The impact of in hospital patient–education intervention on older people's attitudes and intention to have their benzodiazepines deprescribed: a feasibility study

Danijela Gnjidic (iD), **Hui Min Magdalene Ong, Celeste Leung, Jesse Jansen and Emily Reeve**

Abstract

Background: Long-term benzodiazepine use in the older population is common and is associated with significant harm. The provision of a patient-educational booklet during hospitalization may encourage patients to discuss review and possible deprescribing of benzodiazepine therapy with their health professionals. The aim of this study was to assess the feasibility and effect of a patient empowerment intervention in hospital inpatients on patient initiation of a discussion about deprescribing benzodiazepines versus usual care.

Methods: A feasibility interventional study using a patient-empowerment education intervention was conducted at a Sydney teaching hospital. Patients aged ⩾ 65 years, prescribed a benzodiazepine, and able to provide consent were invited to participate in the study. Participants were randomly allocated to intervention or control group (1:1). Intervention participants received the patient-empowerment booklet and control received usual care. All participants received 1-month follow-up phone interviews to assess medication and attitudinal changes.

Results: A total of 42 participants were recruited (20 intervention and 22 control). The average age was 71.5 (interquartile range: 69.0–80.3) and 54.8% were females. There was no difference in baseline characteristics between intervention and control groups ($p > 0.05$). At baseline, 65.0% of participants (53.0% intervention, 86.0% control) were not concerned about the potential benzodiazepine side effects. Twenty-nine participants (15 intervention and 14 control) completed 1-month follow up; 22 participants (11 intervention and 11 control) were discharged on the benzodiazepine. Among these, 13 (59.1%) had ceased benzodiazepine at 1-month follow up [46.2% ($n = 6$) intervention; 53.8% ($n = 7$) control]. In the intervention group, 33.3% ($n = 5$) of participants had initiated a discussion with their doctor or pharmacist about stopping the benzodiazepine compared with 35.7% ($n = 5$) in the control group.

Conclusion: Cessation of benzodiazepines 1 month following discharge was common. Future larger studies are required to confirm the effectiveness of providing a patient-empowerment booklet on reducing benzodiazepine use and other potentially inappropriate medications.

Keywords: deprescribing, benozidiazepines, patient-centred, acute care setting

Correspondence to:
Danijela Gnjidic
Sydney Pharmacy School,
Faculty of Medicine and
Health, The University of
Sydney, Pharmacy and
Bank Bld A15, Sydney,
NSW 2006, Australia
**danijela.gnjidic@sydney.
edu.au**

**Hui Min Magdalene Ong
Celeste Leung**
Sydney Pharmacy School,
Sydney, NSW, Australia

Jesse Jansen
Faculty of Medicine and
Health, The University
of Sydney, Sydney, NSW,
Australia

Emily Reeve
Faculty of Medicine and
Health, University of
Sydney, NSW, Australia
Geriatric Medicine
Research, Dalhousie
University and Nova Scotia
Health Authority, NS,
Canada
College of Pharmacy,
Dalhousie University, NS,
Canada

Danijela Gnjidic
Charles Perkins Centre,
University of Sydney,
Sydney, NSW, Australia

Introduction

International studies have consistently shown that a significant proportion of older adults use benzodiazepines chronically.[1–4] In Australia, 15–42% of all older adults use benzodiazepines chronically[5–9] and 17% use benzodiazepines for at least 4.5 years.[6] This is of particular concern as long-term use may cause dependence and adverse drug reactions (e.g. drowsiness, oversedation, memory loss), falls, hip fractures, and even possibly dementia.[2–4] Therefore, to mitigate the impact of medication burden on quality

of life, long-term use of benzodiazepines and other inappropriate medications should be regularly reviewed, tapered and ceased (deprescribed) when applicable.

Deprescribing relates to the process of stopping inappropriate medications with the intention to minimize polypharmacy and improve patient outcomes.[10–12] A recent study by Qi and coworkers found that 89% of older inpatients were willing to have one or more of their regular medications stopped if it was deemed possible by their doctor.[13] However, a systematic review highlighted some barriers to the deprescribing process from the patients' perspective, which include belief in appropriateness and fears associated with stopping.[14]

A number of clinical trials have been conducted to assess the effects of deprescribing benzodiazepines in older patients and have yielded success rates between 27% and 80% using patient education with tapering, pharmacological substitution with melatonin and mixed interventions.[15] In line with patient-centred-care approaches and shared decision making, providing evidence-based information to patients in an appropriate format is important. It may act as a driving force towards deprescribing, as it can address patients' knowledge about appropriateness and alleviate concerns, overcoming the barrier of fear.[14,16] To investigate this, Tannenbaum and colleagues developed a patient-education intervention booklet (Eliminating Medications through Patient Ownership of End Results, the EMPOWER brochure) about benzodiazepines and found that provision of the EMPOWER brochure to community pharmacy patients in Canada resulted in 62% of intervention participants initiating discussions to reduce the use of benzodiazepines with their doctor or pharmacist. Additionally, 27% of intervention participants managed to completely stop the use of their benzodiazepine *versus* 5% in the control group.[16]

To our knowledge, the use of direct-to-consumer patient-education intervention to reduce the use of benzodiazepines in the acute care setting in Australia has not been tested to date. Although the point of hospitalization provides a good opportunity for medication reconciliation, a recent study has shown it does not reduce the use of potentially inappropriate medications.[17] However, hospitalization may present a unique time in a patient's care journey for provision of education, which may enable changes to occur after discharge. Therefore, the aim of this study was to assess the feasibility of a patient-empowerment intervention in hospital inpatients on patient initiation of a discussion about deprescribing benzodiazepines *versus* usual care.

Methods

Study design and setting
A feasibility interventional patient-education study was conducted at a large teaching hospital, the Royal North Shore Hospital, Sydney, Australia. The baseline recruitment was conducted between August and October 2015. Participants were randomly allocated to control or intervention groups at a 1:1 ratio using computer-generated random digits generated by the Microsoft Excel 'RAND()' function. Participants were followed up *via* telephone interviews at 1 month following discharge. Patients over 65 years of age and admitted to cardiology, renal, endocrine, general medicine, rheumatology or surgical orthopaedic wards were screened by a trained pharmacy research student. Patients were recruited at any time during hospitalization. Patients who were prescribed one or more benzodiazepines on the inpatient medication chart were invited into the study. Participants were excluded from the study if they were: (a) unable to speak, understand and complete the interview in English; (b) identified as cognitively impaired by clinical staff; (c) isolated due to infection; or (d) refused to participate. Prior to obtaining written consent, an information sheet and verbal explanation of the study process was provided to participants. The Northern Sydney Local Health District Human Research Ethics Committee granted ethics approval for this project (RESP/15/156).

Data collection
Following consent, data on sociodemographics and clinical characteristics were captured *via* interview and from medical records. The total number of prescribed drugs and dosing regimen for each medication (including benzodiazepines) were collected during baseline interview and confirmed against the national inpatient medication chart (NIMC). The NIMC is used in hospital to capture prescribing, dispending, administering and reconciling medications, and it includes data on all medications (e.g. dose, indication) during hospitalisation. Information about discharge

medications was collected from electronic medical records.

Attitudinal characteristics of participants towards deprescribing

The revised version of the Patients' Attitudes Towards Deprescribing (r-PATD) questionnaire was used to assess patients' attitudes and perceptions towards their medications.[18] Patients' attitudes were captured on a five-point Likert scale (strongly agree, agree, unsure, disagree and strongly disagree). The r-PATD questionnaire includes four factors consisting of five questions each and two global questions. A score for each factor (involvement, burden, appropriateness and concerns about stopping) is calculated by summing the responses to all the questions in that factor and then dividing by the number of questions in the factor. A higher score indicates a higher level of involvement, higher reported burden of their medications, higher belief in appropriateness of their medications and a higher level of concern about stopping medications. The two global questions are reported individually. Additionally, attitudinal responses to five benzodiazepine-specific questions were also captured on a five-point Likert scale. These questions were developed, piloted and adapted as per a previous study, which investigated patients' attitudes towards having statins deprescribed.[13]

Clinical and health literacy characteristics

Comorbidities, cognitive status and frailty were assessed using the validated tools, Charlson Comorbidity Index (CCI),[19] Mini-Mental State Examination (MMSE)[20] and Reported Edmonton Frail Scale (REFS).[21] The CCI scores are a total sum of presence and severity of 19 predetermined medical conditions. The MMSE is a 30-point scale where a score of $\leqslant 24$ indicates presence of cognitive impairment and a lower score means increasing impairment. A REFS score of $\geqslant 8$ on an 18-point scale indicates that participants are frail, where higher scores indicate increasing severity of frailty. Involvement preferences were assessed using the Control Preference Scale[22] where patients were asked to best describe how he/she and their doctor interact to make decisions regarding his/her medication.[23] This was then categorized into three categories (high, medium and low) as per a previous study.[24] The Single Item Literacy Screener (SILS) evaluation instrument was administered to assess health literacy

and it was scored from one to five, with scores $\geqslant 2$ indicating possible difficulty to read health-related printed materials.

Intervention and control group

Upon completion of data collection at baseline, participants allocated into the intervention group were provided with a patient-empowerment education booklet (EMPOWER brochure).[16] Information in the booklet is presented based on the constructivist learning theory that aimed to cause cognitive dissonance using self-administered true-or-false questions on effects associated with benzodiazepine use, with feedback to correct myths and wrong beliefs.[25] It also uses the social comparison theory by showing a successful cessation example and a tapering protocol as a guide to help stop use of benzodiazepine.[25] Participants were asked to read the booklet in their own time and discuss any concerns about their benzodiazepine medications with their doctor or pharmacist following hospital discharge. The booklet was adapted to include benzodiazepines and brand names available in Australia.

Follow-up data collection

All participants received a phone call at 1 month following discharge and were asked if they had initiated a discussion with a healthcare professional regarding the withdrawal of their benzodiazepine and if so, what the outcome of the discussion was (i.e. whether they were still taking the benzodiazepine and its current dose). A maximum of three calls within a few days of the 1-month period per participant were attempted. Participants' attitudes and beliefs towards deprescribing were also reassessed using the r-PATD.[18]

Statistical analysis

Data collected were coded and analysed using Statistical Package for the Social Science (SPSS) (IBM SPSS, Chicago, Illinois, USA) statistic software version 22.0 for Windows. Standard descriptive statistics were used to describe the study population characteristics. Normality of population variables were tested using Shapiro–Wilk test. Any differences between the intervention and control arms were compared using the Chi-square test and the nonparametric Mann–Whitney U test, as appropriate. To measure the effect of the patient-education booklet on deprescribing benzodiazepines, we compared the proportion of participants in both arms who reported to have initiated a discussion
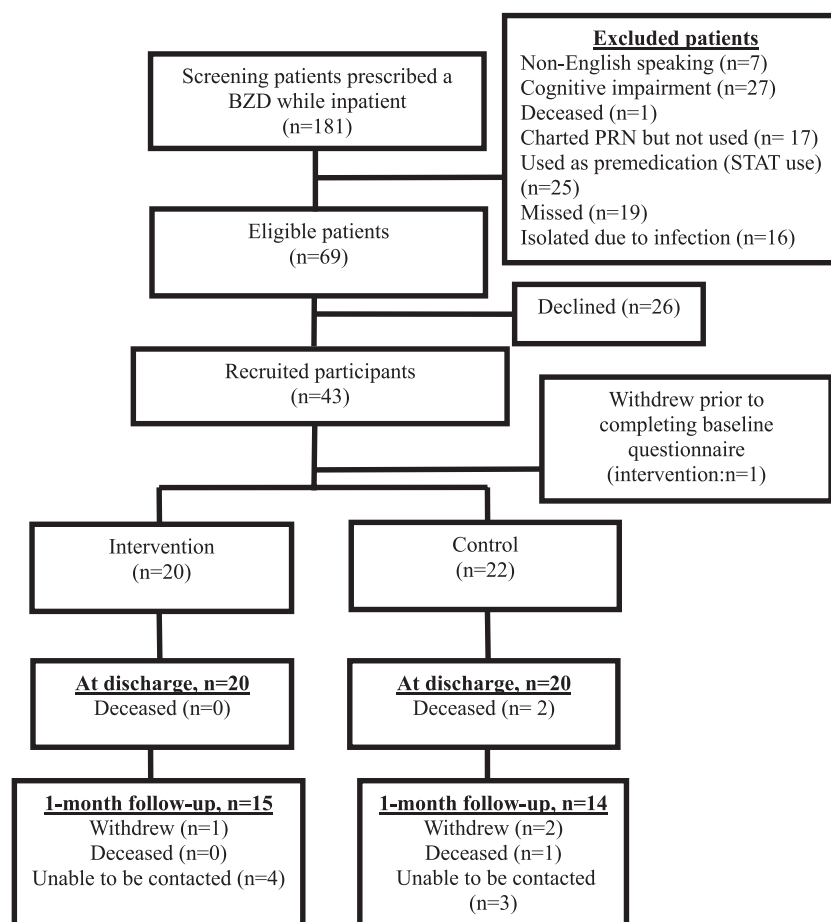
Figure 1. The study recruitment processes.
BZD, benzodiazepine; PRN, *pro re nata* (as required); STAT, .

with a healthcare professional on stopping benzodiazepines, and the proportion of participants in both arms who had reduced the dose of, or stopped, their benzodiazepines. Differences between intervention and control arms were compared using Fisher's exact test. Changes in attitudes towards deprescribing were measured by comparing pre- and postintervention r-PATD factor scores within intervention or control using the Wilcoxon signed-rank test, and between intervention and control using the Mann–Whitney U test.

Results

Baseline characteristics of all participants
A total of 181 patients were screened and 69 were potentially eligible as study participants. Of these, 43 participants consented to participate in the study and were randomly allocated into intervention ($n = 20$; one participant withdrew prior to completing the baseline assessment) and

control ($n = 22$) groups (Figure 1). Table 1 shows the baseline characteristics of all participants. The median age of participants was 71.5 [interquartile range (IQR) 69.0–80.3], 54.8% were females and 90.5% were White. Overall, 38.1% of the participants preferred to share the responsibility of managing their medication with their doctor, while 50.0% stated that they prefer to leave the decision-making responsibility to their doctors. The majority of participants scored 2 or less on the SILS (90.9%), indicating no difficulty in reading health-related printed materials. There were no significant differences in baseline clinical and medication characteristics between intervention and control groups ($p > 0.05$). The patterns of benzodiazepine use are summarized in Table 2. The most common benzodiazepine used at baseline was temazepam (66.7% of participants). Approximately a half of participants (54.8%) had taken the benzodiazepine for more than 1 year; 19% were on it for less than 1 year prior to admission and the rest (26.1%) had it initiated in

Table 1. Baseline characteristics of the study population.

Characteristics	Total population (n = 42)	Control (n = 22)	Intervention (n = 20)	*p* value
Age, years, median (IQR)	71.5 (69.0–80.3)	72.5 (70.0–79.0)	71.5 (68.5–81.5)	0.9
Female gender, *n* (%)	23 (54.8)	12 (54.5)	11 (55.0)	0.97
Marital status, *n* (%)				
Married	21 (50.0)	12 (54.5)	9 (45.0)	0.392
Divorced	9 (21.4)	3 (13.6)	6 (30.0)	
Other	12 (28.6)	7 (31.8)	5 (25.0)	
Ethnicity, *n* (%)				
White	38 (90.5)	21 (95.5)	17 (85.0)	0.287
Middle Eastern	3 (7.1)	0 (0.0)	3 (15.0)	
Aboriginal/Torres Strait islander	1 (2.4)	1 (4.5)	0 (0.0)	
Highest level of education completed, *n* (%)				
None	3 (7.1)	1 (4.5)	2 (10.0)	0.507
Primary school	10 (23.8)	6 (27.3)	4 (20.0)	
High school	13 (31.0)	5 (22.7)	8 (40.0)	
Tertiary education	16 (38.1)	10 (45.5)	6 (30.0)	
Number of medications at recruitment, median (IQR)				
Regular medications	9.5 (7.8–12.3)	10.5 (8.0–13. 0)	8.0 (7.0–11.5)	0.315
PRN medications	3.5 (2.0–5.0)	3.0 (2.0–4. 0)	4.0 (2.0–5.5)	0.485
Number of medications at discharge, median (IQR)				
Regular medications*	11.0 (8.3–13.8)	12.0 (10.0–14.0)	9.5 (8.0–12.5)	0.224
PRN medications*	2.0 (1.0–3.0)	2.0 (1.0–3.0)	2.5 (1.0–4.0)	0.483
Charlson comorbidity Index, median (IQR)	2.0 (1.0–3.0)	2.5 (1.0–3.0)	2.0 (0.5–3.0)	0.310
Reported Edmonton Frail Scale$, *n* (%)				
Frail (8–18)	18 (52.9)	8 (44.4)	10 (62.5)	0.532
Robust (0–7)	16 (47.1)	10 (55.6)	6 (37.5)	
Mini-Mental State Examination‡, median (IQR)	27.0 (25.0–29.0)	27.0 (25.0–28.0)	28.0 (25.5–29.0)	0.401
Control Preference Scale, *n* (%)				
High	5 (11.9)	2 (9.1)	3 (15.0)	0.692
Medium	16 (38.1)	9 (40.9)	7 (35.0)	
Low	21 (50.0)	11 (50.0)	10 (50.0)	

(Continued)

Table 1. (Continued)

Characteristics	Total population (*n* = 42)	Control (*n* = 22)	Intervention (*n* = 20)	*p* value
Single Item Literacy Screener evaluation test, *n* (%)				
Never	34 (81.0)	17 (77.3)	17 (85.0)	0.606
Rarely/sometimes/ often/always	8 (19.0)	5 (22.7)	3 (15.0)	

Data are presented as median (IQR) or number (percentage).
Significance level is 0.05.
*Based on *n* = 40 patients, as 2 were deceased and 1 withdrew after baseline data collection.
$Based on *n* = 34 participants, 16 intervention and 18 control who completed all questions of the Reported Edmonton Frail Scale.
‡Based on *n* = 35, as 7 participants had refused to do the Mini-Mental State Exam; 5 from the intervention group and 2 from the control group.
IQR, interquartile range; PRN, *pro re nata* (as required).

Table 2. Patterns of benzodiazepine use.

	Total population (*n* = 42)	Control (*n* = 22)	Intervention (*n* = 20)	*p* value
Type of benzodiazepine used, *n* (%)				
Diazepam	7 (16.7)	5 (22.7)	2 (10.0)	0.035*
Oxazepam	3 (7.1)	0 (0.0)	3 (15.0)	
Temazepam	28 (66.7)	16 (72.7)	12 (60.0)	
Lorazepam	1 (2.4)	1 (4.5)	0 (0.0)	
Clonazepam	1 (2.4)	0 (0.0)	1 (5.0)	
Nitrazepam	2 (4.8)	0 (0.0)	2 (10.0)	
Prescription timepoint, *n* (%)				
Hospital initiated	11(26.1)	6 (27.2)	5 (25.0)	0.727
Prior to admission ≤1 year	8 (19.0)	3 (13.6)	5 (25.0)	
Prior to admission >1 year	23 (54.8)	13 (59.0)	10 (50.0)	
Pattern of use as charted (prescribed) at recruitment, *n* (%)				
Regular	6 (14.3)	5 (22.7)	1 (5.0)	0.105
PRN	36 (85.7)	17 (77.3)	19 (95.0)	
Use of benzodiazepine at discharge, *n* (%)$	30 (75.0)	16 (80.0)	14 (70.0)	0.602

*Numbers reported are based on the number of primary benzodiazepines used, as three participants used more than one benzodiazepine together. *p* value is also based on the total number of primary benzodiazepines.
$*n* = 40: 1 participant withdrew after baseline data collection (intervention); 2 died while in hospital (control); 1 tapered off the benzodiazepine used prior to discharge (control).
PRN, *pro re nata* (as required).

Table 3. Comparison of revised Patients' Attitudes Towards Deprescribing (r-PATD) factor scores between baseline and 1-month follow up.

	Involvement		Burden		Appropriateness		Concerns	
	Baseline median (IQR)	1-month median (IQR)	Baseline median (IQR)	1-month median (IQR)	Baseline median (IQR)	1-month median (IQR)	Baseline median (IQR)	1-month median (IQR)
Total	4.0 (3.8–4.3)	4.0 (3.7–4.2)	2.8 (2.4–3.2)	2.8 (2.4–3.1)	2.8 (2.4–2.8)	2.4 (2.1–3.3)	2.4 (2.0–2.8)	2.4 (2.0–2.8)
Control	4.0 (3.8–4.3)	4.0 (3.9–4.2)	2.8 (2.4–3.2)	2.8 (2.4–2.9)	2.8 (2.2–3.4)	2.6 (2.2–3.6)	2.3 (2.0–2.7)	2.4 (2.0–2.8)
Intervention	4.0 (3.9–4.4)	4.0 (3.6–4.2)	2.8 (2.4–3.4)	2.8 (2.4–3.4)	2.8 (2.4–3.2)	2.4 (2.0–3.2)	2.5 (2.3–2.8)	2.4 (2.0–2.8)

No significant differences observed ($p > 0.05$).
IQR, interquartile range.
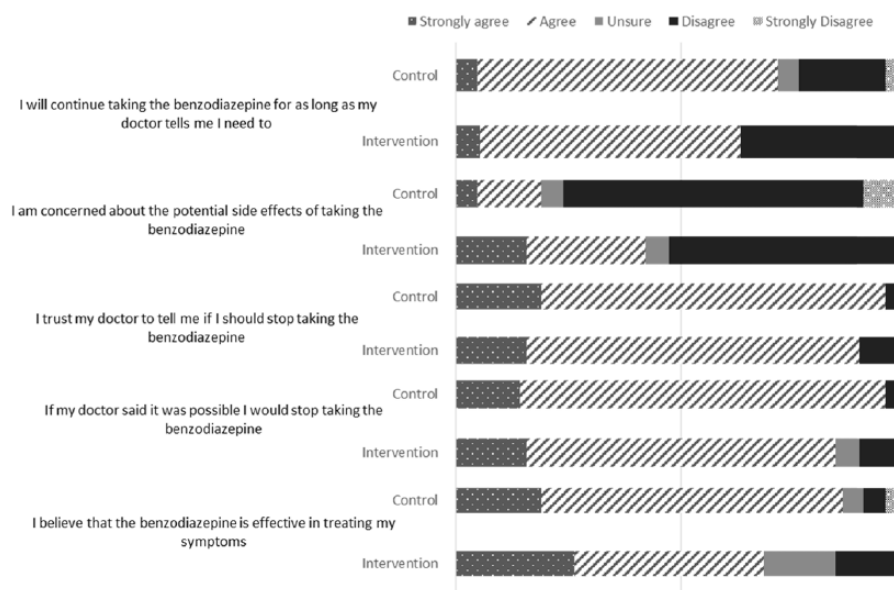
Figure 2. Responses to benzodiazepine-specific-attitude questions in the intervention and control groups at baseline.

hospital. A sum of 75% of participants were discharged on a benzodiazepine. There were no differences in patterns of benzodiazepine use at baseline across control and intervention groups ($p > 0.05$).

Baseline attitudes towards deprescribing regular medications and benzodiazepine-specific questions

The r-PATD factor scores are shown in Table 3. Distribution to all the questions are shown in the supplementary material. Although most participants (90.0% overall, 95.0% intervention, 86.0% control) were satisfied with their current medications, an overwhelming majority (88.0% overall, 88.0% intervention and 86.0% control) were willing to stop one or more of their regular medications if their doctor deemed it was possible (Figure 1, supplementary data). There were no significant differences between the intervention and control groups across all attitudes towards deprescribing medications in general ($p > 0.05$, data not shown).

Figure 2 shows the responses to the benzodiazepine-specific-attitude questions. A total of 65% of participants (53.0% intervention, 86.0% control) were not concerned about potential benzodiazepine side effects. However, when asked if they were willing to stop taking the benzodiazepine if their doctor said it was possible, 90.0% of participants (84.0% intervention and 95.0% control) were willing to do so (combined agree and strongly agree responses).

Impact of patient-education intervention on deprescribing benzodiazepine at 1 month

Twenty-nine participants (15 intervention and 14 control) completed follow-up interviews at 1 month (Figure 1). Of these, 22 participants (11 intervention and 11 control) were discharged on benzodiazepine. Among these, 13 (59.1%) had ceased benzodiazepine at 1-month follow up [46.2% ($n = 6$) intervention, 53.8% ($n = 7$) control]. Of those who had not been discharged on the benzodiazepine ($n = 7$), six participants remained off the medication (two/four intervention/control), while one participant (intervention) resumed benzodiazepine use at 1-month follow up despite having it ceased at discharge. There was no significant difference between intervention and control groups in the withdrawal of benzodiazepine at 1 month between the two groups ($p > 0.05$). In the intervention group, 33.3% ($n = 5$) of participants had initiated a discussion with their doctor or pharmacist about stopping the benzodiazepine compared with 35.7% ($n = 5$) in the control group.

Changes in attitudes towards deprescribing regular medications and benzodiazepine-specific questions

Table 3 compares the responses across the four factors of the r-PATD questionnaire. At baseline, the median study population scores for involvement, burden, appropriateness and concerns about stopping were 4.0 (IQR = 3.8–4.3), 2.8 (2.4–3.2), 2.8 (2.4–2.8) and 2.4 (2.0–2.8), respectively. There was a reduction in appropriateness scores observed in the total, control and intervention groups (indicating reduced belief in appropriateness of their medications), however, it was not significant. Although, the number of individuals in the intervention group who disagreed to feeling concern about the side effects of benzodiazepines increased from baseline ($n = 10$) to follow up ($n = 13$), this was not statistically significant ($p = 0.598$) (supplementary information,

Figure 4). Overall, there was no significant change in r-PATD responses or attitudes towards deprescribing benzodiazepines from recruitment to 1-month follow up within the intervention or control and across groups ($p > 0.05$).

Discussion

This study involved the delivery of a patient-education intervention which aimed to empower patients to discuss the use of benzodiazepines with their doctor or pharmacist. The intervention resulted in a 46% rate of discontinuation in the intervention group compared with 54% in the control group. None of the participants had reduced the dose of the benzodiazepine at 1-month follow up. Importantly, patient willingness to have their benzodiazepine deprescribed if their doctor said it was possible was high in this population (90.0% agreed or strongly agreed).

The rate of discontinuation of benzodiazepine use in this study is similar to previous studies that employed patient education with tapering intervention. However, unlike in the EMPOWER trial where provision of a patient-education booklet resulted in 62% of intervention participants initiating a discussion with their doctor or pharmacist at 6-month follow up, only 33% our participants had done so at the 1-month follow up.[16,18] This may have been due to a shorter follow-up time in this study *versus* the EMPOWER trial (1 month *versus* 6 months) or participants in this study might have felt that they could stop benzodiazepine without the help of their healthcare provider. Additionally, 86% of participants were charted the drug for use on an as-needed basis while in hospital. Therefore, participants in our study may not have been as dependent on benzodiazepine use as those attending a community pharmacy. We also had a high proportion of control participants (54%) who stopped benzodiazepine use at 1-month follow up. The high cessation rates in the control group may have been triggered by the attitudinal questions that were asked as part of the study, as question–behaviour effect has also been seen in other studies.[26,27]

Other studies conducted in the acute care setting have employed a pharmacological substitution intervention, where their usual benzodiazepine (e.g. diazepam or temazepam) was switched to a different but low-dose benzodiazepine, 1 mg lormetazepam, for a week before complete withdrawal of the benzodiazepine.[28,29] These studies reported even higher benzodiazepine discontinuation

rates of about 80%.[28,29] One of the studies reported benzodiazepine discontinuation rates over 1 year, where 40% of the participants in the intervention group *versus* 20% participants in the control group maintained abstinence from benzodiazepine. However, this approach does not encompass patient involvement that is different from current national recommendations, which are to engage patients while managing their benzodiazepine use.[30] Interestingly, in a recent single-arm pilot study conducted in Canada, the provision of the EMPOWER brochure to patients during hospitalization resulted in 64% of participants discontinuing benzodiazepines 30 days after discharge.[31]

A recent Cochrane review has shown that with the employment of decision aids, patients can be encouraged to actively make decisions at the same time as maintaining their patient and practitioner relationship.[32] As prescribers have reported that a barrier to deprescribing is concern about disrupting the doctor–patient relationship, patient-empowerment interventions may be a key to encourage primary care practitioners to deprescribe in regular practice.[33] The effectiveness of a patient-empowerment intervention has also been demonstrated in reducing exposure to other potentially inappropriate medication, such as proton pump inhibitors (PPIs). Krol and coworkers conducted a patient-directed educational study where patients with dyspepsia were sent a letter that suggested stopping or reducing the use of PPIs, with intervention yielding a 24% reduction in PPI use.[34] However, multidisciplinary and multifaceted interventions appear to be the most effective in reducing inappropriate medication use through deprescribing.[35] As such, a combination of patient-empowerment interventions with those encompassing multidisciplinary involvement are likely to be the most effective and lead to optimizing deprescribing in clinical practice.

In relation to patients' attitudes to deprescribing, the responses to the r-PATD were similar to previous studies where a majority of the participants were willing to stop one or more of their current medications.[13,36] This study was the first to examine changes in attitudes over time in response to the intervention. We had hypothesized that the attitudes towards the benefits and harms of benzodiazepine use may have changed after receiving the EMPOWER brochure.[16,25] There were no significant changes observed in attitudes amongst individuals between baseline and follow up. However, this is likely due to the small sample size in this feasibility study and short follow up. Interestingly, we did observe a (nonsignificant) decrease in belief in appropriateness which was greater in the intervention group than the control group. Further investigation is required to determine if this effect would occur in a larger study.

Strengths and limitations

Our study was the first study to assess the feasibility and effectiveness of supplying a patient-education booklet to reduce long-term use of benzodiazepine among older inpatients in Australia. Validated tools were used to assess clinical characteristic and patients' attitudes, beliefs and perceptions towards medication. However, there are a number of limitations associated with this study, including single-hospital site, low recruitment rate in comparison with total number or patients screened (23.8%), short follow-up period (1 month) and incomplete follow up. However, the sociodemographic and clinical characteristics of our study population are similar to other studies.[13,37] Moreover, future studies should consider enrolling individuals with cognitive impairment including dementia as concerns have been raised about the adverse effects of benzodiazepines on chronic cognitive impairment.[38] Use of benzodiazepines can lead to cognitive deficits including deficits in memory, learning, attention and visuospatial ability. While observational studies suggests that long-term use of benzodiazepines may be associated with dementia, further studies are needed to clarify the causality.[38] The possibility of recall bias should be considered, as data on patients' attitudes towards deprescribing, medical conditions and duration of benzodiazepine use were self-reported. Another limitation is the 1-month follow-up time frame. As the time frame of 1 month is relatively short, participants may not have had enough time to approach their GPs or pharmacist to have the discussion, or it may be that some participants are still following the tapering protocol provided in the booklet and as such, discontinuation rates observed are inconclusive, although we did not observe any participants who had reduced their dose. In addition, patients' post-discharge destination (e.g. nursing home, rehabilitation) may have delayed the follow up discussion with their primary care provider.

Future research and clinical implications

The involvement of patients in the deprescribing process is essential and should be considered in

future studies aiming to optimize pharmacological therapies. We noted a number of feasibility issues which would need addressing before conducting a large study of this nature. A substantial number of potential participants declined participation or were missed. This may reflect the busy nature of inpatient wards where there are other competing interests of greater importance. To facilitate implementation into practice, health professionals must consider how the intervention could be incorporated into regular workflow in the acute care setting. We hypothesize that providing the EMPOWER brochure at the time of discharge when receiving counselling from the ward pharmacist may be more effective. This may allow patients to clarify their doubts with the ward pharmacist directly and minimize the potential for the brochure to be accidentally left at the hospital. Additionally, as noted above, pairing the patient-education piece with education to their regular GP may be more effective. Additionally, a previous study found that the GP is highly influential to patients' willingness to deprescribe due to the rapport and trust established as compared with a ward pharmacist or an external researcher.[36]

Conclusion
Cessation of benzodiazepines in the 1 month following discharge was common in our study of older inpatients. Further research is required to determine how to best deliver patient-educational interventions to promote deprescribing in the acute care setting.

Funding

Conflict of interest statement
The authors declare that there is no conflict of nterest.

Supplemental material
Supplemental material for this article is available online.

ORCID iD
Danijela Gnjidic https://orcid.org/0000-0002-9404-3401

References
1. Olfson M, King M and Schoenbaum M. Benzodiazepine use in the United States. *JAMA Psych* 2015; 72: 136–142.

2. Alvarenga JM, Loyola Filho AI, *et al*. Prevalence and sociodemographic characteristics associated with benzodiazepines use among community dwelling older adults: the Bambui Health and Aging Study (BHAS). *Rev Bras Psiquiatr* 2008; 30: 7–11.

3. Llorente MD, David D, Golden AG, *et al*. Defining patterns of benzodiazepine use in older adults. *J Geriatr Psychiatry Neurol* 2000; 13: 150–160.

4. Van Hulten R, Isacson D, Bakker A, *et al*. Comparing patterns of long-term benzodiazepine use between a Dutch and a Swedish community. *Pharmacoepidemiol Drug Saf* 2003; 12: 49–53.

5. Islam MM, Conigrave KM, Day CA, *et al*. Twenty-year trends in benzodiazepine dispensing in the Australian population. *Intern Med J* 2014; 44: 57–64.

6. Jorm AF, Grayson D, Creasey H, *et al*. Long-term benzodiazepine use by elderly people living in the community. *Aust N Z J Public Health* 2000; 24: 7–10.

7. Smith AJ and Tett SE. How do different age groups use benzodiazepines and antidepressants? Analysis of an Australian administrative database, 2003–6. *Drugs Aging* 2009; 26: 113–122.

8. Westbury JL, Jackson S and Peterson GM. Psycholeptic use in aged care homes in Tasmania, Australia. *J Clin Pharm Ther* 2010; 35: 189–193.

9. Windle A, Elliot E, Duszynski K, *et al*. Benzodiazepine prescribing in elderly Australian general practice patients. *Aust N Z J Public Health* 2007; 31: 379–381.

10. Reeve E, Shakib S, Hendrix I, *et al*. The benefits and harms of deprescribing. *Med J Aust* 2014; 201: 386–389.

11. Scott IA, Hilmer SN, Reeve E, *et al*. Reducing inappropriate polypharmacy: the process of deprescribing. *JAMA Intern Med* 2015; 175: 827–834.

12. Woodward M, Bird M and Elliot E. Deprescribing: achieving better health outcomes for older people through reducing medications. *J Pharm Prac* 2003; 33: 323–328.

13. Qi K, Reeve E, Hilmer SN, *et al*. Older peoples' attitudes regarding polypharmacy, statin use and willingness to have statins deprescribed in Australia. *Int J Clin Pharm* 2015; 37: 949–957.

14. Reeve E, To J, Hendrix I, *et al.* Patient barriers to and enablers of deprescribing: a systematic review. *Drugs Aging* 2013; 30: 793–807.

15. Reeve E, Ong M, Wu A, *et al.* A systematic review of interventions to deprescribe benzodiazepines and other hypnotics among older people. *Eur J Clin Pharmacol* 2017; 73: 927–935.

16. 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: 890–898.

17. Mudge A, Radnedge K, Kasper K, *et al.* Effects of a pilot multidisciplinary clinic for frequent attending elderly patients on deprescribing. *Aust Health Rev* 2016; 40: 86–91.

18. Reeve E, Low LF, Shakib S, *et al.* Development and validation of the revised patients' attitudes towards deprescribing (rPATD) questionnaire: versions for older adults and caregivers. *Drugs Aging* 2016; 33: 913–928.

19. Charlson ME, Pompei P, Ales KL, *et al.* A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chron Dis* 1987; 40: 373–383.

20. Folstein MF, Folstein SE and McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975; 12: 189–198.

21. Hilmer SN, Perera V, Mitchell S, *et al.* The assessment of frailty in older people in acute care. *Australas J Ageing* 2009; 28: 182–188.

22. Degner L, Sloan J and Venkatesh P. The control preference scale. *Can J Nur Res* 1997; 29: 21–43.

23. Morris NS, MacLean CD, Chew LD, *et al.* The single item literacy screener: evaluation of a brief instrument to identify limited reading ability. *BMC Fam Pract* 2006; 7: 21.

24. Chiu C, Feuz MA, McMahan RD, *et al.* "Doctor, make my decisions": decision control preferences, advance care planning, and satisfaction with communication among diverse older adults. *J Pain Symptom Manage.* Epub ahead of print 3 September 2015. DOI: 10.1016/j.jpainsymman.

25. 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. *Pat Educ Couns* 2013; 92: 81–87.

26. Ayres K, Conner M, Prestwich A, *et al.* Exploring the question-behaviour effect: randomized controlled trial of motivational and question-behaviour interventions. *Brit J Health Psychol* 2013; 18: 31–44.

27. Conner M, Godin G, Norman P, *et al.* Using the question-behavior effect to promote disease prevention behaviors: two randomized controlled trials. *Health Psychol* 2011; 30: 300–309.

28. Petrovic M, Pevernagie D, Mariman A, *et al.* Fast withdrawal from benzodiazepines in geriatric inpatients: a randomised double-blind, placebo-controlled trial. *Euro J Clin Pharmacol* 2002; 57: 759–764.

29. Petrovic M, Pevernagie D, Van Den Noortgate N, *et al.* A programme for short-term withdrawal from benzodiazepines in geriatric hospital inpatients: success rate and effect on subjective sleep quality. *Int J Geriatr Psychiatry* 1999; 14: 754–760.

30. Brett J and Murnion B. Management of benzodiazepine misuse and dependence. *Aust Prescr* 2015; 38: 152–155.

31. Wilson MG, Lee TC, Hass A, *et al.* EMPOWERing hospitalized older adults to deprescribe sedative hypnotics: a pilot study. *J Am Geriatr Soc.* Epub ahead of print 1 March 2018. DOI: 10.1111/jgs.15300.

32. Stacey D, Legare F, Col NF, *et al.* Decision aids for people facing health treatment or screening decisions. *Cochrane Database Syst Rev* 2014; 1: CD001431.

33. Anderson K, Stowasser D, Freeman C, *et al.* Prescriber barriers and enablers to minimising potentially inappropriate medications in adults: a systematic review and thematic synthesis. *BMJ Open* 2014; 4: e006544.

34. Krol N, Wensing M, Haaijer-Ruskamp F, *et al.* Patient-directed strategy to reduce prescribing for patients with dyspepsia in general practice: a randomized trial. *Aliment Pharmacol Ther* 2004; 19: 917–922.

35. Gnjidic D, Le Couteur DG, Kouladjian L, *et al.* Deprescribing trials: methods to reduce polypharmacy and the impact on prescribing and clinical outcomes. *Clin Geriatr Med* 2012; 28: 237–253.

36. Reeve E, Wiese MD, Hendrix I, *et al.* People's attitudes, beliefs, and experiences regarding polypharmacy and willingness to deprescribe. *J Am Geriatr Soc* 2013; 61: 1508–1514.

37. Best O, Gnjidic D, Hilmer SN, *et al.* Investigating polypharmacy and drug burden index in hospitalised older people. *Intern Med J* 2013; 43: 912–918.

38. Ng BJ, Le Couteur DG, Hilmer SN. Deprescribing benzodiazepines in older patients: Impact of interventions targeting physicians, pharmacists, and patients. *Drug Aging* 2018; 35: 593–521.