (2019). *FAQs: RN prescribing*. Author. https://www.cno.org/en/trending-topics/journey-to-rn-prescribing/qas-rn-prescribing/

Dickson, G. L., & Flynn, L. (2011). Nurses? clinical reasoning: Processes and practices of medication safety. *Qualitative Health Research*, *22*(1), 3–16. https://doi.org/10.1177/1049732311420448

Dwamena, F., Holmes-Rovner, M., Gaulden, C. M., Jorgenson, S., Sadigh, G., Sikorskii, A., Lewin, S., Smith, R. C., Coffey, J., & Olomu, A. (2012). Interventions for providers to promote a patient-centred approach in clinical consultations. *Cochrane Database of Systematic Reviews*, *12*, CD003267. https://doi.org/10.1002/14651858.cd003267.pub2

Eisenhauer, L. A., Hurley, A. C., & Dolan, N. (2007). Nurses' reported thinking during medication administration. *Journal of Nursing Scholarship*, *39*(1), 82–87. https://doi.org/10.1111/j.1547-5069.2007.00148.x

Elwyn, G., Edwards, A., Kinnersley, P., & Grol, R. (2000). Shared decision making and the concept of equipoise: The competences of involving patients in healthcare choices. *British Journal of General Practice*, *50*(460), 892–897. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1313854/

Farrell, B., Black, C., Thompson, W., McCarthy, L., Rojas-Fernandez, C., Lochnan, H., Shamji, S., Upshur, R., Bouchard, M., & Welch, V. (2017). Deprescribing antihyperglycemic agents in older persons: Evidence-based clinical practice guideline. *Canadian Family Physician*, *63*(11), 832–843.

Farrell, B., Pottie, K., Thompson, W., Boghossian, T., Pizzola, L., Rashid, F. J., Rojas-Fernandez, C., Walsh, K., Welch, V., & Moayyedi, P. (2017). Deprescribing proton pump inhibitors: Evidence-based clinical practice guideline. *Canadian Family Physician*, *63*(5), 354–364.

Glasgow, R. E., Vogt, T. M., & Boles, S. M. (1999). Evaluating the public health impact of health promotion interventions: The re-aim framework. *American Journal of Public Health*, *89*(9), 1322–1327. https://doi.org/10.2105/ajph.89.9.1322

Kouladjian, L., Gnjidic, D., Reeve, E., Chen, T. F., & Hilmer, S. N. (2016). Health care practitioners? perspectives on deprescribing anticholinergic and sedative medications in older adults. *Annals of Pharmacotherapy*, *50*(8), 625–636. https://doi.org/10.1177/1060028016652997

Maher, R. L., Hanlon, J., & Hajjar, E. R. (2013). Clinical consequences of polypharmacy in elderly. *Expert Opinion on Drug Safety*, *13*(1), 57–65. https://doi.org/10.1517/14740338.2013.827660

Masnoon, N., Shakib, S., Kalisch-Ellett, L., & Caughey, G. E. (2017). What is polypharmacy? A systematic review of definitions. *BMC Geriatrics*, *17*(1). https://doi.org/10.1186/s12877-017-0621-2

Milat, A., Newson, R., King, L., Rissel, C., Wolfenden, L., Bauman, A., Redman, S., & Giffin, M. (2016). A guide to scaling up population health interventions. *Public Health Research & Practice*, *26*(1), Article e32611604. https://doi.org/10.17061/phrp2611604

Pitkälä, K. H., Juola, A.-L., Kautiainen, H., Soini, H., Finne-Soveri, U. H., Bell, J. S., & Björkman, M. (2014). Education to reduce potentially harmful medication use among residents of assisted living facilities: A randomized controlled trial. *Journal of the American Medical Directors Association*, *15*(12), 892–898. https://doi.org/10.1016/j.jamda.2014.04.002

Popescu, A., Currey, J., & Botti, M. (2011). Multifactorial influences on and deviations from medication administration safety and quality in the acute medical/surgical context. *Worldviews on Evidence-Based Nursing*, *8*(1), 15–24. https://doi.org/10.1111/j.1741-6787.2010.00212.x

Pottie, K., Thompson, W., Davies, S., Grenier, J., Sadowski, C. A., Welch, V., Holbrook, A., Boyd, C., Swenson, R., Ma, A.,

& Farrell, B. (2018). Deprescribing benzodiazepine receptor agonists: Evidence-based clinical practice guideline. *Canadian Family Physician*, *64*(5), 339–351.

Reeve, E., Wiese, M. D., Hendrix, I., Roberts, M. S., & Shakib, S. (2013). People's attitudes, beliefs, and experiences regarding polypharmacy and willingness to deprescribe. *Journal of the American Geriatrics Society*, *61*(9), 1508–1514. https://doi.org/10.1111/jgs.12418

Registered Nurses Association of Ontario. (2006). *Establishing therapeutic relationships [Best practice guideline]*. Author. https://rnao.ca/sites/rnao-ca/files/Establishing_Therapeutic_Relationships.pdf

Schuling, J., Gebben, H., Veehof, L., & Haaijer-Ruskamp, F. M. (2012). Deprescribing medication in very elderly patients with multimorbidity: The view of Dutch GPs. A qualitative study. *BMC Family Practice*, *13*(1). https://doi.org/10.1186/1471-2296-13-56

Sun, W., Tahsin, F., Barakat-Haddad, C., Turner, J. P., Haughian, C., & Abbass-Dick, J. (2019). Exploration of home care nurse's experiences in deprescribing of medications: A qualitative descriptive study. *British Medical Journal Open*, *9*(5), Article e025606. https://doi.org/10.1136/bmjopen-2018-025606

Sun, W., Tahsin, F., Lam, A., & Pizzacalla, A. (2019). Raising awareness about nurse's role in deprescribing of medication for older adults in the community. *Perspectives: Journal of the Canadian Gerontological Association*, *40*(4), 17–22.

Tannenbaum, C. (2011). Effect of age, education and health status on community dwelling older men's health concerns. *The Aging Male*, *15*(2), 103–108. https://doi.org/10.3109/13685538.2011.626819

Tannenbaum, C., Mayo, N., & Ducharme, F. (2005). Older women's health priorities and perceptions of care delivery: Results of the wow health survey. *Canadian Medical Association Journal*, *173*(2), 153–159. https://doi.org/10.1503/cmaj.050059