

Prescribing cascades in persons with Alzheimer's disease: engaging patients, caregivers, and providers in a qualitative evaluation of print educational materials

Sarah Bloomstone , Kathryn Anzuoni, Noelle Cocoros, Jerry H. Gurwitz, Kevin Haynes, Vinit P. Nair, Richard Platt, Paula A. Rochon, Sonal Singh  and Kathleen M. Mazor

Abstract

Introduction: Prescribing cascades occur when the side effect of a drug is misinterpreted as a new medical condition, and a second drug is prescribed to address the side effect. Persons with Alzheimer's disease (AD) are at increased risk of prescribing cascades due to greater multimorbidity, polypharmacy, and complexity of care. The objective of this study was to evaluate educational materials about prescribing cascades in persons with AD, and elicit input on their use in a future trial.

Methods: We interviewed community-dwelling adults with either an AD diagnosis or a prescription drug used to treat AD ($n=12$), caregivers of patients meeting the same criteria ($n=14$), and providers ($n=15$). We coded interview transcripts and organized themes according to the communication-human information processing model. We revised the materials based on the interviews, and surveyed participating caregivers and providers for their reactions to the revised materials.

Results: Analysis of patients', caregivers', and providers' comments suggest: (a) Providers had conflicting views about the messaging of materials; (b) Caregivers were likely to read letters addressed to patients; (c) Providers were likely to ignore letters, but were receptive to patient/caregiver-initiated conversations; (d) Patients and caregivers had difficulty understanding prescribing cascades; (e) Providers worried that mailed materials would undermine trust; (f) Participants had mixed views on how materials might affect the clinical encounter; (g) Participants felt that materials would improve patient/caregiver engagement. When surveyed, most providers found the revised materials informative and actionable, and most caregivers found them understandable and useful.

Conclusions: This evaluation of educational materials about prescribing cascades in patients with AD provides strong support for engaging caregivers to communicate with providers about prescribing cascades. By giving patients and caregivers a basic description of the prescribing cascade concept, our educational materials may help them prepare for a conversation with the provider, who can then tailor the discussion of the possible cascade to the specific needs of the individual patient and caregiver. However, evidence on whether materials can stimulate such conversations awaits testing in a future trial.

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Correspondence to:

Sarah Bloomstone
University of
Massachusetts Medical
School, Worcester, MA,
USA and Meyers Primary
Care Institute, a joint
endeavor of University of
Massachusetts Medical
School, Reliant Medical
Group, and Fallon
Health, 385 Grove Street,
Worcester, MA 01655-
0112, USA
sjbloomstone@gmail.com

Kathryn Anzuoni
Jerry H. Gurwitz
Sonal Singh
Kathleen M. Mazor
University of
Massachusetts Medical
School, Worcester, MA,
USA and Meyers Primary
Care Institute, a joint
endeavor of University of
Massachusetts Medical
School, Reliant Medical
Group, and Fallon Health,
Worcester, MA, USA

Noelle Cocoros
Richard Platt
Department of Population
Medicine, Harvard Medical
School/Harvard Pilgrim
Health Care Institute,
Boston, MA, USA

Kevin Haynes
HealthCore, Inc.
Wilmington, DE, USA

Vinit P. Nair
Humana Inc., Louisville,
KY, USA

Paula A. Rochon
Women's College
Research Institute,
Women's College Hospital,
University of Toronto,
Toronto, Ontario, Canada

Lay summary

Patient, caregiver and provider thoughts on educational materials about prescribing and medication safety

Prescribing cascades occur when the side effect of a medication is misinterpreted as a new medical condition, and a second medication is prescribed to treat the side effect. Persons

with Alzheimer's disease (AD) are at increased risk of prescribing cascades because they often have more medical conditions, more medications, and more complex care. The goal of this study was to evaluate mailed educational materials about prescribing cascades in persons with AD, and get input on their use in a future study. We interviewed 12 adults with AD, or prescribed a medication to treat AD, 14 caregivers of persons with AD, and 15 providers. We reviewed the interview transcripts to identify important findings about our educational materials. We edited the materials based on the interviews, and sent participating caregivers and providers a questionnaire to get their reactions to the new materials. Important findings from the interviews suggest: (a) Providers had conflicting views about the recommendations given; (b) Caregivers were likely to read letters addressed to patients; (c) Providers were likely to ignore letters, but were receptive to patients/caregivers introducing the topic; (d) Patients and caregivers had difficulty understanding prescribing cascades; (e) Providers worried mailed materials would undermine trust; (f) Participants had mixed views on how materials might affect a doctor's appointment; (g) Participants felt strongly that materials would improve patient/caregiver engagement. When surveyed, almost all providers found the revised materials informative and actionable; and most caregivers found them understandable and useful. These findings provide strong support for engaging caregivers to communicate with providers about prescribing cascades. The educational materials may help patients and caregivers prepare for a conversation with the provider, who can then tailor the discussion of the possible cascade to the specific needs of the individual patient and caregiver. However, evidence on whether materials can stimulate such conversations awaits testing in a future study.

Keywords: Alzheimer's disease and related dementias; Educational materials; Prescribing cascades; Medication safety; Older adults

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Introduction

Prescribing cascades occur when a healthcare provider misinterprets the side effect of a drug as a new medical condition and prescribes a second, potentially unnecessary, drug therapy to address the side effect. Sometimes referred to as 'morbid-ity multipliers', prescribing cascades may increase overall symptom burden, and adversely affect health-related quality of life and function.¹⁻³ Persons with Alzheimer's disease (AD) are at increased risk of prescribing cascades due to high levels of multimorbidity, polypharmacy, and the challenges and complexities related to their care. In addition, patient/caregiver-provider communication regarding medication-related adverse effects is often suboptimal.⁴⁻⁶

There is some evidence that simple direct-to-patient communication efforts can be effective in improving the quality and safety of pharmacotherapy. For example, Smith and colleagues used direct-to-patient mailings of educational materials describing the importance of beta-blockers following myocardial infarctions to improve patient

adherence to beta-blocker therapy.⁷ Tannenbaum and colleagues reported successfully reducing inappropriate benzodiazepine prescriptions among older adults through mailed educational materials,⁸⁻¹¹ and other inappropriate prescriptions through a similar, pharmacist-led educational intervention.¹² These investigators described how direct-to-consumer education stimulated shared decision-making around certain medications. While these studies suggest that direct-to-patient education holds promise, adapting this approach to address prescribing cascades in patients with AD will require attention to at least two major challenges: (a) the need to engage the caregiver; and (b) the absence of standardized guidelines for how to address prescribing cascades in patients with AD.

The purpose of the present study was to conduct a preliminary evaluation of educational materials about prescribing cascades in persons with AD, and a plan for implementing the materials in the context of a future, health plan-based pragmatic clinical trial. To this end, we engaged patients, caregivers, providers, and two panels of advisors

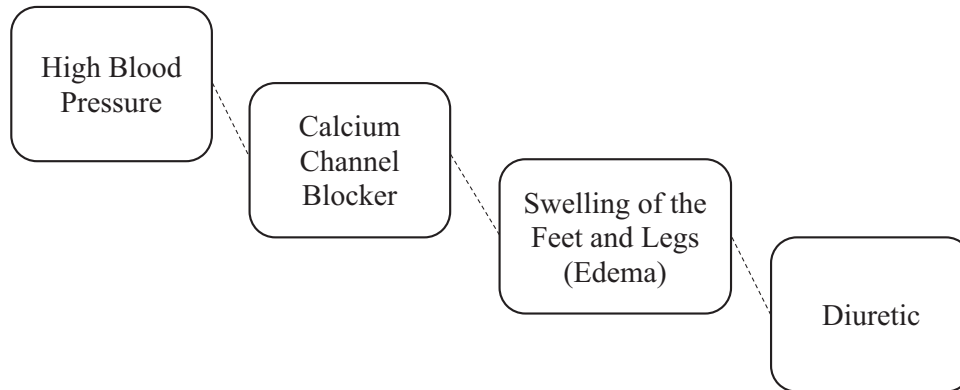


Figure 1. Calcium channel blocker and diuretic prescribing cascade.

to inform the development and refinement of educational materials and the corresponding implementation plan.

Methods

We conducted qualitative interviews with patients with AD, their caregivers, and providers to gather feedback on educational materials about prescribing cascades. We also met with two distinct advisory panels to elicit their feedback on the same materials. We used participant and advisor feedback to revise the materials and presented these versions in subsequent interviews and meetings. In the final stage, we surveyed caregivers and providers to solicit their input on the final materials.

Development of educational materials

Initial versions of patient/caregiver and provider educational materials were designed using models from the deprescribing literature,^{9,13} and other mailed, direct-to-patient and provider educational interventions.^{7,14} Our materials focused on the calcium channel blocker–diuretic (CCB–diuretic) prescribing cascade.^{3,15} This prescribing cascade occurs when a healthcare provider misinterprets swelling of the legs and feet (edema) secondary to a CCB as a new medical condition and prescribes a diuretic to treat the swelling, which has the potential to lead to additional adverse effects (Figure 1).

The patient/caregiver materials were intended to inform and activate the caregiver to initiate a conversation with the provider about this prescribing

cascade, while the provider materials were intended to prepare the primary care provider to be receptive to such a conversation. The final versions of the patient/caregiver and provider materials are presented in Appendices A and B, respectively. The patient/caregiver materials include three components: (a) a cover letter addressed to the patient, introducing the issues of polypharmacy and prescribing cascades; (b) an educational brochure describing the components of the CCB–diuretic cascade; and (c) a ‘pocket card’, listing questions for patients and caregivers to ask at an appointment with the primary care provider. The provider materials include a letter, addressed to the provider that lists patients identified as experiencing a possible CCB–diuretic prescribing cascade with recommendations for how the provider could address the issue. We employed an iterative approach to developing and revising the educational materials, using advisor, patient, caregiver and provider feedback to revise materials, then presenting these versions in subsequent interviews and meetings. This process was repeated until materials were considered acceptable by advisors, patients, caregivers and providers.

Advisory panels

We engaged two distinct advisory panels periodically over the course of the study to gather diverse perspectives and feedback on all aspects of the educational materials and intervention design. One panel consisted of national experts from multiple disciplines with experience relative to medication safety in older adults as researchers, clinicians, policy makers, or as a family caregiver advocate. This panel met virtually four times over

the course of the study and provided feedback on the educational materials, and prioritized a list of clinically important prescribing cascades. We also engaged a second panel of advisors that consisted of local caregivers and geriatricians, as well as two health plan leaders. This panel met three times over the course of the study and used a hybrid model whereby some advisors met in person, and others joined virtually. Although panel members were not considered study subjects, their feedback was used to inform the development and revising of the educational materials. Advisors also provided input on the context of the study findings and whether the responses were considered generalizable and valid to their respective settings and expertise.

Study setting

We identified and recruited a convenience sample of community-dwelling patients, caregivers and providers from an ambulatory clinic associated with an academic health center in central Massachusetts.

Eligibility and recruitment

Using information available in the electronic health record (EHR), we identified community-dwelling adults over the age of 50 years with a diagnosis of AD or a pharmacological therapy used in the treatment of AD, and their primary care providers. In the absence of a gold standard, there is no single algorithm that can perfectly identify the spectrum of AD ranging from mild cognitive impairment to severe dementia. As such, patients were eligible if they had either a diagnostic code for AD or a prescription for a drug used to treat dementia (e.g. donepezil, rivastigmine, galantamine, and memantine) more accurately to identify members of this population.

We then sent providers lists of their eligible patients *via* secure email and asked them to indicate which patients would be appropriate to recruit for the study. Study staff mailed invitations to all patients deemed appropriate to contact and subsequently followed up by telephone. During this phone call, study staff established eligibility, including whether or not the patient had a caregiver over the age of 18 years. Patients who did not have a caregiver were excluded. Patients and caregivers could participate together, or caregivers could participate alone. Study staff scheduled

interviews with eligible patients and caregivers who agreed to participate in an interview.

We recruited providers who cared for at least one patient with AD within the past year. Any provider type, including physicians, nurse practitioners, and physician assistants, were eligible to participate. Provider recruitment occurred using one of two approaches. Study investigators distributed study information and recruitment materials at meetings of primary care and geriatric providers. Providers of patients being recruited were also invited to participate *via* email. Interested providers were scheduled for an interview.

Interview procedure

After approval from the University of Massachusetts Medical School Institutional Review Board (H00016477), we recruited patients, caregivers and providers, as described above, to participate in an in-person interview with trained interviewers. Prior to each interview written, informed consent was obtained from the participating patients, caregivers and providers. The interview guide was developed to permit flexibility, allowing interviewers to change the phrasing or order of the questions asked to accommodate the interviewees' responses. Interviews followed a modified, 'think-aloud' method whereby interviewers presented the educational materials and asked participants to verbalize their thoughts while interacting with the materials. Interviewers then asked follow-up questions to assess further the participant's reactions to and understanding of the materials, and to elicit suggestions for improving the materials. Providers reviewed and reacted to both the provider and patient/caregiver educational materials.

After completing half of the interviews, we noticed we were not sufficiently capturing how patients and caregivers would react to the experience of having a prescribing cascade, or how providers might respond to a patient with a prescribing cascade. To address this, we began the remaining interviews with patient/caregiver and provider-specific hypothetical scenarios. We presented patients and caregivers with a description of the CCB-diuretic prescribing cascade and asked them how they would feel about experiencing this chain of events. We asked providers how they would respond to a patient-caregiver dyad that

brought educational materials about prescribing cascades to an appointment.

Follow-up questionnaire

After revising the educational materials based on the feedback gathered from interviews and advisory panel meetings, we sent a questionnaire to all providers and caregivers who had participated in an interview. Given that caregivers were the target for our educational materials, as they would likely be taking care of the patient's mail and accompanying him/her to their appointments, we felt it was most appropriate to collect feedback from caregivers on the final materials. The questionnaire included the revised materials and questions assessing whether the revisions resulted in understandable and acceptable materials. Providers received a brief three-item online questionnaire (Appendix C), while caregivers received a longer, 14-item mailed, paper-based questionnaire (Appendix D).

Data analysis

Interviews and meetings were audio recorded and transcribed, except in two instances in which technological issues prevented recording, and detailed notes were taken. We used content analysis to code the interview transcripts with the interview guide and study aims as an initial organizing framework.¹⁶ Two research team members (SB, KM) read a set of transcripts to develop a preliminary set of codes. Two research team members (SB, GF) then coded five transcripts, applying the preliminary codes, and suggesting modifications to the coding scheme. Potential modifications were discussed until consensus was reached, and the process was repeated until the team concurred that the coding scheme was sufficiently clear and inclusive of relevant content in the transcripts. Two team members (SB, GF) then independently coded the remaining interview transcripts. The coders met to compare coding and resolve discrepancies. A third team member provided input and helped to resolve discrepancies as needed. Themes were inductively derived from the content codes.

Transcripts from all advisory panel meetings were reviewed by study staff, and we used the feedback and advice received during the panel meetings to

confirm and further validate the themes that emerged from the interviews. We identified a small number of additional themes from the health plan leaders' feedback, which were not mentioned during the interviews with patients, caregivers, and providers.

We employed the communication–human information processing model (C-HIP), a framework originally designed for use in the drug and safety warning literature, to organize themes emerging from the interviews.¹⁷ C-HIP builds on the most basic model of communication whereby a message from a source is transmitted to a receiver. Individual receiver characteristics impact whether the desired behavior in the message is completed. The message is the information that is transmitted from the source to the receiver with the goal of cuing or prompting specific behaviors. In our study, the message is equivalent to the educational materials sent to patients, caregivers and providers (the receivers) from a health plan (the source). The channel refers to the medium and mode by which the educational materials are delivered to the receiver. Once received, the materials need to be attended to (attention) and understood (comprehension). The receiver's attitudes and beliefs, or their pre-existing knowledge or understanding of the information, can impact how they process the educational materials. The receiver's motivation determines whether the materials will stimulate them to carry out the desired behavior. Whether or not the receiver carries out the desired behavior (behavior) is the final stage in the model. These stages serve as an organizing framework for our study findings.

Results

Study sample

We completed qualitative interviews with 12 patient/caregiver dyads, two caregivers, and 15 providers. Tables 1 and 2 describe patient/caregiver, and provider characteristics respectively.

Interview findings

Interviews with patients, caregivers, and providers suggest the following: (a) Providers had conflicting views about the messaging in the materials (message); (b) Letters addressed to patients were likely to reach caregivers (channel); (c) Providers were

Table 1. Patient and caregiver characteristics.

Patient and caregiver characteristics	Patients, n (%)	Caregivers, n (%)
Sex		
Male	11 (91.7)	1 (7.1)
Female	1 (8.3)	13 (92.9)
Age, years		
45–54	0 (0.0)	1 (7.1)
55–64	0 (0.0)	1 (7.1)
65–74	6 (50.0)	6 (42.9)
75 and older	6 (50.0)	6 (42.9)
Race		
White	11 (91.7)	14 (100.0)
Information not available	1 (8.3)	
Ethnicity		
Not Hispanic or Latino	9 (75.0)	12 (85.7)
Information not available	3 (25.0)	1 (7.1)
Education		
Some high school, but did not graduate	0 (0.0)	1 (7.1)
High school graduate or GED	4 (33.3)	1 (7.1)
Some college or 2-year degree	2 (16.7)	4 (28.6)
4-Year college graduate	2 (16.7)	3 (21.4)
More than 4-year college degree	4 (33.3)	5 (35.7)
Marital status (patient only)		
Married or living with a partner	11 (91.7)	–
Divorced	1 (8.3)	–
Relation to patient (caregiver only)		
Spouse	–	12 (85.7)
Child	–	2 (14.3)
'How comfortable are you filling out medical forms?'		
Not at all	3 (25.0)	1 (7.1)
A little bit	2 (16.7)	–
Somewhat	2 (16.7)	3 (21.4)
Quite a bit	2 (16.7)	1 (7.1)
Extremely	3 (25.0)	9 (64.3)

GED, General Educational Development Test.

Table 2. Provider characteristics.

Provider characteristics	n (%)
Number of years in practice	
1–2 Years	3 (20.0)
5–10 Years	4 (26.7)
11–20 Years	2 (13.3)
21 Years or more	6 (40.0)
Clinical training	
MD/DO	14 (93.3)
NP	1 (6.7)
Specialty	
Family medicine	9 (60.0)
General internal medicine	3 (20.0)
Geriatrics	3 (20.0)
Percentage of time in clinical practice	
26–50%	6 (40.0)
51–75%	2 (13.3)
76–100%	7 (46.7)
Number of years with current organization	
Less than 1 year	1 (6.7)
1–5 Years	5 (33.3)
5–10 Years	2 (13.3)
More than 10 years	7 (46.7)
Sex	
Male	8 (53.3)
Female	7 (46.7)
Race or ethnicity	
White	12 (80.0)
Asian	3 (20.0)
Ethnicity	
Hispanic or Latino	1 (6.7)
Not Hispanic or Latino	14 (93.3)
MD/DO, Doctor of Medicine/Doctor of Osteopathic Medicine; NP, Nurse Practitioner.	

likely to ignore letters, but were receptive to patients and caregivers initiating conversations about prescribing cascades (attention); (d) Patients and caregivers had difficulty understanding the concept of prescribing cascades (comprehension); (e) Providers worried mailed materials would undermine trust (attitudes and beliefs); (f) Participants had mixed views on how materials might affect the clinical encounter (motivation); (g) Participants felt strongly that materials would improve patient/caregiver engagement (behavior). Table 3 lists our findings as they pertain to the C-HIP domains, with the initial and ultimate strategies used to address each finding in the educational materials.

Message (cue to action). In the provider letter, providers had conflicting views about the recommendations for addressing the CCB-diuretic prescribing cascade. For some providers, it was important that the recommendations be general and respectful of their clinical expertise and decision making. ‘(The letter) says you decide what you think is best, which is nice, it’s not telling me what to do [. . .] It respects my opinion and ability to clinically make a decision’ (#85-provider). Other providers felt the same messaging was too non-specific, and thus difficult to act on. ‘I just feel like you’ve told me there’s a problem, but I don’t know how to fix that problem [. . .] I don’t know what I did that was incorrect. And I don’t know safe examples of how to correct [. . .] So I think I’d be more likely to follow your advice if I had a really good, easy solution already there’ (#31-provider). These providers felt that incorporating specific recommendations into the educational materials (e.g. decreasing dose; identifying alternative medications; eliminating the medication) would help them address the prescribing cascade more effectively. Health plan leaders strongly favored avoiding specificity, citing concerns that such specific recommendations may threaten the payer–provider relationship. ‘I think even considering the nature of relationships between health plans and physicians, you certainly don’t want to go to the point of being prescriptive [. . .]’ (health plan leader).

Method of delivery (channel). Our educational materials were intended to be delivered from health plans to patients and providers directly *via* mail, and to caregivers indirectly *via* the patient. Because health plans have administrative data only for patients, materials would necessarily be

Table 3. Mapping of study findings to C-HIP domains, initial and ultimate strategy for addressing findings in our educational materials.

C-HIP domain finding	Relevant materials	Initial strategy ^a	Ultimate strategy ^a
Message			
Providers had conflicting views about the messaging in the provider materials	Provider letter	Include recommendations for providers that were more open ended (e.g. 'Please review the patient's medication list at the next appointment to determine if the combination of medications is appropriate for your next patient')	Include recommendations with more specificity to the identified prescribing cascade (e.g. '1. Review med list to determine if diuretic was given to treat edema caused by a calcium channel blocker; 2. Discuss medications to assess side effects and goals; 3. Determine right combination of medications for patient')
Method of delivery (channel)			
Caregivers were likely to see/read mail addressed directly to the patient	Patient/caregiver materials	Mail to patient; include text encouraging sharing materials with caregiver (e.g. 'Please share this letter and materials with the person who helps you with your medicines')	Slight modifications to wording of text (e.g. 'Share this information with the person who helps you with your medications')
Attention			
Providers were likely to ignore a letter from health plans, but were receptive to patients and caregivers initiating conversations	Patient/caregiver materials	Mail to patients (caregivers) as well as providers	Mailing strategy was confirmed as appropriate
	Provider letter		Modified the provider letter to make the list of affected patients more prominent on materials
Comprehension			
Patients and caregivers had difficulty understanding the concept of prescribing cascades from the materials	Patient/caregiver materials	Describe in text component parts of prescribing cascade concept	Described in text the component parts of the prescribing cascade concept in a different order than appeared in the initial version Include graphic illustrating component parts of prescribing cascade in addition to text
Attitudes and beliefs			
Providers worried mailed materials would undermine trust	Patient/caregiver materials	Framed language to encourage collaboration between providers, caregivers and patients	Removed language that was not acceptable to providers and caregivers
Motivation			
Participants had mixed views on how materials might affect the clinical encounter	Patient/caregiver materials	List questions patients/caregivers can ask during visit	Shortened list of questions; made questions more specific target prescribing cascade
Behavior			
Participants felt strongly that materials would improve patient/caregiver engagement	Patient/caregiver materials	Materials encourage patients and caregivers to weigh the risks and benefits of their medications and to talk with the provider about their experience with medications	Materials encourage patients and caregivers to share the informational materials, and engage provider about their combination of medications through a set of brief, targeted questions
^a Initial strategy refers to the strategy used in the preliminary versions of the provider and patient/caregiver materials. 'Ultimate strategy' refers to the strategy used in the final version of the materials as a result of the feedback we received during the interviews and advisory panel meetings. C-HIP, Communication-Human Information Processing model.			

addressed directly to the patient, as opposed to a caregiver. This poses a challenge for our study as persons with AD may have limited cognition that may make receiving mail, like our educational materials, more challenging without the help of a caregiver. We circumvented this issue by incorporating caregiver-specific language into the materials, with the goal of reaching caregivers *via* the patient. Interviews suggested that this approach would be effective. In some cases, the caregiver was primarily responsible for receiving and reviewing mail. ‘We get a lot of mail, but on things like that [. . .] [caregiver] would read it first because she gets the mail and then she’d show it to me later’ (#41-patient). In other cases, patients would initially open the materials but subsequently share them with their caregivers. ‘With me being the caregiver, she gives me everything. So I see it anyways’ (family caregiver advisor). Participants suggested placing an alert to caregivers on the exterior of the envelope, but due to concerns from health plan leaders about patient confidentiality, this option was not deemed feasible.

Attention

Interviews revealed that providers would likely ignore our materials, as they receive many letters, often with incorrect or outdated information. ‘When I get these notices from the insurance companies often their information isn’t the most up to date, so I may sometimes get a reminder about something that was actually addressed 6 months ago. So I don’t always put that much stock in those things in general’ (#57-provider). Providers did offer some suggestions for differentiating our materials, like listing the patient names and medications on the front page immediately to personalize the letter and capture the provider’s attention. ‘So having the names of who my patients are on the front would’ve been more like, hello, don’t throw me out!’ (#31-provider). Despite this change, providers indicated they were still unlikely to pay much attention to the letter. However, most providers responded enthusiastically to the patient/caregiver materials, commenting that this sort of engagement would be a more effective strategy for bringing the issue of prescribing cascades to the provider’s attention. ‘We do receive many letters from insurance companies’ drug plans and it is easy to ignore these letters. Given the patient gets the letter as well

and likely would call the office, it makes it more difficult to ignore. That’s how this method would be more effective’ (#85-provider).

Comprehension. The patients and caregivers we interviewed had difficulty understanding the concept of prescribing cascades. ‘I think I’m still not totally clear where you’re going with this cascade (idea), is this a new medication you’re trying to come up with? Or is this that we want to take the medications and find what works the best’ (family caregiver advisor). Other participants made comments about other medication safety issues (e.g. side effects and contraindications) rather than prescribing cascades specifically. To explore this more fully, we incorporated into later interviews a hypothetical scenario breaking down the steps in the CCB-diuretic prescribing cascade. Patient and caregiver responses to the hypothetical scenario suggested that this approach led to better understanding of the significance of this prescribing issue. ‘Oh, both prescribed. Oh, I wouldn’t go along with that [. . .] If they eliminated the first one and they prescribed a new one, that would be fine’ (#58-caregiver). One iteration of the materials encouraged patients and caregivers to weigh the risks and benefits of medications generally, without explicit mention of the CCB-diuretic prescribing cascade. When presented with these materials, patients appreciated the simplicity, but providers and caregivers felt they were too general to be useful. Even when patients and caregivers had difficulty understanding the concept of a prescribing cascade, they continued to state the importance of discussing medications and medication safety with their providers.

Attitudes and beliefs

Providers worried that the educational materials would undermine patient/caregiver trust in the provider. ‘I would worry about something like this (causing) harm to the provider/patient relationship where my patient would start to lose respect for me or not trust my opinion if they think that I blatantly put them on a medication that obviously everyone knows causes side effects’ (#32-provider). Despite providers’ concerns, patients and caregivers did not comment that materials would undermine trust in their providers, citing the importance of trust in the patient-provider relationship. ‘I just feel that we have a tremendous amount of confidence in our doctor.

We've been with him for years, before problems really arise, we've just kind of been going with him' (#50-caregiver). Patients and caregivers did, however, report concerns with how certain phrasing in the materials might put them in a position of appearing adversarial towards the provider. 'Asking what would happen if I took less of this medicine seems like I'm getting into the doctor's role. The answer I'd get from . . . the doctor is, "Which one of us went to medical school?"' (#15-caregiver).

Motivation

Participants had mixed views on how the materials might impact the clinical encounter. Some providers and caregivers were concerned about the amount of time these discussions of medications could take in an already shortened appointment, which made them less approving of the materials as a whole. 'I think it's just a little lengthy [. . .] most internists or family medicine (doctors) are going to have like 15 min. It's just going to be even less time and maybe even harder to kind of delve into these questions' (#54-provider). Other patients and caregivers really appreciated the questions listed in the educational brochure and pocket card, indicating it would be a good reminder for what they should be asking their providers. Similarly, some providers felt that the materials could serve as a tool to help patients and caregivers collect their thoughts, ultimately facilitating the clinical encounter. 'I tell my patients that they should write down questions all the time to bring in, so this is a really good prompt and a reminder. So I think this is a really good idea' (#33-provider).

Behavior

As the current study was an evaluation of the materials and not a trial, we were not able to assess whether patients, caregivers and providers engaged in collaborative conversations about prescribing cascades. However, interviews did reveal that participants felt strongly about the importance of direct patient and caregiver education as a means of facilitating collaborative conversations around prescribing cascades. 'I think in this example you're helping the caregiver understand that potential link and then with these common side effects, giving them the knowledge as well as the examples of questions and encouraging them to have that conversation' (physician advisor).

Caregivers also indicated that the educational materials gave them confidence to initiate these conversations by providing specific questions to use as a starting point for this dialogue. 'These are excellent because people go, I don't know what to say to my doctor. These tell you what to say to your doctor' (#86-caregiver). Caregivers and providers both valued patient/caregiver education, citing improved engagement and collaboration as a beneficial outcome of the educational materials.

Follow-up questionnaire

Eleven of the 15 providers and 10 of the 14 caregivers responded to the follow-up questionnaire. Table 4 details providers' and caregivers' responses to all questions included in the questionnaire. Overall, providers rated the revised materials as informative (11 of 11), actionable (10 of 11), and indicated they would be comfortable with their patients receiving the educational materials (11 of 11). Almost all caregivers rated the revised materials as understandable (9 of 10), and all indicated they would bring the materials to their loved one's appointment (10 of 10) and ask the provider the questions included (10 of 10). Analysis of the readability of the revised educational materials (Flesch-Kincaid grade level) revealed that the patient cover letter was at an 8.9 grade level; the patient/caregiver brochure was at a 6.9 grade level; the patient/caregiver pocket card was at a 5.9 grade level; and the provider letter was at a 12.7 grade level.

Discussion

Findings from interviews conducted with patients with AD, their caregivers, and providers revealed strong endorsement of collaborative patient/caregiver-provider conversations about prescribing cascades. While opinions on the level of detail and content varied, there was broad and consistent support for disseminating materials to support caregivers in initiating conversations about medications with providers.

Providers were reluctant to receive mailed educational materials, but were enthusiastic about caregivers receiving materials and bringing to their attention issues related to prescribing cascades and medication safety. Therefore, it is important that the materials both engage and support caregivers in initiating collaborative conversations

Table 4. Provider and caregiver follow-up questionnaire responses.

Provider questionnaire	Provider responses, n (%)
Would you find this letter informative?	
Yes	11 (100.0)
Would you find the information in this letter actionable?	
Yes	10 (91.0)
Would you be comfortable with your patients receiving these materials?	
Yes	11 (100.0)
Caregiver questionnaire	Caregiver responses, n (%)
If this letter were sent to my loved one, I would see it	
Agree	9 (90.0)
This letter is easy to understand	
Agree	9 (90.0)
Overall, how would you rate this new educational brochure?	
Poor	–
Good	1 (10.0)
Very good	4 (40.0)
Excellent	5 (50.0)
I understand this description of a prescribing cascade	
Agree	10 (100.0)
If my loved one was on the combination of medications listed in this prescribing cascade, I would be concerned	
Agree	9 (90.0)
I understand what actions this section is recommending	
Agree	10 (100.0)
I would take these materials to my loved one's next doctor's appointment.	
Agree	10 (100.0)
I would ask my loved one's doctor these questions.	
Agree	10 (100.0)

about prescribing cascades. Consistent with our findings, Martin *et al.* noted that bypassing physicians and directly educating older adults on inappropriate medications can serve as an important catalyst for provider action in addressing medication-related risks.⁹ As such, educational materials focused on engaging caregivers is an important strategy for prompting providers to think about prescribing cascades and how to address them. Although providers in our study were concerned that the educational materials may compromise trust, prior research found that trust in providers was unchanged or improved after a sample of community-dwelling older adults received educational materials about deprescribing inappropriate medications.¹⁸ Another study, which focused on verbal communication among patients with AD, their caregivers, and primary care physicians demonstrated not only the importance of caregiver involvement in primary care visits, but also the need for interventions that can enhance caregivers' communication during these encounters.¹⁹ Our study provides further evidence that giving caregivers specific questions to use in a visit could be a successful strategy to improve caregiver communication and engagement to ensure important dialogues about prescribing cascades occur.²⁰ Given the cognitive limitations inherent in patients with AD, and the added benefits of caregiver involvement in discussions about medication-related issues, like prescribing cascades, there is a greater need to involve caregivers, and support them in initiating collaborative conversations.

In the interviews and meetings with advisors, we observed an inherent tension between avoiding overly prescriptive recommendations and providing physicians with actionable information for addressing prescribing cascades. Concerned with preserving the integrity of the payer-provider relationship, health plan leaders were reluctant to substitute individual clinical judgment with prescriptive recommendations in these health plan-based educational materials. On the other hand, some providers wanted more specific instructions for addressing the CCB-diuretic prescribing cascade. Unlike other educational interventions with messaging based on specific clinical guidelines, such as deprescribing benzodiazepines to reduce adverse effects,¹² or prescribing anticoagulants to prevent risk of stroke,¹⁴ the guidelines around prescribing cascades are more complicated and less straightforward. Providers

need to understand and weigh patient-specific circumstances. They need to consider carefully the clinical context in which the prescribing cascade is occurring, information that is not included in our educational materials. Finally, some prescribing cascades may be considered appropriate, in that the benefits outweigh the harms for individual patients. Given this, materials for providers need to maintain a balance between giving practical steps for addressing prescribing cascades that are not prescriptive, and that focus on considering patient/caregiver preferences and goals of care.

Providers and caregivers both endorsed encouraging collaborative conversations about prescribing cascades. While the providers we interviewed said they would welcome these caregiver-initiated conversations, competing priorities may serve as potential barriers to these discussions. As patients, caregivers, and providers shared in our interviews, time constraints may limit their ability to have collaborative discussions about prescribing cascades. Prior research suggests that discussions about medications are often inadequate in primary care encounters, even when these discussions are considered appropriate and necessary. Time is likely one of many reasons for this.^{6,21} Some providers have also indicated that they feel they have a gap in knowledge when it comes to addressing deprescribing and medication-related issues among older patients with multi-morbidities, the very patients who are at risk of complicated medication-related issues like prescribing cascades.²¹ Considering these concerns, we sought to create materials that would facilitate successful collaborations around prescribing cascades without taking up too much time in a clinical encounter.

Our study has some limitations. First, our small sample was drawn from a single practice, limiting the generalizability of our results. The patients and caregivers involved had higher levels of education as compared to the average population, with the majority of participants achieving at least a 4-year college degree. As such, we did not get input from patients and caregivers that may have lower levels of health literacy. While patients were involved in the interviews, which informed iterative revisions of the materials, we did not survey patients to obtain their views on the final versions of the materials. In addition, patients in the

current study were required to have a caregiver in order to be eligible to participate. Therefore, the current study does not provide insight into how a patient without a family caregiver may respond to receiving educational materials about prescribing cascades.

Despite these limitations, a strength of the current study was the engagement of multiple stakeholders (e.g. patients, family caregivers, providers and health plan leaders). Our materials evolved as a result of our participants' feedback, hopefully optimizing the acceptability of this intervention for this population of patients with AD. Furthermore, the ultimate versions of the materials we developed can serve as a useful template for addressing additional clinically important prescribing cascades.

Conclusion

This evaluation of educational materials about prescribing cascades in persons with AD provides strong support for involving and engaging caregivers in communicating with providers about prescribing cascades. By giving patients and caregivers a basic description of the prescribing cascade concept, our educational materials may help them prepare for a conversation with the provider, who can then tailor the discussion of the possible cascade to the specific needs of the individual patient and caregiver. The results presented are promising as participants strongly endorsed encouraging collaborative conversations about prescribing cascades, although evidence on whether mailed materials can stimulate such conversations awaits testing in a future trial.

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ORCID iDs

Sarah Bloomstone  <https://orcid.org/0000-0002-3022-6620>

Sonal Singh  <https://orcid.org/0000-0003-0912-941X>

Supplemental material

Supplemental material for this article is available online.

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