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SHORT COMMUNICATION

Older adults' adherence to medications and willingness to deprescribe: A substudy of a randomized clinical trial

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Our study investigated the association between patients' willingness to have medications deprescribed and medication adherence. This longitudinal substudy of the 'Optimizing PharmacoTherapy In the Multimorbid Elderly in Primary CAre' (OPTICA) trial, a cluster randomized controlled trial, took place in Swiss primary care settings. Participants were aged ≥65 years and over, with ≥3 chronic conditions and ≥5 regular medications. At baseline, the 'revised Patient Attitudes Towards Deprescribing' (rPATD) questionnaire was measured. The A14-scale measured adherence (self-report) at the 12-month follow-up. Multilevel linear regression analyses adjusted for baseline variables were performed. Of the 298 participants, 45% were women, and the median age was 78. Participants reported a high level of adherence and willingness to have medications deprescribed. We did not find evidence for an association between patients' willingness to deprescribe and medication adherence. Further research is needed to explore the relationship between these concepts and to inform collaborative decisions about medicines in the context of polypharmacy.

KEYWORDS
comorbidity, deprescribing, patient attitudes, polypharmacy, prescription

1 | INTRODUCTION

Many older adults aged ≥65 years take at least one potentially inappropriate medication daily.[1] Recent international data from five European countries found that 45% of older adults report engaging in polypharmacy (taking five or more medications daily) and 42% had a high risk of experiencing medication-related problems.[2] High treatment burden, medication-related problems and polypharmacy can lead to reduced adherence,[3,4] or they can be cause for deprescribing—a process of dose reduction or discontinuing selected medicines.[5] Of note, reduced adherence to medication is an important opportunity and reason for deprescribing identified by European geriatricians.[6]

Adherence to medications is less common than it appears with a recent German study finding that only a quarter of participants in a representative sample described themselves as being fully adherent

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to their medication regimen.[7] The definitions and measures of adherence vary[8,9]; however, discontinuing a medication earlier than recommended is an aspect of adherence that relates to deprescribing.[9] A national poll of American adults about deprescribing found that of those who had stopped taking a medication (without a replacement), 36% did so *without* talking to a healthcare professional.[10] Depending on how this is viewed, it could be considered an opportunity for retrospective deprescribing or medication non-adherence. On the other hand, clinicians say deprescribing is a complex process and can be challenging to implement because older patients are often hesitant to stop their medications.[11]

A person's beliefs and attitudes towards their medications play a key role in how willing they are to start, continue or stop taking a medication.[12,13] Adherence and deprescribing are both influenced by the following patient-related factors about medications: positive or negative attitudes, beliefs about the potential impact, perceived necessity and importance and fears or concerns about the medication and/or the health condition.[4,13–16]

It is important to better understand the association between willingness to deprescribe and medication adherence, as this is key to understanding patient attitudes, priorities and preferences in the context of polypharmacy. From here, shared decisions about medicines and attempts to optimize medication use can be made. However, the complex interplay between deprescribing and medication adherence has not been fully explored in the literature. Our study investigates the association between patients' willingness to have medications deprescribed and medication adherence in a sample of older adults with multimorbidity and polypharmacy.

What is already known about this subject

- Medication-related problems, high treatment burden and polypharmacy can lead to reduced adherence to medications, and they can be triggers for deprescribing—dose reduction or discontinuation of selected medicines.
- The interplay between deprescribing and medication adherence is influenced by patient-related factors such as attitudes, beliefs, perceived necessity and concerns about medications.
- Understanding patients' willingness to deprescribe or adhere to their medications is crucial for collaborative decision-making in the context of polypharmacy.

What this study adds

- Our study examined the association between patients' reported willingness to have medications deprescribed and medication adherence in older adults with multimorbidity and polypharmacy.
- The longitudinal study design allowed for a clear temporal distinction between patients' willingness to have medications deprescribed assessed at baseline and medication adherence at 12-month follow-up.
- Participants reported a high level of medication adherence and willingness to have medications deprescribed; however, we did not find any evidence for an association between willingness to deprescribe and adherence.

2 | METHODS

2.1 | Overview of the OPTICA trial

The methods and results of the 'Optimising PharmacoTherapy In the multimorbid elderly in primary Care' (OPTICA) trial (clinicaltrials.gov identifier: NCT03724539) have been reported elsewhere.[17–20] From January 2019 to February 2020, a total of 323 patients from 43 GP practices were recruited into this cluster randomized clinical trial. The last patient completed the 12-month follow-up in February 2021. In the OPTICA trial, 21 GPs with 160 patients were assigned to the intervention group and 22 GPs with 163 patients to the control group. Eligible patients were older adults with multiple chronic conditions and regularly using 5 or more medications. While GPs in the control group continued to provide usual care to their patients, GPs in the intervention group performed a structured medication review centred around an electronic clinical decision support system (eCDSS) called the 'Systematic Tool to Reduce Inappropriate Prescribing'-Assistant (STRIP-Assistant). This eCDSS is based on the STOPP/START criteria and generated prescribing recommendations to stop, start or adapt the dosage and flagged interactions.[21–23]

Due to the pragmatic design, data for the OPTICA trial was partly collected from participants' electronic health records (e.g., medications and diagnoses) and partly from participants or their legal representatives over the phone (e.g., quality of life, medication adherence, willingness to deprescribe and sociodemographic characteristics). The two primary outcomes of the trial were the improvement in the Medication Appropriateness Index (MAI) and the Assessment of Underutilization (AOU) at 12 months. Secondary outcomes included the number of medications, number of falls, fractures and quality of life. The results of the trial on whether the medication review intervention led to an improvement in outcomes were inconclusive. The OPTICA trial was approved by the competent cantonal ethics committee (BASEC-ID: 2018–00914). All participants or their legal representatives provided written informed consent.

2.2 | Study design and sample definition

This is a longitudinal substudy of the OPTICA trial. Data from the trial baseline and the 12-month follow-up were used for the analyses. This manuscript adheres to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline for observational studies.[24] All 323 participants of the OPTICA trial were older adults (≥65 years of age), with multimorbidity (≥3 chronic conditions) and polypharmacy (≥5 medications). The present analyses were

limited to the participants for whom the patient version of the 'revised Patient Attitudes Towards Deprescribing' (rPATD)[25] questionnaire was assessed at baseline.

2.3 | Assessment of patients' willingness to have medications deprescribed

Patients' attitudes towards having medications deprescribed were measured using the rPATD[25] at baseline (Box 1). Several rPATD questions were chosen as independent variables to measure the variation in patients' self-reported attitudes towards deprescribing, rather than the global question alone that tends to have a ceiling effect.[26] The variables were dichotomized creating a category with patients reporting to be agreeing or strongly agreeing with the rPATD statements and another group with patients reporting to be unsure, disagreeing or strongly disagreeing. This approach was chosen because there were very few events in some of the categories of the original 5-point Likert scale.

2.4 | Assessment of medication adherence

The A14-scale[27] was used to measure patients' medication adherence and individual barriers to adherence. This questionnaire contains 14 Likert-scale questions ranging from *never* (4 points) to *very often* (0 points). The total score ranges from 0 to 56 where a higher score represents better adherence. The score was used as a continuous outcome in our analyses and medication adherence was assessed at the 12-month follow-up.

Box 1 Independent variables: rPATD[25] questions about attitudes towards deprescribing.

Global question:
'If my doctor said it was possible, I would be willing to stop one or more of my regular medicines'
Appropriateness questions:
'I would like to try stopping one of my medicines to see how I feel without it'
'I would like my doctor to reduce the dose of one or more of my medicines'
Concerns about stopping questions score, ranging from 1 to 5, calculated based on the following rPATD questions:
'I have had a bad experience when stopping a medicine before'
'I would be reluctant to stop a medicine that I had been taking for a long time'
'If one of my medicines was stopped I would be worried about missing out on future benefits'
'I get stressed whenever changes are made to my medicines'
'If my doctor recommended stopping a medicine I would feel that he/she was giving up on me'
Response items (Likert-scale):
Strongly agree, agree, unsure, disagree and strongly disagree

2.5 | Statistical analyses

First, the demographics and main clinical characteristics of study participants were described, by willingness to have medications deprescribed. Second, patients' baseline willingness to have medications deprescribed was described. Third, then multilevel linear regression analyses were performed using a two-stage approach with a minimally and a fully adjusted model. All models were adjusted for the clustering effect at the level of general practitioner, the group allocation and a selection of covariates. The fully adjusted model was adjusted for the following covariates: patient age, gender, educational status, living situation, number of chronic conditions, number of chronic medications, informal care received (yes/no), number of GP visits, number of specialist visits, number of hospitalizations and proxies for patient satisfaction with and financial burden caused by medication use (measured with rPATD questions 'I spend a lot of money on my medicines' and 'Overall, I am satisfied with my current medicines'). Financial burden and satisfaction with medication use can be important factors influencing patients' medication-related decisions.[28–30] Including them in the model allows to control for potential confounding. The minimally adjusted model was adjusted for the following covariates: patient age and gender.

3 | RESULTS

Table 1 shows participants' baseline characteristics by medication adherence. Forty-five percent of participants in the sample were women ($n = 133$), and median age was 78 (interquartile range: 74–83). Most participants reported to be satisfied with their current medications (93%), and 88% of patients agreed or fully agreed with the statement 'If my doctor said it was possible, I would be willing to stop one or more of my regular medicines'. More than two-thirds of participants were classified as having equal or higher than median medication adherence. Table 2 shows patients' willingness to have medications deprescribed by medication adherence.

The association between patients' willingness to have medications deprescribed and medication adherence from both the minimally and fully adjusted models are shown in Table 3. We did not find evidence for a statistically significant association between adherence and patients' reported willingness to have medications deprescribed as measured by the rPATD questions 'If my doctor said it was possible, I would be willing to stop one or more of my regular medicines', 'I would like my doctor to reduce the dose of one or more of my medicines', 'I would like to try stopping one of my medicines to see how I feel without it' or the concerns about stopping score.

TABLE 1 Baseline characteristics, by willingness to have medications deprescribed.

Variables	All participants ($n = 298$)[a]	High willingness to have medications deprescribed ($n = 262$)[b]	Lower willingness to have medications deprescribed ($n = 36$)[b]
Female	133 (45)	115 (44)	18 (50)
Age (in years)	78 (74–83)	78 (73–83)	81 (77–84)
Education			
Mandatory schooling or less	111 (38)	96 (37)	15 (42)
Diploma at secondary school level or apprenticeship	139 (47)	126 (49)	13 (36)
Higher education diploma	45 (15)	37 (14)	8 (22)
Living situation			
In apartment/house without any external help	227 (76)	198 (76)	29 (81)
In apartment/house with some external help	61 (20)	56 (21)	5 (14)
In a residential aged care facility	10 (3)	8 (3)	2 (6)
Number of chronic conditions	7 (5–10)	7 (5–10)	7 (4–10)
Number of medications	7 (5–10)	7 (5–10)	7 (4–9)
Patient receiving informal care	11 (4)	8 (3)	3 (9)
Number of GP visits in the 6 months prior to trial enrolment	8 (5–14)	9 (5–15)	8 (6–13)
Number of specialists visits in the 6 months prior to trial enrolment	1 (0–2)	1 (0–2)	1 (1–2)
Hospital visits in the 6 months prior to trial enrolment	0 (0–1)	0 (0–0)	0 (0–0)
rPATD Q10. 'I spend a lot of money on my medicines'			
Strongly agree	42 (14)	38 (15)	4 (11)
Agree	44 (15)	36 (14)	8 (22)
Unsure	26 (9)	22 (8)	4 (11)
Disagree	60 (20)	53 (20)	7 (19)
Strongly disagree	126 (42)	113 (43)	13 (36)
rPATD Q1. 'Overall, I am satisfied with my current medicines'			
Strongly agree	215 (72)	184 (70)	31 (86)
Agree	64 (21)	61 (23)	3 (8)
Unsure	4 (1)	4 (2)	0 (0)
Disagree	11 (4)	10 (4)	1 (3)
Strongly disagree	4 (1)	3 (1)	1 (3)
Outcome			
Medication adherence score[c]	55 (55–56)	55 (55–56)	56 (55–56)

Note: Categorical variables: frequencies and percentages are presented. Continuous outcomes: median and the interquartile range (IQR) are presented.
[a]Among the 298 patients, 146 patients were then randomized to the control group and 152 patients to the intervention group.
[b]Based on the rPATD question 'If my doctor said it was possible, I would be willing to stop one or more of my regular medicines'. (Strongly agree/agree categorized as high willingness to have medications deprescribed; unsure/disagree/strongly disagree categorized as lower willingness to have medications deprescribed).
[c]Information on medication adherence was available for 276 patients at the 12-month follow-up. The score ranges from 0 to 56 points.

4 | DISCUSSION

In this substudy of a randomized clinical trial, we did not find evidence for an association between patients' reported agreement with deprescribing and medication adherence. Participants in the sample generally reported a high level of medication adherence and high agreement with hypothetical deprescribing if their doctor said it was possible.

Studies assessing adherence and self-reported agreement with deprescribing using the (r)PATD questionnaires have been conducted in Australia[31–33] ($n = 3$) and Jordan[34] ($n = 1$). Of the four studies, three different self-reported measurements of adherence were used: the Morisky Medication Adherence Score,[35] the Tool for Adherence Behaviour Screening (TABS)[36] and the Adherence Attitude Inventory (AAI).[37] No association was found between adherence and deprescribing outcomes in two of the Australian studies of deprescribing

interventions (one used the PATD[31] and the other the rPATD[33]). A cross-sectional study conducted in Jordan[34] ($n = 501$) found that participants with high commitment to adherence (domain of the AAI) and high self-efficacy were less likely to agree with the idea of deprescribing a medication. Similar to ours, this study used the rPATD question: 'I would like to try stopping one of my medicines to see how I feel without it' to assess deprescribing. However, our study was longitudinal and theirs cross-sectional, which must be considered when comparing the results.

There are different potential reasons for why we did not find evidence for an association between agreement with deprescribing and adherence. First, the methods used to measure agreement with deprescribing, and medication adherence may lack sensitivity or accuracy. Second, it can be hypothesized that a person with high self-efficacy and/or health literacy may be more likely to be both adherent and be willing to reduce or stop unnecessary medicines, recognizing both the benefits of adhering to medicines but also the potential harms of unnecessary or inappropriate medicines.

Our study was strengthened by its longitudinal design, which allows for a clear temporal distinction between patients' agreement with deprescribing assessed at baseline and medication adherence at 12-month follow-up. In future research, it would be interesting to examine the association between these two concepts in an opposite temporal order. Furthermore, it would be useful to study the association between those two concepts not only using self-reported questionnaires but also using real-world adherence data (e.g., proportion days covered and use of electronic pill bottles) and data related to the implementation of specific deprescribing recommendations to determine if that would show the same results.

Limitations were that participants who agreed to take part in the OPTICA trial may have been more motivated about their medications than their peers. The present analyses were a substudy of the OPTICA trial, during which a medication review intervention was tested. Since the main trial findings did not show any differences in medication-related outcomes at the 12-month follow-up and since we adjusted the analyses for the group allocation, however, we think it is unlikely that the intervention has affected medication adherence at the 12-month follow-up. Agreement with

TABLE 2 Patients' willingness to have medications deprescribed.

Variables	All participants ($n = 298$)[a]
rPATD Q7. 'If my doctor said it was possible, I would be willing to stop one or more of my regular medicines'	
Strongly agree/agree	262 (88)
Unsure/disagree/strongly disagree	36 (12)
Concerns about stopping factor score[b]	1.6 (1–2.4)
rPATD Q13. 'I would like to try stopping one of my medicines to see how I feel without it'	
Strongly agree/agree	185 (62)
Unsure/disagree/strongly disagree	113 (38)
rPATD Q14. 'I would like my doctor to reduce the dose of one or more of my medicines'	
Strongly agree/agree	217 (73)
Unsure/disagree/strongly disagree	81 (27)

Note: Categorical variables: frequencies and percentages are presented. Continuous outcomes: median and the interquartile range (IQR) are presented.

[a]Among the 298 patients, 146 patients were then randomized to the control group and 152 patients to the intervention group.

[b]The concerns about stopping score were calculated based on five questions from the rPATD (Box 1). For factors, a higher total score indicates greater perceived concerns about stopping medicines (strongly agree = 5, agree = 4, unsure = 3, disagree = 2, strongly disagree = 1).[25]

TABLE 3 Multivariate associations between patients' medication adherence and their willingness to have medications deprescribed.

	Fully adjusted model ($n = 229$)			Minimally adjusted model ($n = 271$)		
Name of the variable	Coefficient	*P*-value	95% confidence interval	Coefficient	*P*-value	95% confidence interval
'If my doctor said it was possible, I would be willing to stop one or more of my regular medicines' (reference: agree/strongly agree)						
Unsure/disagree/strongly disagree	0.10	0.819	−0.76 to 0.96	0.11	0.779	−0.66 to 0.88
Concerns about stopping score[a] (per 1-unit increase)	−0.07	0.736	−0.44 to 0.31	0.04	0.822	−0.28 to 0.35
'I would like to try stopping one of my medicines to see how I feel without it' (reference: agree/strongly agree)						
Unsure/disagree/strongly disagree	0.22	0.447	−0.35 to 0.80	0.21	0.419	−0.29 to 0.71
'I would like my doctor to reduce the dose of one or more of my medicines' (reference: agree/strongly agree)						
Unsure/disagree/strongly disagree	0.06	0.856	−0.57 to 0.69	0.04	0.894	−0.52 to 0.59

Note: Multilevel linear regression models were performed. The fully adjusted model was adjusted for the clustering effect at the level of the general practitioner, the group allocation and for the following covariates: patient age, gender, educational status, living situation, number of chronic conditions, number of chronic medications, informal care received (yes/no), number of GP visits, number of specialist visits, number of hospitalizations and rPATD questions 'I spend a lot of money on my medicines' and 'Overall, I am satisfied with my current medicines'. The minimally adjusted model was adjusted for the clustering effect at the level of the general practitioner, the group allocation and for the following covariates: patient age and gender.

[a]The concerns about stopping score was calculated based on five questions from the rPATD (Box 1). For factors, a higher total score indicates greater perceived concerns about stopping medicines (strongly agree = 5, agree = 4, unsure = 3, disagree = 2, strongly disagree = 1).[25]

deprescribing was measured hypothetically meaning participants may feel differently about real-life deprescribing decisions. Adherence was assessed using a self-reported questionnaire, which may have led to an overestimation of adherence due to social desirability and memory biases.[38] It seems that the adherence measure we used (A14-scale) and the rPATD global question have a ceiling effect; therefore, misclassification bias cannot be excluded. Further, self-reportedagreement with deprescribing may have been overestimated due to social desirability bias.

AUTHOR CONTRIBUTIONS

All authors contributed to the concept and study design. All authors contributed to the acquisition, analysis or interpretation of data. Katharina Tabea Jungo and Kristie Rebecca Weir wrote the first draft of the manuscript. All other authors provided feedback and approved the final version of the manuscript. Katharina Tabea Jungo and Sven Streit provided administrative and technical support. Katharina Tabea Jungo did the statistical analyses. Sven Streit obtained funding for the work and supervised the study. Katharina Tabea Jungo and Kristie Rebecca Weir had full access to all the data in the study and are the guarantors.

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CONFLICT OF INTEREST STATEMENT

The authors do not have any conflicts of interest to disclose.

DATA AVAILABILITY STATEMENT

We will make the data for this study available to other researchers upon request after publication. The data will be made available for scientific research purposes, after the proposed analysis plan has been approved. Data and documentation will be made available through a secure file exchange platform after approval of the proposal. In addition, a data transfer agreement must be signed (which defines obligations that the data requester must adhere to with regard to privacy and data handling). Deidentified participant data limited to the data used for the proposed project will be made available, along with a data dictionary and annotated case report forms. For data access, please contact the corresponding author.

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