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Linking Patients' Goals and Priorities to Recommendations for Medication Changes in a Polypharmacy-Focused Structured Clinical Pathway

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Abstract

Polypharmacy is associated with poorer health outcomes in older adults. It is challenging to minimize the harmful effects of medications while maximizing benefits of single-disease-focused recommendations. Integrating patient input can balance these factors. The objectives are to describe the goals, priorities, and preferences of participants asked about these in a structured process to polypharmacy, and to describe the extent that decision-making within the process mapped onto these, signaling a patient-centered approach. This is a single-group quasi-experimental study, nested within a feasibility randomized controlled trial. Patient goals and priorities were mapped to medication recommendations made during the intervention. Overall, there were 33 participants who reported 55 functional goals and 66 symptom priorities, and 16 participants reported unwanted medications. Overall, 154 recommendations for medication alterations occurred. Of those, 68 (44%) recommendations mapped to the individual's goals and priorities, whereas the rest were based on clinical judgment where no priorities were expressed. Our results signal this process supports a patient-centered approach: allowing conversations around goals and priorities in a structured process to polypharmacy should be integrated into subsequent medication decisions.

Keywords

older adults, polypharmacy, patient-centered, shared decision-making, goals and priorities, patient preferences, medication burden

Introduction

Polypharmacy, frequently defined as taking 5 or more long-term medications,[1] is common among older adults, particularly those with high comorbidity.[2] Although the individual medicine effects may be beneficial, polypharmacy is associated with many negative patient outcomes (eg, adverse drug events, drug–drug interactions, risk of falls, and cognitive impairment) and system-related outcomes (eg, increases in outpatient visits and hospitalizations associated with polypharmacy which increases costs).[3,4]

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A single-disease model still dominates decision-making for patients with chronic conditions,[5,6] which conflicts with the reality of everyday clinical practice and makes polypharmacy inevitable. For example, applying all relevant clinical practice guidelines to a patient with 5 chronic conditions leads to 12 different medications, and a regimen of 19 doses per day, taken at 5 different times during the day.[7] Importantly, this gives 16 different possibilities for drug–drug or drug–disease interactions.[8] Treating patients not as a collection of single diseases, but instead as a collection of their medications carries a similar risk of missing the point of care. Approaches to polypharmacy solely driven by lists of potentially inappropriate medicines ("explicit" approaches) miss the opportunity for individualized optimization based on shared decision-making, which involves patients and their providers discussing the evidence with decisions made in agreement on the best option for the individual.[9] A framework that addresses polypharmacy with a generalist lens, looking at treatments across conditions simultaneously from the perspective of the patient, is clearly needed.[10]

The results of our previous work with patients in understanding the requirements for successful deprescribing showed shared decision-making is key and flagged 2 key elements: (a) regarding patients as expert, and (b) a patient-centered approach.[11] For patients, this means seeking and valuing their views and experiences for active consideration in recommendations for care (ie, valuing the patients as the expert in these domains).[11] Therefore, one should explicitly consider individual patient context and preferences in addition to the generalist lens on their multiple chronic conditions and multiple medications and include shared decision-making.

Unfortunately, very few structured and validated processes or tools exist for eliciting patient priorities and preferences regarding polypharmacy and multimorbidity.[10,12] Although tools to facilitate treatment choices within single-disease frameworks exist,[8] patients continue to report that their input is often not sought.[10] Clearly, there is a gap between the need to have patient preferences and priorities guide decision-making, and successful implementation in day-to-day clinical practice.

The Team Approach to Polypharmacy Evaluation and Reduction (TAPER) is a model that operationalizes a clinical pathway aiming to reduce inappropriate polypharmacy. There are 3 key elements of TAPER[Figure 1]: (1) A team model where the patient has one consultation with the pharmacist, followed by one with the physician and includes an ongoing "*pause and monitor*" period; (2) Gathering and integration of patient goals, priorities, and preferences related to medicine use with evidence tools to electronically flag potentially inappropriate medications and cumulative medication effect burdens; and (3) A shared secure digital platform (TaperMD™) that efficiently integrates these information streams, as well as allowing integrated access across providers (pharmacists and prescribers) using multiple existing individual record systems. The question domains included within the TAPER approach were informed by patient and caregiver focus groups, underpinning the work described above on patient experiences of successful deprescribing, and then reviewed by some members of those focus groups.[11]

The TAPER model aims to integrate a patient's preferences and priorities into an evidence-based approach to reduce polypharmacy, focusing on deprescribing. This

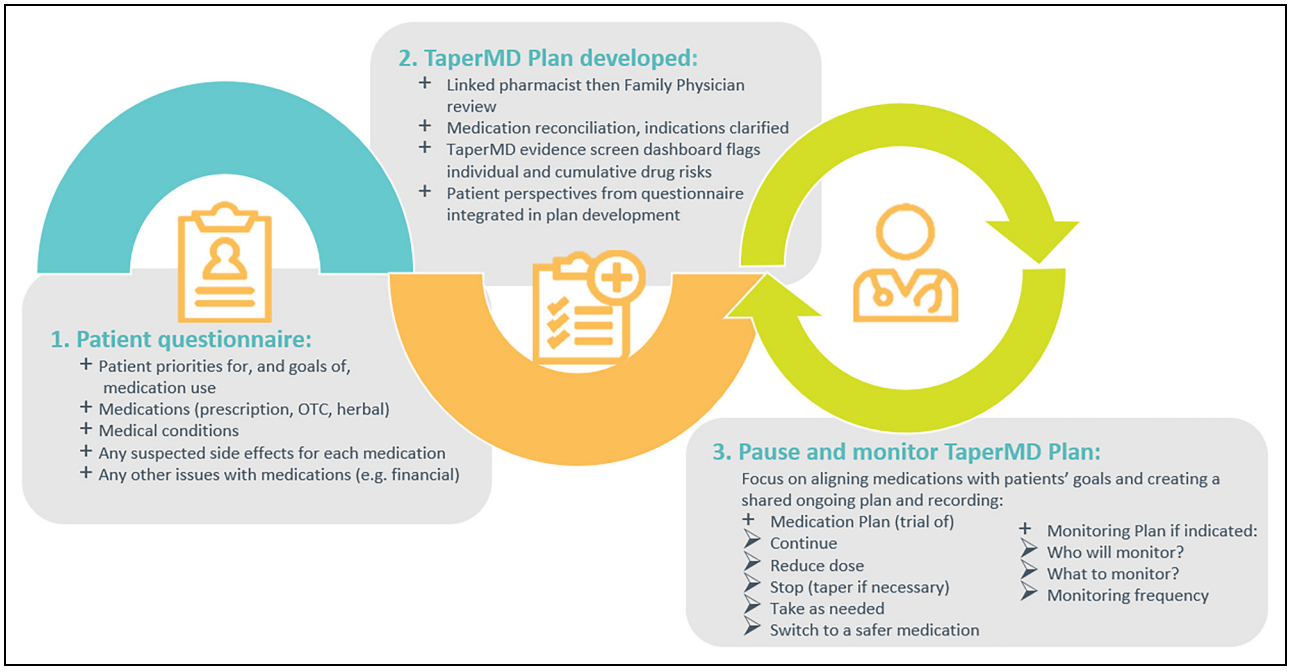

Figure 1. Operational Steps of Team Approach to Polypharmacy Evaluation and Reduction (TAPER).

paper investigates the effects of the TAPER model on deprescribing-related decision-making. Specifically, we aimed to (a) describe the articulated goals, priorities, and preferences reported by patient participants, and (b) map these goals, priorities, and preferences onto the recommendations made for medication changes in the TAPER deprescribing plan.

Methods

This single-group quasi-experimental study was a sub-study nested within a single-blind, feasibility RCT of TAPER (reported elsewhere), and was completed between November 2016 and May 2017 within the McMaster University primary care practice-based research network, in Ontario, Canada. The feasibility RCT is registered through clinicaltrials.gov (#NCT02562352) and was approved by the Hamilton Integrated Research Ethics Board. Supplemental Material A shows a visual representation of how this study was nested within the feasibility RCT, using data from both RCT arms (as the control group was a "wait-list" control, and received the intervention, including data collection on goals and priorities, after 6 months).

Participants and Recruitment

As described above, the feasibility RCT utilized a "wait-list" approach; thus, patients allocated to the control group were offered the TAPER intervention after collection of 6-month outcome data. Outcome data at both baseline and 6 months included collection of goals and priorities data as part of the TAPER intervention for both groups. For this substudy, we pooled all participants who completed the TAPER appointments with the pharmacist and physician, regardless of original allocation, into single group. This allowed us to investigate the stated goals and priorities data and potential linkages to medication recommendations for all who received the intervention. Recruitment for the feasibility RCT is described elsewhere in detail. In short, participants were aged 70 or older, taking at least 5 long-term prescribed medications, rostered with a participating family doctor, willing to try discontinuation, and must not have had a recent comprehensive medication review. Participants who had English language or cognitive skills inadequate to complete the surveys, a terminal illness, or other circumstances precluding a 13-month study period were excluded.

Data Collection

Data collection included patient characteristics (collected at baseline), and medication-related information (collected at baseline and 6 months) such as a current medication list, and the question "do you find taking your medications burdensome?". Patient goals, priorities, and preferences were also collected ahead of the TAPER intervention in each arm (Supplemental Material A). This was done using structured questions by a research assistant and recorded in the TaperMD™ electronic platform (Supplemental Material B) as part of the TAPER clinical pathway. These goals, priorities, and preferences are also displayed within TaperMD™ in such a way that they are visible to the clinician throughout the TAPER process. As this substudy pooled patients from both allocation groups, the priorities and preferences collected at the time point ahead of each participant's TAPER appointments were used to most accurately reflect their most current priorities and preferences.

Functional goals were elicited by asking participants to list (in order of priority) goals they would like to achieve (eg, activities they would like to perform that their health currently restricts them from doing) that they feel medication use (or medication discontinuation) could help improve, where possible. Symptom priorities were elicited by asking participants to list (in order of priority), which of their symptoms, illnesses, or other medical problems are the most important for them to have controlled by their medications. Outcome priorities were measured by asking participants to indicate which outcome had higher relative importance to them: (1) taking medications to potentially extend the length of life by preventing further illness, or (2) reducing and eliminating symptoms associated with their medical conditions. Participants ranked each outcome on a scale of 1 to 10, with higher values representing higher importance,[13] and were unable to give the same rating for both, forcing prioritization of one relative to the other. Three additional questions solicited patient preferences and priorities: patients were asked to identify unwanted current medications (medications they would most like to discontinue, if possible); if they considered their medication regimen burdensome; and whether or not they took any of their medications in ways that differed, and were potentially more helpful to them, from the instructions on the label (a non-judgmental question eliciting adherence). Other feasibility and research outcomes, also collected at baseline and 6 months, are reported elsewhere.

Data Analysis

Research objective 1: Describing goals, priorities, and preferences. A frequency count was completed to determine the number of functional goals and symptom priorities reported by participants. Participants may have reported more than one goal or symptom priority. Similar functional goals and symptom priorities were categorized together to understand the patterns of reported goals and priorities. For outcome priorities, frequencies (and proportions) were calculated to determine the number of people who prioritized taking medications to extend length of life and prevent future illness versus taking medications to reduce or eliminate symptoms.

Research objective 2: Mapping goals, priorities to deprescribing plan. To map priorities and goals onto the deprescribing plan, we conducted a case-by-case descriptive analysis. Two researchers with experience around medication use in older adults (AA, a recent medical school graduate with primary care research experience; and KF, a former pharmacy technician

with pharmacy service and primary care research experience) independently reviewed the medications the patient was taking at the time of the TAPER appointments, as well as any recommendations made for medication changes by the pharmacist or physician at either of their respective TAPER appointments. These recommendations then were compared to the listed responses to the 6 patient priority questions (eg, functional goals, symptom priorities, unwanted medication, etc). The researchers assessed whether the recommendations made could address a particular goal, priority, or preference reported by the participant, or whether they appeared unrelated. The rationale for whether the recommendations could (or could not) be mapped in this way was recorded. The 2 coders met in person with a third researcher (LL) to confirm (or challenge) the mapping and/or the rationale behind the mapping. All mapping was then reviewed by a fourth researcher (the lead investigator, primary care physician, DM) to resolve any disagreements and provide a final decision on interpretation. The number and nature of the disagreements were recorded and presented in the results section below.

Results

A total of 33 patients received the TAPER intervention. The mean age of the patients was 79 years (range 68-90 years), and 55% were female. Patients were on a mean (SD) of 7.8 (2.4) medications at baseline and had a mean (SD) Charlson Comorbidity Index score of 3.1 (2.4).[14,15] Overall, 30 (91%) were being treated for hypertension, 13 (39%) had diabetes, 9 (27%) had asthma or chronic obstructive pulmonary disease (COPD), and 8 (24%) had heart failure. The data for one patient under the age of 70 were included in this study as they received the intervention at age 68 during the RCT due to an error. However, it was felt this did not affect the analysis in the current paper.

Table 1. Number and Categories of Functional Goals.

Functional goal category (example if appropriate)	Number
Improve walking[a]	18
Participate more in physical activities other than walking (eg, exercise, games or sports, other activities [eg, ride a bike, swim])[a]	16
Improve breathing	5
Be able to do household activities (eg cooking)[a]	5
Driving	3
Reading	2
Improved body mobility (eg, better balance, going up stairs)[a]	2
Hear better	1
Writing	1
Being well enough to participate in leisure activities/ social clubs	1
Be able to travel on a plane	1
Total	55

[a]Goals related to mobility.

Research Objective 1: Describing Goals, Priorities, and Preferences

In total, participants reported 55 functional goals[Table 1] and 66 symptom priorities[Table 2]; all reported at least one symptom or goal. The top 2 functional goals related to physical activity, with 2 others also relating to aspects of mobility, and the top 2 symptom priorities related to adverse effects of blood pressure control medications and diabetes.

Assessing outcome prioritization, we found 16 (48.5%) participants prioritized taking medications to extend length of life and prevent illness, and 16 (48.5%) participants prioritized taking medication to reduce or eliminate symptoms; 1 (3%) participant declined to answer. Sixteen (48.5%) participants stated they had unwanted medications they would like to stop if possible. These participants were evenly split between those who prioritized taking medication to extend life and those who prioritized symptom reduction. Cholesterol and blood pressure medications were the most common groups of unwanted medication, with each being identified by 3 (9.1%) participants, followed by medications for anxiety and depression, identified by 2 (6.1%) participants.

Research Question 2: Mapping Goals, Priorities to Deprescribing Plan

Researchers mapped 121 identified goals or priorities to recommendations made during the TAPER appointments. Eleven disagreements arose during coding, which were resolved by discussion with the principal investigator. A total of 154 recommendations for

Table 2. Number and Categories of Symptom Priorities.

Symptom or medical problem priorities (example if appropriate)	Number
Less symptomatic blood pressure control (eg, postural hypotension prevention)	14
Diabetes-related symptoms or issues	11
Cardiovascular-related symptoms (eg, atrial fibrillation)	8
Breathing difficulty (eg, emphysema)	5
Arthritis and related pain	4
Sleep issues	4
Urinary-related issues (eg, urinary retention)	4
Prevention of future illness (eg, cholesterol control, osteoporosis, cardiovascular)	3
Gastroesophageal reflux disease (ie, GERD) symptom control	3
Eye/vision symptoms	2
Bowel-related symptoms	2
Psychiatric symptoms (eg, depression)	2
Coughing	1
Gout control	1
Vertigo	1
Neurological issues (restless leg syndrome)	1
Total	66

medication changes (ie, switching to a safer medication, dose reduction, dose increase, discontinuation, and adding new medications) were made as part of the deprescribing plans. Of those, 68 (44%) medication changes were mapped to specific patient goals, priorities, or preferences, while the remaining 88 (66%) were based solely on the clinician's judgment. Specifically, 12 (18%) recommendations were mapped to functional goals, 40 (59%) were mapped to symptom priorities, and 16 (23%) were mapped to unwanted medications. Recommended changes that mapped to patient goals and priorities were most frequently made for oral antidiabetic medications (n = 8), beta-blockers (n = 5), and calcium channel blockers (n = 5). Six examples[Table 3] demonstrate the mapping of a recommendation to the patient goal or priority.

Emergent Findings: Medication Recommendation-Symptom Priority Incongruencies

Some medication recommendations in the deprescribing plan did not explicitly align with a patient priority and appeared to be incongruent with those priorities (14 incongruences, or 9% of total medication recommendations). In each case, the patient did not report that their medications were burdensome overall and the incongruencies were only with symptom priorities. When explored further, we found that these recommendations were made based on evidence for effectiveness or patient safety, using the evidence support flagging potentially inappropriate medicines in the TAPER tool, and were not incongruent with patient goals and priorities. For example, a patient had a symptom priority of hypertension control.

Table 3. Example of Mapped Medication Alteration to Patient Goal.

Functional goals, Symptom priorities, and Medication Priorities (categorization)	Recommendations for medication change[a]	Rationale for linking recommendation to goal/ symptom priority
Symptom priority		
"High blood pressure" (Less symptomatic blood pressure control)	Reduce amlodipine from 5 mg to 2.5 mg daily	Patient experienced side effect of pedal edema, linked by intervention pharmacist to amlodipine. Patient was also on multiple antihypertensive medications, blood pressure was well controlled, and patient expressed desire to take less antihypertensives.
"Heart…atrial fibrillation" (Cardiovascular-related symptoms)	Switch warfarin 7 mg daily to apixaban 5 mg twice daily	Patient had stated that they found it difficult to come into clinic for regular INR testing. Apixaban is an equally effective therapeutic alternative for atrial fibrillation control.
Functional goal		
"Exercise. I don't have the energy" (Participate more in physical activities other than walking)	Stop atenolol 150 mg twice daily	Atenolol is a beta blocker, which can cause fatigue/ low level of energy, and evidence indicates it is not recommended as a first-line antihypertensive in those 60 and over as there is no link to improved cardiovascular outcomes.
"Painting. I get dizzy on the ladder and looking up" (Be able to do household activities)	Switch terazosin 5 mg daily to tamsulosin 0.4 mg daily	Patient was on terazosin, which has antihypertensive properties, as well as being on a second antihypertensive, ramipril. Upon further discussion, patient revealed he had been experiencing low blood pressure and orthostatic hypotension, causing dizzy spells. It was recommended that he switch to a safer medication for this indication—tamsulosin is reported to have a significantly lower incidence of postural hypotension and dizziness than terazosin.
Medications patients would like to stop		
"Iron medication because it upsets my stomach and leads to nausea, diarrhea and constipation" (Prescribable supplements)	Stop ferrous gluconate 300 mg twice daily	Ferrous gluconate is well-known to cause gastrointestinal symptoms such as nausea and constipation. Patient was not actively iron deficient, and a plan for monitoring iron levels was developed.
"Metoprolol…I take a good dose twice a day….As my blood pressure is good now, maybe I could lower the dosage" (Blood pressure medications)	Reduce metoprolol from 50 mg twice daily to 25 mg twice daily	Patient was on 2 medications for controlling blood pressure (perindopril and metoprolol), and blood pressure was well-controlled. Patient expressed desire to trial a lower dosage of metoprolol to see if blood pressure would remain under control.

[a]Recommendations may include stopping a medication, reducing a medication's dose, or switching to a safer medication.

The pharmacist recommended to stop bisoprolol, which at first glance, appeared to be incongruent with the patient's symptom priority. However, when the patient's individual context was explored, we found that the patient was taking 3 other medications to control hypertension, was on warfarin to control atrial fibrillation and had blood pressure recordings frequently below target with a low heart rate. The clinician judged the blood pressure to be overtreated, placing the patient at risk of adverse effects. Furthermore, beta-blockers are not recommended for the treatment of hypertension in those over 60 as they do not improve cardiovascular outcomes. Therefore, while this recommendation appeared to be incongruent with a stated priority of hypertension control, the recommendation was made from a patient efficacy and safety standpoint and was still consistent with the maintenance of the overall priority of hypertension control.

Discussion

Our study described the types of goals, priorities, and preferences of patients and explored how they can be integrated into, and influence, a deprescribing plan as part of clinical practice. Our findings showed that, when prompted, patients articulate a diverse range of functional goals and symptom priorities and have clear and varying priorities for the outcome focus they want for their medications (eg, extending life and/or symptom control). Improving mobility in various ways was the most common broad functional goal grouping, and common symptom priorities were related to better control of antihypertensive side effects or balanced hypertension and diabetes control. Our findings also showed that people can identify their unwanted medications.

Regarding our second objective, our results demonstrated that by recording patient goals and priorities and making them visible to clinicians, a substantial proportion of subsequent recommendations for medication changes appear to be guided by patient-articulated functional goals, symptom priorities, and preferences in a pathway implemented in routine clinical practice. Answering the question "does explicitly asking these questions matter?," we found that 44% of the medication recommendations could be mapped to a patient functional goal, symptoms priority, or unwanted medication. This finding is very encouraging as it is within the context of complex medication plans stemming from multimorbidity and polypharmacy.

Some changes in the deprescribing plan did not explicitly align with a patient priority at first glance and appeared incongruent with those priorities. Further investigation showed that these cases were instead driven by an evidence-based approach to flagging potential issues of effectiveness and safety. Furthermore, upon the exploration of the contextualized narrative of these cases, we found they were in fact not directly antagonistic to patient priorities. This finding illustrates a few points. First, the nuance of shared decision-making (which integrates patient priorities, evidence, and clinical judgment) illustrates how patient priorities, provider knowledge, and evidence can be synthesized into deprescribing conversations. Second, primary care is a very appropriate location for medication-related conversations to occur, as providers have comprehensive knowledge of their patients built over time. Third, that explicit or list-based approaches (eg, Beers Criteria) used alone may miss opportunities for shared decision-making. Identifying instances of apparent incongruencies may be a fruitful area of research to better understand the nuance involved in medication-related decision-making. Applying the structured process of TAPER to these decisions may be a productive way to balance input from patients and providers with clinical evidence, by integrating these domains within a shared electronic platform.

Our results have significant practical implications for putting patient-centered care for medications into practice. The process we have developed allows for systematic conversations about medications that intentionally consider patient goals, priorities, and preferences to create opportunities for a more patient-centered conversation and demonstrates that the personal expertise of patients and medical expertise can be integrated into the ideal practice of evidence-based medicine as initially conceptualized.[11,16] This process, with its emphasis on shared decision-making and patient-centered care, now forms the basis of several interventions implemented internationally, with large-scale trials (both ongoing and completed) in Canada, Australia, and New Zealand.[17–19] The pathway platform has been made available for use in routine care; implementation as part of routine care is being trialed in community and long-term care settings.[19]

Strengths and Limitations

Currently, there is no consensus on good methodologies to use for a mapping exercise such as this. A strength of this study is the multiple rounds of coding and checking that occurred during the mapping to improve the rigor and the validity of our findings. Another strength is that the study research questions and outcomes were based on the findings of a previous systematic review of existing tools.[12]

A limitation of this study and its design is that we cannot be sure how many of the decisions made during the process would have been made if the patient's input was not sought (ie, a drug-based model rather than a patient-centered approach). Further, given our study population and implementation, we cannot be certain of the generalizability for other populations (eg, younger adults) or practice types, which is worthy of further exploration.

Conclusion

Explicitly seeking patients' goals, priorities, and preferences and making them visible helps shape conversations about medications within the TAPER clinical pathway, demonstrating that clinicians can be responsive to patient input while also making decisions based on the individualized drug-centered evidence of potentially inappropriate medications. Overall, our results indicate that the true shared decision-making model, as articulated by patients as underpinning successful deprescribing conversations in our previous

work,[11] can be successfully implemented within the TAPER clinical pathway in everyday clinical practice.

Authors' Note

Ethical approval for this study was obtained from the Hamilton Integrated Research Ethics Board (#0665). All procedures in this study were conducted in accordance with the Hamilton Integrated Research Ethics Board (#0665) approved protocols. Written informed consent was obtained from the participants for their anonymized information to be published in this article. Data will not be available publicly; however, de-identified data will be made available upon reasonable request to the corresponding author.

Declaration of Conflicting Interests

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Supplemental Material

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