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Deprescribing benzodiazepines among hospitalised older adults: quality improvement initiative

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ABSTRACT

Benzodiazepines are recognised as being potentially inappropriate medications for seniors due to their considerable side-effect profile, yet they are commonly prescribed and infrequently discontinued (deprescribed). The study's primary objective was the deprescription or the dose reduction of benzodiazepines among newly hospitalised seniors using a patient education intervention. A 3-month duration quality improvement study based on the plan–do–study–act model was conducted across two units (3C and 4D) in the Glenrose Rehabilitation Hospital to improve benzodiazepine deprescribing among newly admitted seniors (65 years or older) who were using benzodiazepines. The primary outcome measure was the number of eligible patients who had benzodiazepine deprescribing initiated. A patient education intervention comprising a structured medication review, written patient education (the Eliminating Medications Through Patient Ownership of End Results (EMPOWER) brochure) and at least one brief supportive counselling session by the clinical pharmacist or physician was applied to all eligible patients. All 12 eligible patients consented to benzodiazepine deprescribing; however, only 11 of them (92%) initiated benzodiazepine deprescribing. Six of the 11 patients (55%) had their benzodiazepines discontinued, with the 5 remaining patients (45%) achieving greater than 50% dosage reduction. Seven patients (64%) experienced side effects during the deprescribing process, with over half (57%, n=4) of these seven patients experiencing worsening anxiety symptoms. Five of the 11 patients (45%) required benzodiazepine substitute medications. The use of a structured patient education intervention involving the use of a structured medication review, written patient education material and one-on-one patient counselling can promote benzodiazepine deprescribing. Although worsening anxiety was frequently observed, this was easily managed by the substitution of a more appropriate and clinically indicated medication, which was well tolerated and acceptable by all of our participants. Targeted screening for the presence of anxiety would help to guide the deprescribing process and the need for medication substitution.

PROBLEM

Benzodiazepine usage among seniors is a significant problem. Within Alberta Health Services—Edmonton zone, during the fiscal year 2015/2016, an estimated 49 000 geriatric patients 60 or older (20.7% of the total population) were taking benzodiazepines.[1 2] The use of benzodiazepines among seniors is of a growing concern due to their significant side-effect profile[3] and limited clinical indications for their use. As a consequence, these medications have been classified as being 'potentially inappropriate medications' for seniors.[4] Commonly recognised short-term side effects include cognitive changes, delirium, dizziness, insomnia and paradoxical agitation[3]; physical and psychological dependence, increased falls and accidents can occur with long-term use.[3] Advancing age is a significant risk factor for developing side effects (relative risk 2.45).[3] Despite this, benzodiazepine prescriptions are common in seniors,[4] with the most commonly quoted reasons for prescribing benzodiazepines being for the treatment of insomnia, anxiety and delirium[5]; an estimated 5%–33% of the elderly population receives benzodiazepine (or benzodiazepine receptor agonists) prescriptions for sleep problems.[5]

The Glenrose Rehabilitation Hospital is a tertiary rehabilitation and academic teaching hospital in Edmonton, Alberta. The hospital has two geriatric focused units (35/36 beds). Each unit has its own dedicated multidisciplinary team comprising one or more care of the elderly (COE) physicians (ie, family physicians trained in the COE). The units are served by a ward-based geriatric pharmacist who conducts structured medication reviews for all newly admitted patients and subsequent routine weekly medication reviews. In addition, the medical stability of the study patient population and the close monitoring provided by the healthcare team within this institutional setting provided an ideal environment in which to conduct this study.

The frequent usage of benzodiazepines, particularly among hospitalised seniors, was identified during routine clinical practice at the lead author's local institution and was

subsequently confirmed through prospective data collection over a 1-month period. These data also revealed a trend towards inappropriate benzodiazepine prescribing and highlighted an absence of usage of any patient education material about benzodiazepine use. Although benzodiazepine deprescribing was occurring, it was incomplete by the time of discharge. We aimed to have all benzodiazepine users who are admitted to two geriatric units at the Glenrose Rehabilitation Hospital deprescribed or to have their dosage reduced by at least 50% within a 3-month period.

INTRODUCTION

The inappropriate use of benzodiazepines among seniors has been recognised by the College of Physicians and Surgeons of Alberta,[6] as well as by national (Choosing Wisely Canada)[7] and international (American Geriatric Society)[5] societies, with all supporting the need for benzodiazepine deprescribing.

Deprescribing has been defined as 'the process of withdrawal of an inappropriate medication, supervised by a healthcare professional with the goal of managing polypharmacy and improving outcomes'.[8] Different deprescribing methods have been proposed; however, the most comprehensive network of resources is available from the Canadian Deprescribing Network (CaDeN).[8] The CaDeN was developed by Dr Tannenbaum and her colleagues to help educate and promote the deprescribing of inappropriately used medications, which includes benzodiazepines. The Ontario Pharmacy Evidence Network research programme, in collaboration with the CaDeN, has developed and validated a number of deprescribing algorithms, which include benzodiazepines.[9]

The use of patient education material for empowering patients in their medication usage to encourage benzodiazepine deprescribing was explored in the EMPOWER study.[10] This study used targeted patient education material (EMPOWER brochure)[11] to empower community-dwelling seniors around appropriate benzodiazepine usage. The results revealed an improvement in shared decision making by increasing the number of conversations around benzodiazepine therapy and cessation, and improving rates of benzodiazepine deprescribing.

Although the process of deprescribing of benzodiazepines is usually performed over an extended period of time, commonly in the community, the process can often be initiated in hospital. The use of patient education material to educate and enable individuals within the deprescribing process has great potential, both by engaging individuals in self-medication management and providing them with necessary and sufficient information with the hope of continuing the deprescribing process postdischarge into the community, with lasting effects. Supporting patient education with direct one-on-one counselling should enhance information transfer and help enhance patient education with the ultimate goal of promoting appropriate benzodiazepine deprescribing.

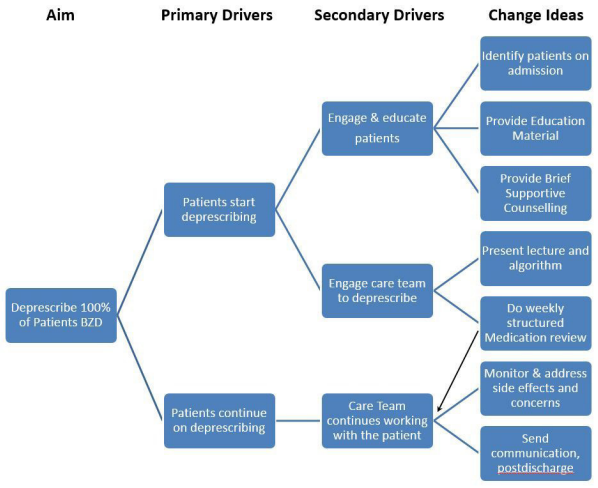

Figure 1 Driver diagram showing the primary and secondary drivers for the aim and related change interventions. BZD, benzodiazepine.

METHODS

Baseline measurement

Baseline data were collected prospectively over a 1-month period (July 2017), from unit 4C, on the number of patients with active benzodiazepine prescriptions admitted to the unit and the rate of benzodiazepine deprescribing. These data showed that out of 16 patients admitted during this time, only 2 patients (12.5%) were using benzodiazepines. Benzodiazepine deprescribing was initiated on both patients: one patient had the dosage frequency reduced, while the other had a decrease in their benzodiazepine dose. However, neither of the patients had his or her benzodiazepines deprescribed.

The multidisciplinary study team comprised a geriatric physician, a research coordinator, a geriatric pharmacist, a care of the elderly physician and faculty, the unit manager, a medical student and a quality improvement consultant. The team members, in varying capacities, provided clinical leadership, technical expertise, day-to-day operational leadership and project sponsorship.

DESIGN

A driver diagram was developed to identify primary and secondary drivers for our aim (figure 1). Change ideas were then developed based on these drivers. The plan–do–study–act (PDSA) method of quality improvement (QI) was chosen for this project. Two parallel streams of PDSA cycles were conducted concurrently at two different levels: (1) the project level and (2) the patient level.

The study was conducted over 3 months (August–October 2017). Prior to recruitment, engagement and education about the study were provided to both physicians and unit staff through presentation of the study (which included education around benzodiazepine usage) to attending physicians (and other interested parties) at one of the institutions' routine physician meetings. Unit staff engagement (which included basic

education about benzodiazepines) was provided through communication by the unit manager and through the distribution of a one-page summary about the intended study. All eligible patients were initially identified by the attending physician and/or the pharmacist at the time of their admission. Criteria for study participants were patients (ages 65 and over) who were taking benzodiazepines at the time of hospital admission (defined as having an active prescription for one or more than one benzodiazepine, which was being taken on a scheduled basis), could understand English and were admitted to one of two units at the hospital.

Patients meeting study criteria were approached and asked for their consent to initiate benzodiazepine deprescribing. For patients who consented to deprescribing, an appropriate tapering schedule was created, the specifics of which were decided between them and their healthcare team and/or pharmacist. A sticker was placed on the consenting patient's chart, and the deprescribing form was placed in the front of their chart by the pharmacist. The deprescribing form remained in the patients' medical records until the time of their discharge, at which point it was removed and combined together with all the other study data, and was kept confidential.

Preintervention and postintervention data were collected by the study team using the deprescribing form (see online supplementary appendices 1 and 2 for a copy of the process map and the deprescribing form). Study feedback was collected from involved parties (pharmacists, patients and family members) and stakeholders (physicians, unit managers) both informally, during the study duration, and formally, at study completion. Patients who did not consent to deprescribing were monitored on a weekly basis and were provided at each of the weekly encounters with the opportunity to initiate benzodiazepine deprescribing.

STRATEGY AND IMPROVEMENT CYCLES

Change interventions

The change intervention consisted of four components: a structured medication review, provision of validated patient education material (EMPOWER brochure), a brief supportive patient counselling session and postdischarge communication of the deprescribing intervention to the family physician.

1. Structured medication review
   A structured medication review was conducted at the time of the patient's admission to the hospital by the pharmacist using the Best Possible Medication History medication reconciliation form. The information collected during the structured medication review included details about the number, type and dosage, frequency of benzodiazepine use and duration of use.
2. Patient education material—brochure
   The patient education material selected for this study was the EMPOWER brochure,[10 11] which has been previously validated for use with community-dwelling seniors for engaging and enabling patients in the shared decision-making process of benzodiazepine deprescribing. The EMPOWER brochure is a 12-page colour brochure that uses a combination of approaches to enable and encourage patient participation in the process of benzodiazepine deprescribing.
3. Brief supportive counselling session
   Following the provision of the EMPOWER brochure, a one-on-one brief supportive counselling session was provided by the physician and the medical student for each patient, which lasted no longer than 15 min. The aim of these counselling sessions was to support the information provided in the brochure, in addition to providing an opportunity for feedback and questions. Further patient counselling was provided via the healthcare team and the pharmacist during their hospital stay.
4. Communication postdischarge
   On the patient's discharge from hospital, copies of the EMPOWER brochure and the deprescribing history were sent to the patient's family physician, with the goal being to establish clear communication around the medication changes and to help maintain prior deprescribing efforts.

Measurement

Appropriate outcome, process and balancing measures were developed. The primary outcome measure was the number of people in whom benzodiazepine deprescribing was initiated. The amount of deprescribing that had occurred by study completion was quantified into three categories: (1) 100% benzodiazepines deprescribed, (2) 50%–99% benzodiazepines deprescribed and (3) <50% benzodiazepines deprescribed. The other outcome measures were the proportion of patients who refused benzodiazepine deprescribing and the reason for their refusal.

Selected process measures included the proportion of eligible patients who received the intervention, the number of counselling occasions provided to each patient by (1) the pharmacist and (2) the physician, and the mean counselling time (minutes) received per patient by (a) the pharmacist and (b) the physician.

A number of balancing measures were selected to ensure that the proposed change intervention would not adversely impact patient care. First, we looked at the incidence of complications arising during the deprescribing process and measured the incidence of falls, delirium, withdrawal symptoms, and changes in sleep or changes in anxiety. Second, we looked at the incidence of new medication prescriptions or dose adjustments for any psychotropic medications (which included benzodiazepines, antipsychotics, z-drugs and antidepressants). Third, we looked at the cost of intervention (eg, patient education material).

Intervention implementation and oversight of the various measures were achieved through regular monitoring, which incorporated the use of weekly medication review meetings between the pharmacist and the

healthcare team. During these reviews, the current status of benzodiazepine deprescribing was reviewed and documented on the deprescribing form by either the pharmacist or the attending physician with documentation, including the date, current benzodiazepine dosage, changes in benzodiazepine dosage and details of any benzodiazepine deprescribing regime being used. If benzodiazepine deprescribing had not been initiated, the reasons were documented.

PDSA improvement cycles

Project-level PDSA cycles

Five PDSA cycles were conducted fortnightly to assess study progress. Each PDSA cycle followed a similar format: at 2-week intervals, a meeting was held with one to two members of the study team and the pharmacist to discuss study progress and to identify new or ongoing concerns. Problem solving was used to develop necessary strategies to overcome any identified issues. These change strategies were then implemented in the subsequent cycle, and their impact was then re-evaluated.

The first PDSA cycle used the following aim statement: '100% of all current benzodiazepine users who are admitted to unit 4C at the Glenrose Rehabilitation Hospital will have their benzodiazepines deprescribed or dosage reduced by at least 50% within a 3-month period'. During the meeting in the first cycle, an issue was identified around inadequate patient recruitment, as no patients had been recruited at this point. Problem solving to overcome this barrier resulted in the decision to expand to an additional site (3D) to enhance participant recruitment. The aim statement for the subsequent PDSA cycles was also adjusted to account for the additional unit.

During the third PDSA cycle, several issues were identified around the inconsistent documentation of Functional Independence Measure and SCOTT scoring for patients at admission and discharge. Following a group discussion, the decision was made to not include these measures in the final data analysis.

The second, fourth and fifth PDSA cycles did not identify any concerns or barriers, and thus, no new change intervention was implemented as a consequence.

Patient-specific PDSA cycles

Thirteen PDSA cycles were conducted weekly, which focused on the success of benzodiazepine deprescribing at the patient level. The general format of these PDSA cycles included a weekly medication review conducted between the pharmacist and physician (team), weekly chart reviews by the study team, and a separate meeting between a member of the study team and the patient/family member, in addition to discussions with the pharmacist and/or the healthcare team. In the setting of patient concerns/unsuccessful benzodiazepine deprescribing attempts or refusal to initiate benzodiazepine deprescribing, problem solving between the study team, the patient/family, and the pharmacist and healthcare team was used to develop necessary strategies to overcome these barriers, which were then subsequently implemented in the following cycles.

As these interventions were patient specific, and to avoid repetition and to improve data readability, and to help preserve patient confidentiality, data from all PDSA cycles were aggregated and grouped according to identified issue and implemented intervention (table 1).

RESULTS

All 12 eligible patients were recruited to the study across the two units. The mean age was 79.3 years (SD=5.1). Seventy-five per cent (n=9) of the patients were female.

The most common indications for using benzodiazepines included anxiety (83%, n=10) and insomnia (58%, n=7) (see table 2). Many patients (n=6, 50%) were using benzodiazepines for more than one clinical indication. One patient was using benzodiazepines for headaches, while another patient had no clinical indication for being on benzodiazepines.

Table 1 Patient-level plan–do–study–act identified issues/concerns versus change intervention data (aggregated)

Identified issues/concerns	Change interventions
No patients	1. Study expanded across an additional unit to improve recruitment population pool.
Withdrawal symptoms	1. Restart benzodiazepine and increase the duration of deprescribing. 2. Start a new appropriate medication (ie, antidepressant when it is being used for anxiety).
Reluctance to start deprescribing	1. Increasing number of conversations being held between patient and prescriber. 2. Changing to an alternative benzodiazepine. 3. Approaching the issue of benzodiazepine deprescribing at different encounters. 4. Substituting the benzodiazepine for a more appropriate medication (ie, antidepressant when it is being used for anxiety).
Worsening anxiety symptoms during benzodiazepine deprescribing	1. Substituting the benzodiazepine for a more appropriate medication (ie, antidepressant when it is being used for anxiety). 2. Consultation with geriatric psychiatry as needed. 3. Titration of benzodiazepine dose up as needed.

Table 2 Medication changes and complications reported among patients

	Benzodiazepine at admission (indication)	Change in benzodiazepine	Complications reported	Other psychoactive medications, notes
Patient 1	Clonazepam (uncertain)	Totally (100%) deprescribed	Anxiety	Added mirtazapine
Patient 2	Nitrazepam (anxiety and sleep)	Totally (100%) deprescribed	Fall	Increased duloxetine, continued zopiclone
Patient 3	Lorazepam (anxiety and insomnia)	Changed to clonazepam and totally (100%) deprescribed	Anxiety	Added duloxetine and mirtazapine, increased gabapentin
Patient 4	Clonazepam (headache, insomnia and anxiety?)	Decreased dose (2.5 mg daily to 1 mg od)	Anxiety and sleep changes	Added venlafaxine and melatonin
Patient 5	Clonazepam (anxiety and insomnia?)	Decreased dose (1.5–0.25 mg two times per day)	Mild withdrawal symptoms	Stopped risperidone
Patient 6	Lorazepam (anxiety)	Failed deprescribing	Anxiety	Added mirtazapine and cymbalta, neurontin; transferred to geriatric psychiatry
Patient 7	Lorazepam (anxiety)	Totally (100%) deprescribed	Anxiety	Added zopiclone, mirtazapine, cymbalta and seroquel; transferred to geriatric psychiatry
Patient 8	Lorazepam (anxiety and sleep)	Totally (100%) deprescribed	Mild withdrawal symptoms	Increased mirtazepine, added effexor
Patient 9	Lorazepam (anxiety)	Decreased dose (1.0–0.25 mg hs)	None	Added melatonin
Patient 10	Clonazepam (anxiety)	Decreased dose (1 mg two times per day to 0.25 mg hs)	None	Added duloxetine
Patient 11	Clonazepam (anxiety and insomnia)	Totally (100%) deprescribed	None	Decreased seroquel
Patient 12	Temazepam (insomnia)	Decreased dose (15 mg hs to prn)	None	Temazepam decreased to prn

hs, half strength; od, once a day; prn, as needed.

Process measures

Of the 12 patients approached, 100% were eligible to participate. All eligible participants were enrolled in the study, and all consented to benzodiazepine deprescribing. Eleven of the 12 patients (92%) had benzodiazepine deprescribing initiated. One patient who had initially consented did not have benzodiazepine deprescribing initiated due to worsening anxiety symptoms during her hospital stay. All patients received the EMPOWER brochure and underwent counselling. The average times spent for counselling by physicians and pharmacists were 18.3 (median 17.5 min) and 39 min (median 55 min), respectively.

Patients who did not consent to deprescribing (n=1, 8%) were monitored on a weekly basis and were provided at each of the weekly encounters with the opportunity to initiate benzodiazepine deprescribing.

Outcome measures

At the time of study completion, six patients (6/11, 55%) had their benzodiazepines completely discontinued, with the five remaining patients achieving greater than 50% in dosage reduction (see table 2). For these five patients, deprescribing was not completely achieved due to insufficient time, and the goal was to continue the deprescribing process in the community with their family physician.

Balancing measures

Seven patients (64%) experienced side effects during the deprescribing process: four experienced worsening anxiety symptoms, two had withdrawal symptoms and one patient encountered a fall. The fall was witnessed by the physiotherapist and was attributed to decreased attention to her surroundings. This fall was not thought to be related to the deprescribing of her benzodiazepine as deprescribing had not been initiated at that point.

During the benzodiazepine tapering process, five patients (5/11, 45%) required benzodiazepine substitute medications: four (4/11, 36%) required the addition of an antidepressant, and one (1/11, 9%) required the addition of an antipsychotic medication, with only one patient (9%) requiring amendment of his benzodiazepine dosage back to the original level. The local environment and close follow-up provided to all patients during the study process allowed the early identification of ensuing complications, such as worsening anxiety. Due to the availability of expertise

and resources within the study environment, additional expertise/consultation could easily be obtained, which was required for one individual who required transfer to an inpatient geriatric psychiatry unit.

Feedback

Physicians on the unit reported being more aware of the appropriate indications for benzodiazepines in the elderly population and more confident in the deprescribing process. Patient feedback highlighted that although they liked the EMPOWER brochure, the one-on-one counselling session was more beneficial and provided an opportunity for bonding and trust building between the patient and the health professional. One family physician reported that his patients liked the EMPOWER brochure and would like a link to access the brochure in order to distribute to his patients.

Observed associations between outcomes, interventions and relevant contextual elements

The observed incidence of overall complications arising during the deprescribing process was not unexpected. However, the incidence of (worsening) anxiety was deemed as being significant, occurring in five individuals (5/11, 45%). Although one of the study exclusion criteria included severe anxiety, this was not formally assessed prior to study entry, and these worsening/new anxiety symptoms could likely be an underlying manifestation of pre-existing anxiety, which may have been precipitated by medication withdrawal. All of the 11 patients were either started on a more appropriate medication (antidepressant) or had pre-existing dosages increased.

The other most notable finding was the large number of patients who required substitute medications; seven patients (7/11, 64%) required new medications (n=7; these patients required antidepressants with 1 of these patients also requiring a new antipsychotic). This highlights an important finding that consideration should be made during the deprescribing process to whether there is a need to substitute the benzodiazepine for a more appropriate medication, such as an antidepressant for patients with anxiety. Therefore, although the intervention may not be associated with an absolute decrease in the number of medications, it appears to be associated with an improvement in appropriate prescribing, which is of equal value.

Although two patients (2/11, 18%) developed withdrawal symptoms, this was uncommon and likely a reflection of inadequate prescribed education or experience as in these circumstances the medications were withdrawn in a rapid manner. In general, the low incidence of withdrawal symptoms supports the concept that even long-standing benzodiazepine use can be deprescribed without encountering withdrawal effects.

LESSONS AND LIMITATIONS

The use of this multipronged patient education intervention was shown to be well tolerated and effective for promoting benzodiazepine deprescribing, with relatively few side effects seen, with worsening anxiety arising as the most common side effect. The intervention was applied and accepted by all, which is evident of its acceptability among the target population. The feedback received from patients indicated that, although the brochure was helpful, the one-on-one supportive counselling was found to be the most useful in terms of promotion of informed and shared decision making.

Although the concept of deprescribing is relevant across all medical specialties, nowhere is it more important than in the field of geriatrics. In particular, it is important for those medications with high rates of side effects and those medications that are being used inappropriately in high-risk populations, such as the use of benzodiazepines in the elderly, which was the reason for this project.

From the baseline data analysis, it was shown that for some patients, benzodiazepines were being prescribed for inappropriate indications, for example, depression and pain. In the actual study, the reported common indications for benzodiazepine prescriptions included them being used for ‘no indication’ in two patients. Through interactions with patients and their family members during the counselling sessions, when asked why they are taking the benzodiazepines and the duration of use, a common response from patients was, ‘I don’t know why I take it, but I have been taking it for many years.’ Another common response was, ‘my family doctor prescribed it for me many years ago, and I just kept taking it.’ From these responses, it can be seen that often patients may no longer have the indication for benzodiazepines; however, they are still kept on the medication for many years.

The baseline data analysis also showed that although 100% of the patients with active benzodiazepine prescriptions were initiated on deprescribing, none were provided education about appropriate benzodiazepine use, and none were encouraged to be involved in the deprescribing process. Therefore, one of the study’s goals was to provide patients with educational material such that they could be empowered to participate in shared decision making with their prescriber and be actively involved in the deprescribing process. This goal was successfully met in the study and feedback we received from patients was all positive. We originally anticipated some resistance from patients, especially those who have been on benzodiazepines for a long time. However, after further explanation about the side effects of long-term benzodiazepine use, and reassurance around the symptom management of side effects, most patients and their family members were very willing to embark on deprescribing. One woman, who was a chronic benzodiazepine user with a history of anxiety, was initially hesitant to initiation of deprescribing; however, after a couple of weeks, she consented to start the deprescribing process.

Most patients appreciated the one-on-one counselling session more than the EMPOWER brochure. They liked the personal touch, enjoyed the social interaction,

and found that they could ask questions and get answers immediately during the counselling sessions. In particular, the counselling session provided an opportunity for bonding and trust building between the patient and the health professional. With rapport built, patients were more willing to consider trying to have their benzodiazepine deprescribed.

During the baseline data analysis, 100% of the patients had benzodiazepine deprescribing initiated; however, 0% had deprescribing completed at discharge. During this QI study, 6 of the 11 patients (55%) had their benzodiazepines completely discontinued. The five remaining patients achieved greater than 50% in dosage reduction, with deprescribing not completed due to insufficient time to complete the tapering process. Tapering requires a considerable amount of time, which is variable between patients. For these patients, the goal would be to continue the deprescribing process in the community with their family physician. To ensure continuity of care in the community postdischarge, the EMPOWER brochure, along with a letter explaining the patient's participation in the deprescribing study, was sent to each family physician. For patients who were completely deprescribed at discharge, this would help maintain the deprescribed status; for those whose deprescribing was incomplete at discharge, the family physician can play an important role in helping the patient continue the tapering process in the community.

Of the side effects most commonly encountered during the deprescribing process, worsening of anxiety symptoms was the most frequently encountered. This can often be relieved with the addition of an alternative, more appropriate and clinically indicated medication to benzodiazepines, for example, an antidepressant. Therefore, although the total number of medications did not reduce for many patients, there was an improvement in appropriate prescribing, which can be of equal value.

One of the major limitations to our study included our small sample size. This was due to lower than predicted numbers of eligible patients being admitted to the hospital and low participant turnover. Another limitation was the short amount of time over which the deprescribing process could occur, which was of shorter duration than that usually employed. We attempted to overcome this hurdle by providing continuity of care and translating deprescribing information to the participant's family physician.

CONCLUSION

We were able to deprescribe or decrease the dosage of benzodiazepines in the majority of hospitalised patients enrolled in the project. Results indicated that using a combination of medication review, patient education and brief counselling can empower patients, as well as support appropriate benzodiazepine usage that is well tolerated and acceptable. Clinicians, however, need to anticipate the management of anxiety, a common side effect. Although small, our study showed significant potential for improvement of benzodiazepine deprescribing among hospitalised seniors.

The most commonly encountered side effects were worsening anxiety; better screening of patients for the presence of underlying anxiety could help prescribers predict the development of this complication and minimise its occurrence through premedicating or coadministration of a more suitable agent. The low incidence of other more worrying complications, such as withdrawal symptoms, supports and justifies feasibility of encouraging and prompting the deprescribing of benzodiazepines in this patient population, where such use is inappropriate.

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REFERENCES

1. AHS. AHS Tableau workbook: Alberta community pharmacy prescribed medication-per population (2015/2016); 2017.
2. AHS. AHS Tableau workbook: Alberta population counts by user selected resident geography (2015/2016); 2017.
3. Sithamparanathan K, Sadera A, Leung L. Adverse effects of benzodiazepine use in elderly people: a meta-analysis. *Asian J Gerontol Geriatr* 2012;7:107–11.
4. Panel A, By the American Geriatrics Society 2015 Beers Criteria Update Expert Panel. American geriatrics Society 2015 updated beers criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc* 2015;63:2227–46.
5. Craig D, Passmore AP, Fullerton KJ, *et al*. Factors influencing prescription of CNS medications in different elderly populations. *Pharmacoepidemiol Drug Saf* 2003;12:383–7.
6. CoPaSo A, Toolkit C. Benzodiazepines: use and taper. Canada College of Physicians and Surgeons of Alberta; 2016. http://www.cpsa.ca/your-practice/prescribing-resources-tools/
7. Society CG. Geriatrics: five things physicians and patients should question Toronto, Canada Canadian Medical association, 2014. Available: http://www.choosingwiselycanada.org/recommendations/geriatrics/
8. Reeve E, Gnjidic D, Long J, *et al*. A systematic review of the emerging definition of 'deprescribing' with network analysis: implications for future research and clinical practice. *Br J Clin Pharmacol* 2015;80:1254–68.
9. Farrell B, Tannenbaum C. deorescribing.org: Bruyere, 2017. Available: http://deprescribing.org/about/

10. Tannenbaum C, Martin P, Tamblyn R, *et al*. Reduction of inappropriate benzodiazepine prescriptions among older adults through direct patient education: the empower cluster randomized trial. *JAMA Intern Med* 2014;174:890–8.
11. Martin P, Tamblyn R, Ahmed S, *et al*. A drug education tool developed for older adults changes knowledge, beliefs and risk perceptions about inappropriate benzodiazepine prescriptions in the elderly. *Patient Educ Couns* 2013;92:81–7.