The use of an electronic clinical rule to discontinue chronically used benzodiazepines and related Z drugs

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The use of an electronic clinical rule to discontinue chronically used benzodiazepines and related Z drugs

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Abstract
Purpose The chronic use of benzodiazepines and benzodiazepine-related drugs (BZ/Z) in older people is common and not without risks. The objective of this study was to evaluate whether the implementation of a clinical rule promotes the discontinuation of chronically used BZ/Z for insomnia.
Methods A clinical rule, generating an alert in case of chronic BZ/Z use, was created and applied to the nursing home (NH) setting. The clinical rule was a one-off intervention, and alerts did not occur over time. Reports of the generated alerts were digitally sent to NH physicians with the advice to phase out and eventually stop the BZ/Z. In cases where the advice was adopted, a follow-up period of 4 months on the use of BZ/Z was taken into account in order to determine whether the clinical rule alert led to a successful discontinuation of BZ/Z.
Results In all, 808 NH patients were screened. In 161 (19.1%) of the patients, BZ/Z use resulted in a clinical rule alert. From these, the advice to phase out and stop the BZ/Z was adopted for 27 patients (16.8%). Reasons for not following the advice consisted of an unsuccessful attempt in the past (38 patients), patients family and/or patient resistance (37 patients), the non-continuous use of BZ/Z (32 patients) and indication still present (27 patients). Of the 12 NH physicians, seven adopted the advice.
Conclusions The success rate of a clinical rule for discontinuation of chronically used BZ/Z for insomnia was low, as reported in the present study. Actions should be taken to help caregivers, patients and family members understand the importance of limiting BZ/Z use to achieve higher discontinuation rates.

Keywords Benzodiazepines · Nursing home patients · Clinical rule · Discontinuation

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Introduction and objective

Benzodiazepines and benzodiazepine-related drugs (BZ/Z) are widely used to symptomatically treat insomnia [1]. Given their risks (i.e., dependence, tolerance and central side effects), their use should be limited to a maximum of 1 to 2 months, depending on the drug [2–7]. However, in daily practice, BZ/Z chronic use is widespread, especially within the nursing home population. European studies show a prevalence of chronic BZ/Z use in the nursing home population of between 28 and 50% [8–12].

Furthermore, based on different criteria, such as the Beers or the STOPP/START criteria (screening tool of older people's prescriptions (STOPP) and screening tools to alert to the right

treatment (START)), benzodiazepines have been identified as inappropriate medications; they should be avoided in patients 65 years and older, independent of diagnosis or condition. The reasons for this are the increased risks of impaired cognition, delirium, falls, fractures and motor vehicle accidents with benzodiazepine use [1, 13, 14]. The STOPP criteria also suggest that benzodiazepines should not be used for longer than 4 weeks [14].

Given the importance of the earlier described events, a clinical rule was created to generate an alert whenever a patient used a BZ/Z for longer than 4 weeks, as described in the Summary of Product Characteristics (SPC) and the STOPP criteria [14]. A clinical rule is a real-time decision support module that focuses on medication safety and medication optimisation [15].

The objective of this study was to evaluate the feasibility of using a clinical rule to promote the discontinuation of chronically used BZ/Z for insomnia in the nursing home setting.

Methods

This feasibility study was performed in the Zuyderland nursing homes, which include 15 nursing homes with a capacity of approximately 800 patients. Patients admitted into one of the nursing homes in July 2016 were included in the study. In the present study, the clinical rule was applied as a one-off intervention.

A clinical rule was created to generate a report whenever a patient had been using a BZ/Z for longer than 4 weeks. An extraction of the medication information (drug, dosage, start date and stop date) was obtained using Crystal Reports, version XI, by SAP SE (Germany); Crystal Reports is a business intelligence application used to design and generate reports from a wide range of data sources. The clinical rule screened the extraction and generated a report creating an alert for patients who had used a BZ/Z for longer than 4 weeks. For these patients, the indication of BZ/Z was established afterwards by taking into account the information on the medication record and/or the time the medication was given, assuming that a single night dose was indicated to treat insomnia. Establishing the indication was performed manually by medication record review by two of the authors (CMG and VM).

An advisory for each patient was generated whenever a patient had chronically been using BZ/Z. After the indication was assessed, these advisories were digitally sent to the respective nursing home (NH) physician ($n = 12$) as a list. The advisory consisted in a recommendation for phasing out BZ/Z use and eventually stopping it. After the BZ/Z has been completely stopped, a minimum of 2 weeks resting period should be granted before evaluating whether there was still an indication for BZ/Z usage.

The NH physicians were requested to indicate whether the advisory to phase out BZ/Z and eventually stop it was followed or not. When the advisory was not adhered to, they were asked to specify the reason by indicating one of the following options:

- Patient/family resistance
- It has already been tried before without success
- It is not necessary: BZ/Z use is only as needed
- Indication is still present

The NH physicians returned the digital list along with a reply to the question of whether they had followed the given advisory. Follow-up on BZ/Z use was performed during the period 4 months after the NH physicians had reacted in order to evaluate whether, in cases of following the advisory, BZ/Z had been successfully stopped.

Results

The clinical rule screened 808 NH patients, 269 (33.3%) of whom were using BZ/Z. Of these, 161 (19.9%) were chronically using BZ/Z to treat insomnia (i.e., longer than 4 weeks). The clinical rule generated 180 alerts, which means that 19 patients were using two BZ/Zs.

An advisory per patient was sent to the corresponding NH physician; only 27 out of 161 (16.8%) of the given advisories were followed, meaning that the NH physician had started phasing out the BZ/Z. The other 134 advisories (83.2%) were not followed by the NH physician. Figure 1 shows the inclusion and the follow-up for the given advisories.

The median time a BZ/Z was prescribed before the advisory was given was 19.1 months. This median time-use was slightly longer for the group in which the advisory was not followed (22.3) and was shorter for the groups in which the advisory was followed, i.e., being successfully stopped or restarted (17.2 and 14.8, resp.).

Baseline characteristics, including age, gender, time-use BZ/Z and type BZ/Z, are shown in Table 1.

Regarding physician performance, five NH physicians did not follow any of the advisories to stop BZ/Z prescribing. The other seven NH physicians adopted the advisory in 9.1 to 65.0% of their patients.

The most frequently used BZ/Z was oxazepam, followed by temazepam. In the group in which the advisory was adopted, the use of temazepam was higher than oxazepam (Table 1).

Discussion and conclusion

In the current study, the feasibility of a CR to discontinue chronically used BZ/Z for insomnia has been evaluated. Based on the data, we can conclude that even though it is feasible to discontinue chronically used BZ/Z drugs in the nursing home population, the success rate of the CR seems rather low. These results match with previous studies showing that in the nursing home population, BZ/Z discontinuation is difficult due to a lack of life prospects [12].

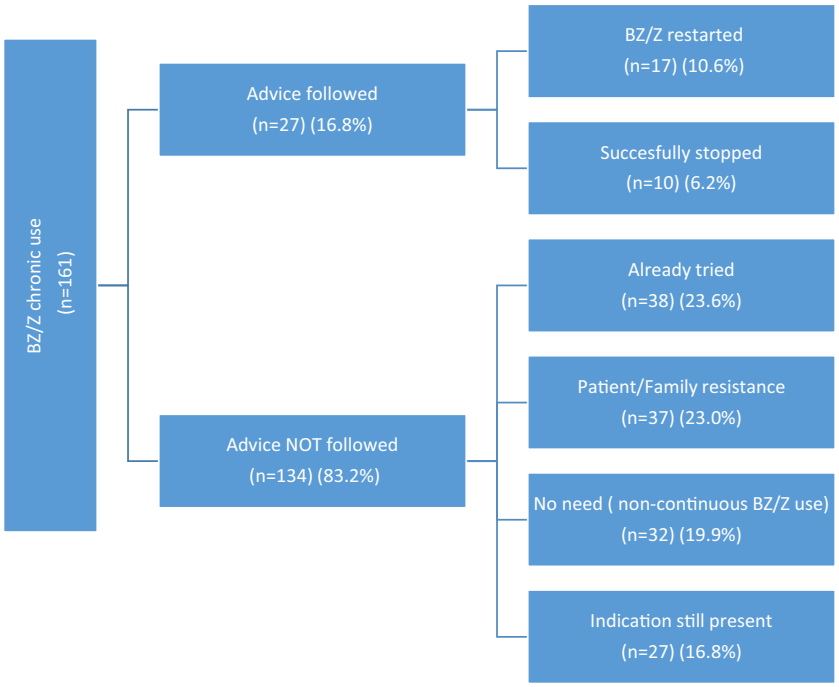

Fig. 1 Inclusion and follow-up

In the study of Burgeois et al., in 28% of the cases, discontinuation was initiated, and after 8 months of follow-up, 66.0% of the cases had successfully discontinued the use of BZ/Z. In the present study, in only 16.8% of the cases was discontinuation initiated, and at 4 months follow-up, 37% were successfully discontinued [12]. This can be explained by the fact that the time-use of BZ/Z in the current study was rather long, ranging from 6.4 to 92.5 months. We strongly believe that the long time-use of BZ/Z in the present study made it more difficult to discontinue use. Furthermore, the

Table 1 Baseline characteristics and time-use of the BZ/Z before intervention

	BZ/Z chronic use ($n = 161$)	Advice NOT followed ($n = 134$)	Advice followed	
			BZ/Z restarted ($n = 17$)	BZ/Z stopped ($n = 10$)
Mean age (SD)	84.4 (9.3)	84.5 (9.7)	85.8 (8.2)	83.8 (7.7)
Woman	125 (77.6%)	105 (78.4%)	14 (82.4%)	6 (60.0%)
BZ/Z time-use in months before intervention				
Median (IQR)	19.1 (81.7)	22.3 (81.3)	14.8 (9.1)	17.2 (9.5)
Max	92.5	92.5	27.2	46.5
Min	6.4	6.4	7.8	8.1
BZ/Z types (n)				
Alprazolam	1	1	0	0
Clorazepate	1	1	0	0
Flunitrazepam	1	1	0	0
Lormetazepam	1	1	0	0
Clobazam	2	2	0	0
Diazepam	4	4	0	0
Zolpidem	4	4	0	0
Nitrazepam	8	5	1	2
Zopiclone	17	14	1	2
Temazepam	50	39	8	3
Oxazepam	72	62	7	3

prevalence of chronic BZ/Z use in the present study was 19.1%, which is on the lower side compared with the European prevalence of 28 and 50%. In addition, in the present study, it seems that when discontinuation of BZ/Z is started, the success rate to completely discontinue a BZ/Z increases when the resting period of 14 days is granted, as described in the STOPP criteria [14].

In the current study, the main reason not to adopt the advisory to discontinue a BZ/Z was the occurrence of an unsuccessful attempt in the past. This fact has not been checked in the present study, which is a limitation; nevertheless, another study mentioned the time needed to attempt the discontinuation process as a barrier to actually start the process [16]; this might explain why physicians in the present study seemed reluctant to start the discontinuation process again when it had already been (unsuccessfully) tried in the past, since it would mean a substantial time investment. The second reason was patient and/or family resistance; this finding is consistent with those of other studies, which mentioned patient resistance as an important factor working against chronic BZ/Z discontinuation [16–18].These findings indicate that motivation and resistance, both from patients and family, seem to be the main reasons for low success rates. The present study consisted of a one-off intervention, and alerts did not occur over time; therefore, more research is needed to evaluate whether the success rate would be higher when alerts would be repeated occasionally (e.g., 2–3 weeks). In addition, and taking into account that the time-use for BZ/Z was rather long, more research is needed to evaluate if an alert, given directly after 4 weeks of BZ/Z use, would increase the success rate.

In the current study, no advice regarding a method to discontinue the BZ/Z was provided to the physicians. Other studies have given indications on how to best approach the process, including barriers and enablers [19, 20]. In addition, the clinical rule in the present study was a simple rule identifying patients who qualified for discontinuation. A more sophisticated algorithm could provide better results (http://www.open-pharmacy-research.ca/evidence-based-deprescribing-algorithm-for-benzodiazepines/).

Even though the success rate for discontinuance of chronically used BZ/Z described in the present study was rather low, a simple clinical rule, which screens all NH patients within 5 min, can be used to identify which patients qualify for discontinuation. Further research is needed to evaluate ways in which the CR could be improved and/or how often and in which way the advice should be given to achieve a higher success rate. In addition, actions should be taken to help caregivers, patients and family members understand the importance of limiting BZ/Z use in order to achieve higher discontinuation rates.

Authors' contributions All authors have made substantial contributions to conception and design, acquisition of data, analysis and interpretation of data; they all have been involved in drafting the manuscript and revising it critically for important intellectual content; they all have given final approval of the version to be published; and they all agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Compliance with ethical standards

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