# Association between patient attitudes towards deprescribing and subsequent prescription changes

Short title: Association between the rPATD and deprescribing

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## Abstract

Deprescribing is an essential component of safe prescribing, especially for people with higher levels of polypharmacy. Identifying individuals prepared to consider medicine changes may facilitate deprescribing-orientated reviews. We aimed to explore the relationship between revised patient attitudes towards deprescribing (rPATD) scores and medication changes in older people prescribed ≥15 medicines. Asecondary analysis of rPATD scores and prescription data from a cluster randomised controlled trial of a GP-delivered, deprescribing-orientated medication review was conducted. The association between number of medicines stopped, started and changed and baseline rPATD scores was assessed using Poisson regression adjusting for patient age, gender, study group allocation, baseline number of medicines and effects of clustering. Participants (n=404) had a mean age of 76.4 years and were prescribed a mean of 17.1 medicines at baseline. Willingness to stop a medicine was associated with higher rates of both deprescribing (IRR: 1.40; 95%CI: 1.06-1.84) and initiating medicines (IRR: 1.43; 95%CI: 1.09-1.88). Satisfaction with current medicines was associated with a lower rate of deprescribing (IRR: 0.69; 95%CI: 0.57-0.85). The rPATD questionnaire could be used as part of a deprescribing intervention to identify participants who may be prepared to engage in deprescribing, enabling more efficient use of clinician time during complex consultations.

The SPPiRE trial was registered prospectively on the ISRCTN registry (ISRCTN12752680) and funded by the HRB Primary Care Clinical Trials Network, Ireland. Ethical approval was granted by the Irish College of General Practitioners Research and Ethics Committee.

## Introduction

There is a growing population of older people living with multimorbidity and resultant polypharmacy [1]. Polypharmacy is often necessary and appropriate in people with multimorbidity but it is associated with an increased risk of preventable drug related morbidity, unplanned hospital admissions and treatment burden for the individual [2, 3]. The term appropriate polypharmacy is used to describe prescribing where benefits are maximised, risks minimised and patient preferences respected [4]. Deprescribing, the process of clinician-supervised medication withdrawal with the goal of managing polypharmacy and improving outcomes [5], is vital to ensure polypharmacy is appropriate. However, clinicians face barriers to deprescribing, including a lack of acceptability of deprescribing, incorrect assumptions about patients’ priorities and practical considerations such as time constraints [6]. Qualitative research suggests that GPs are reluctant to “rock the boat” in these older complex patients [7]. Similar research with patients and their carers has suggested that both can be reluctant to stop a medicine that is not currently giving any perceived benefit for fear of missing out on possible future benefits [8]. As a result, medicines that may be ineffective or inappropriate are often not discontinued.

The revised patients’ attitudes towards deprescribing questionnaire (rPATD) is a twenty-two item validated questionnaire that was designed to quantify patient’s attitudes towards deprescribing based on qualitative work in the area which identified potential patient barriers and enablers of deprescribing [8]. Attitudes across four domains of involvement, burden, appropriateness and concern about stopping, are captured by a 5-point Likert response scale (strongly agree, agree, unsure, disagree and strongly disagree) to five different statements for each domain. The questionnaire also includes two general statements to capture respondents’ overall satisfaction with their medicines and overall willingness to stop a medicine.

Given that lack of time and incorrect assumptions about patient priorities are clinician barriers to deprescribing, identifying patients who are agreeable to deprescribing may facilitate targeting individuals most likely to respond to health care professional driven intervention versus those who may benefit from intervention directed at patients’ behaviour. The aim of this study was to explore if there was any relationship between patient attitudes towards deprescribing and subsequent medication changes over a one-year period of time.

## Methods

The study was conducted in accordance with the Basic & Clinical Pharmacology & Toxicology policy for experimental and clinical studies [9]. This study is a secondary analysis of patient reported outcome measure (PROM) data and prescription data collected from participants recruited to a cluster randomised controlled trial (RCT) in the Republic of Ireland [10]. The supporting prescribing in older adults with multimorbidity in primary care (SPPiRE) trial was designed to assess the effectiveness of a web-guided medication review that supported GPs in deprescribing medicines that were no longer effective or appropriate [11, 12]. There was a small reduction in the number of repeat medicines in the intervention group at follow-up (IRR 0.95, 95% CI: 0.899-0.999, p=0.045) but no effect on potentially inappropriate prescribing and the intervention was acceptable to both GPs and patients [10, 13]. See supplementary Figure 1 for an overview of the qualitative and quantitative evaluations of the SPPiRE intervention.

### Study Population

Between April 2017 and December 2019, 51 general practices and 404 patients throughout the Republic of Ireland were recruited (see Supplementary Figure 2). Practices identified eligible patients who were aged ≥65 years and prescribed ≥15 repeat medicines by running a finder tool embedded in their practice software and invited them to participate by posting study information leaflets and consent forms. The patient enrolment rate was 25%, see Supplementary Figure 2.

### Data Collection

Baseline data collection occurred in conjunction with recruitment between April 2017 and December 2019. A baseline prescription for each patient was collected from practices once patient recruitment was complete in that practice. Demographic details and PROMs, including the rPATD were collected directly from patients in the form of postal questionnaires, which were returned by the patient directly to the study manager. Practices were randomly allocated to the SPPiRE intervention or usual care (by minimisation) once baseline data had been collected for each participant in the practice. GPs submitted follow-up prescriptions and patients submitted follow-up questionnaires six months post intervention (which equated to approximately 12 months after baseline data collection).

### Variables of interest

The variables of interest in this analysis were baseline rPATD scores, the number of medicines stopped and started and total changed (medicines stopped plus medicines started) at follow-up and the medication therapeutic subgroups that were changed. A retrospective secondary analysis of prescription changes during the study was previously undertaken which described medication changes based on World Health Organisation Anatomical Class Classification (WHO-ATC) codes [14], and for that analysis duplicate ATC codes in the one prescription were removed, as were catheters and ostomy products (these items were included in medication counts in the main RCT analysis). Pre-death prescriptions (where available) for participants lost to follow up were also included, whereas in the main RCT analysis, baseline data was carried forward for consistency.

### Data Analysis

Baseline characteristics of participants, including rPATD scores were analysed using descriptive statistics in Stata (version 17, Stata Corp, College Station, Texas, USA). The two global rPATD questions were described using counts and proportions. The remaining 20 questions comprised five questions from four domains, and was scored by creating a mean score for each domain. The mean domain score per participant was described using the median with inter-quartile range (IQR) for the sample for comparison with similar studies. Medication changes during the study period were also analysed descriptively (frequencies and proportions), and the number of medicines stopped and started per participant were determined, as well as the total number of changes (summing medicines stopped and started). Poisson regression was used to explore the number of medicines stopped, started and changed given baseline rPATD scores and the results presented using incidence rate ratios (IRR) and 95% confidence intervals (CI). The number of medicines stopped, started and changed had long tailed distributions so an upper limit was used for these variables (see Supplementary Figure 3). Responses to the two global rPATD questions were dichotomised into either agreeing (agree and strongly agree) or not agreeing (strongly disagree, disagree and unsure) as done in a similar study using the non-revised version of the PATD [15]. For the four rPATD domains, the mean domain scores were included as continuous variables. The baseline number of medicines, age, gender and study group allocation were included in the analysis as co-variates and standard errors were adjusted for within GP practice clustering using a clustered sandwich estimator (using the vce(cluster) option in Stata). Given that this was secondary analysis of trial data, we also assessed whether the relationship between rPATD and the medication changes differed by allocation by adding an interaction term to the models. Logistic regression was used to estimate the odds of having a specific class of medicine discontinued given rPATD scores and the results presented as odds ratios (ORs) with 95% CIs, and adjusted as described above.

## Results

### Baseline Characteristics

Recruited participants (n=404) had a mean age of 76.4 years (SD6.8), 224 (56.9%) were female and were prescribed a mean of 17.1 repeat medicines (SD 3.4). The majority of participants were satisfied with their medicines (80%) and expressed a willingness to consider stopping a medicine if suggested by their doctor (87%), Table 1. The median domain score for the involvement domain was 4.2 (IQR 3.8-4.8) indicating that most participants expressed agreement with questions around wanting to be involved in decisions about their medicines, see Table 1 for all domain scores, and Supplementary Table 1 for Likert responses to all the questions.

Table 1 rPATD Global Question Responses and domain scores at baseline

| **rPATD Global Questions** | | **Response, N (%)** | | |
| --- | --- | --- | --- | --- |
| *Satisfied with medicines*  Strongly agree  Agree  Unsure  Disagree  Strongly disagree | | N=371 (%)  118 (31.8)  178 (48.0)  55 (14.8)  16 (4.3)  3 (0.8) | | |
| *Willing to stop a medicine*  Strongly agree  Agree  Unsure  Disagree  Strongly disagree | | N=368 (%)  164 (44.6)  155 (42.1)  35 (9.5)  8 (2.2)  6 (1.6) | | |
| **Domains a** | **Nb** | | **Median** | **IQR** |
| **Involvement** | 359 | | 4.2 | 3.8 – 4.8 |
| **Burden** | 345 | | 3.0 | 2.4 – 3.4 |
| **Appropriateness** | 350 | | 3.0 | 2.6 – 3.8 |
| **Concerns about stopping** | 353 | | 2.6 | 2.2 – 3.2 |

a Possible score range 1-5. Higher scores indicate greater involvement in medication management, perceived burden of medication, belief in appropriateness and concern about stopping a medicine.

b Number of participants who answered all five questions in the domain.

*Abbreviation: IQR; interquartile range*

### Medication changes

During the approximately one year study period, there was a median of three medicines stopped per person (IQR 1-5, range 0-16), two started (IQR 1-4, range 0-22) and five overall changes per person (IQR 3-9). Table 2 lists the most common classes of medicines stopped.

Table 2 Commonly stopped classes of medicines

|  |  |
| --- | --- |
| **Drug group** | **Number of participants with medicine stopped (%)** |
| Inhalers for obstructive airway diseases | 89 (22.0) |
| Diuretics | 48 (11.9) |
| Drugs acting on the renin-angiotensin system | 45 (11.1) |
| Antiplatelets | 41 (10.2) |
| Laxatives | 36 (8.9) |
| Nasal corticosteroids | 32 (7.9) |
| Calcium channel blockers | 31 (7.7) |
| Calcium | 30 (7.4) |
| Proton pump inhibitor | 28 (6.9) |
| Opioid/paracetamol combinations | 26 (6.4) |
| Lidocaine plasters | 23 (5.7) |
| Nitrates | 21 (5.2) |
| Tramadol | 20 (5.0) |

### Association between rPATD Scores and medication changes

There was evidence the global rPATD question “willingness to stop a medicine” was associated with an increased rate of both stopping and starting medicines, Table 3. Satisfaction with medicines was associated with a reduced rate of stopping medicines and was also associated with a reduced rate of starting medicines although this did not reach statistical significance. Perceived appropriateness of medicines was associated with a reduced rate of stopping medicines and there was no relationship with the rate of starting medicines. With respect to total number of changes, baseline satisfaction was associated with a reduced rate of changes and baseline willingness to consider deprescribing was associated with an increased rate of changes. There was a significant interaction between allocation and the global rPATD question “willingness to stop a medicine” considering medications started as an outcome. There was evidence willingness to stop was associated with a reduced rate of medications started in the intervention group versus control group (IRR for interaction term: 0.55; 95%CI: 0.33 to 0.93; p=0.03). Otherwise there was no significant interaction between allocation and the other global question or domain scores.

Table 3 Association between rPATD scores and medication changes

| **Variables** | **N** | **Unadjusted IRR**  **(95% CI)** | **P**  **value** | **N** | **Adjusted IRR\***  **(95% CI)** | **P value** |
| --- | --- | --- | --- | --- | --- | --- |
| ***Dependent variable: count of medicines stopped at~ 1 year follow-up*** | | | | | | |
| Independent variables | | | | | | |
| Willingness to stop a medicine a | 368 | 1.27  (0.97-1.68) | 0.08 | 365 | 1.40  (1.06-1.84) | 0.02 |
| Satisfaction with medicines b | 371 | 0.67  (0.55-0.82) | <0.001 | 368 | 0.69  (0.57-0.85) | <0.001 |
| Involvement mean domain score c | 359 | 0.99  (0.97-1.02) | 0.67 | 356 | 0.95  (0.85-1.05) | 0.28 |
| Burden mean domain score c | 345 | 1.02  (0.99-1.05) | 0.17 | 342 | 1.10  (0.98-1.24) | 0.11 |
| Appropriateness mean domain score c | 350 | 0.97  (0.94-0.99) | 0.03 | 347 | 0.87  (0.77-0.98) | 0.03 |
| Concern about stopping mean domain score c | 353 | 1.00  (0.97-1.03) | 0.92 | 350 | 0.97  (0.86-1.09) | 0.63 |
| ***Dependent variable: count of medicines started at ~1 year follow-up*** | | | | | | |
| Independent variables | | | | | | |
| Willingness to stop a medicine a | 368 | 1.43  (1.10-1.85) | 0.01 | 365 | 1.43  (1.09-1.88) | 0.01 |
| Satisfaction with medicines b | 371 | 0.84  (0.68-1.04) | 0.10 | 368 | 0.84  (0.69-1.03) | 0.09 |
| Involvement mean domain score c | 359 | 0.99  (0.96-1.01) | 0.25 | 356 | 0.92  (0.82-1.03) | 0.16 |
| Burden mean domain score c | 345 | 1.01  (0.99-1.04) | 0.22 | 342 | 1.06  (0.95-1.19) | 0.30 |
| Appropriateness mean domain score c | 350 | 1.00  (0.97-1.02) | 0.86 | 347 | 1.01  (0.88-1.15) | 0.91 |
| Concern about stopping mean domain score c | 353 | 1.02  (0.99-1.05) | 0.15 | 350 | 1.10  (0.97-1.25) | 0.13 |
| ***Dependent variable: count of medicine changes at ~1 year follow-up*** | | | | | | |
| Independent variables | | | | | | |
| Willingness to stop a medicine a | 368 | 1.36  (1.08-1.70) | 0.01 | 365 | 1.43  (1.15-1.78) | 0.001 |
| Satisfaction with medicines b | 371 | 0.84  (0.78-0.91) | 0.001 | 368 | 0.77  (0.65-0.90) | 0.001 |
| Involvement mean domain score c | 359 | 0.99  (0.97-1.01) | 0.51 | 356 | 0.95  (0.86-1.04) | 0.27 |
| Burden mean domain score c | 345 | 1.02  (0.99-1.04) | 0.14 | 342 | 1.08  (0.98-1.19) | 0.13 |
| Appropriateness mean domain score c | 350 | 0.98  (0.96-1.00) | 0.11 | 347 | 0.93  (0.83-1.03) | 0.16 |
| Concern about stopping mean domain score c | 353 | 1.01  (0.99-1.03) | 0.49 | 350 | 1.02  (0.92-1.13) | 0.66 |

*\** *Both models incorporated the effects of clustering at the GP practice level. The adjusted model included baseline number of medicines, age, gender and allocation as co-variates.*

*a Represents IRR for agreeing with willingness to stop relative to disagreeing*

*b Represents IRR for agreeing with satisfaction with medicines relative to disagreeing*

*c Represents IRR per one unit increase in mean domain score*

There was no evidence of an association between willingness to stop a medicine and the odds of having any of the 13 medication classes listed in Table 3 stopped, see Supplementary Table 2. There was evidence of reduced odds of having inhalers, nasal corticosteroids and opioid combinations stopped in participants who were satisfied with their medicines, see Supplementary Table 2. Higher involvement scores were associated with reduced odds of having an inhaler stopped but increased odds of having a nasal corticosteroid stopped. Higher burden scores were associated with an increased odds of having a diuretic stopped (OR: 1.97; 95%CI: 1.27 to 3.07; p<0.01) and higher concern about stopping a medicine scores were associated with an increased odds of having a proton pump inhibitor stopped (OR: 1.87; 95% CI 1.1 to 3.07; p=0.01).

## Discussion

This analysis demonstrated an association between attitudes to deprescribing (measured by the rPATD) and subsequent medication changes in older patients prescribed ≥15 medicines in Irish primary care. Baseline rPATD scores were similar to results in other populations with almost 87% of respondents indicating that they would be willing to stop a medicine if suggested by their doctor [16]. Previous research has not found any association between medication appropriateness and the rPATD [17], and a similar secondary analysis of a deprescribing RCT failed to see an association between the original PATD and medication changes [15]. However the outcome measure for this study was the deprescription of specific PIP, and participants had been recruited into the study on the basis of having one of these PIP, whereas SPPiRE participants were recruited on the basis of being prescribed at least 15 medicines and the outcome measures for the current analysis were the overall medication changes per person (adjusted for study group allocation and number of medicines at baseline). Perhaps unsurprisingly, satisfaction was associated with a reduced rate of both stopping and starting, which may reflect the idea of maintaining the status quo, a theme which has been identified in qualitative research with both patients and GPs [8, 18]. Given that this was trial data we also explored the interaction between rPATD responses and allocation, on outcomes and patients who were willing to have a medicine stopped and received the intervention had significantly lower rates of medicines started compared to those in the usual care group. This may suggest that deprescribing orientated reviews influences future prescribing and this finding emerged in the trial’s parallel process evaluation [13]. When looking at the most common classes of medicines stopped during the study period, there was no association between willingness to stop a medicine and the odds of having a specific class of medicine discontinued. Satisfaction with medicines was associated with reduced odds of having certain classes of medicines stopped, and these were all from medication groups used to treat symptoms, perhaps reinforcing the importance of assessing individual priorities when both prescribing and deprescribing. Interestingly higher burden scores were associated with an increased odds of stopping a diuretic and, perhaps counter-intuitively higher concern about stopping medicines was associated with an increased odds of stopping a proton pump inhibitor.

### Strengths and limitations

A strength of the study was that it focuses on a vulnerable group who are often excluded from clinical research; older people with complex multimorbidity and high levels of polypharmacy. Over 90% of participants answered the two global rPATD questions (n=365) at baseline, however overall enrolment rates for the trial were low (25%) so the results may not be generalisable to all older people with high levels of polypharmacy (≥15 medicines). Patient-level factors that may influence attitudes towards deprescribing and medication changes such as age, gender, number of repeat medicines and study group allocation were included in the analysis as co-variates. The effects of clustering were accounted for in this analysis given that the outcome variables were clustered (intra-class correlation for number of medicines stopped was 0.23) [19]. The relative rates of change were small, and our relatively small sample size and accounting for clustering reduced the precision of estimates. Overall, there was potential evidence of an inverse association with medication initiation in patients who were satisfied with their medicines and felt they were involved in decision-making. This may suggest that informed patients opt for more conservative non-pharmacological approaches to management and this has been described previously with the use of decision aids leading to fewer patients opting for discretionary surgery [20].

## Conclusion

The rPATD is an established and validated questionnaire that has been widely used in deprescribing research to characterise both patient and carer attitudes to deprescribing. This secondary analysis of a trial including vulnerable patients with very high medication burden suggests that the rPATD questionnaire may have the potential to facilitate deprescribing interventions. It can identify patients who are satisfied with their current medicines and therefore may not need or be willing to change medicines. It can also identify patients who may benefit from a medication review focusing on deprescribing, which has the potential to improve more efficient approaches to medicines management.

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## Conflict of Interest Statement

The authors declare no conflict of interest

## References

1. Fortin M, Stewart M, Poitras ME, et al. A systematic review of prevalence studies on multimorbidity: toward a more uniform methodology. Ann Fam Med. 2012;10(2):142-51.

2. Mair FS, May CR. Thinking about the burden of treatment. BMJ : British Medical Journal. 2014;349:g6680.

3. Payne RA, Abel GA, Avery AJ, et al. Is polypharmacy always hazardous? A retrospective cohort analysis using linked electronic health records from primary and secondary care. Br J Clin Pharmacol. 2014;77(6):1073-82.

4. Spinewine A, Schmader KE, Barber N, et al. Appropriate prescribing in elderly people: how well can it be measured and optimised? Lancet. 2007;370(9582):173-84.

5. Reeve E, Gnjidic D, Long J, et al. A systematic review of the emerging definition of “deprescribing” with network analysis: implications for future research and clinical practice. Br J Clin Pharmacol. 2015:n/a-n/a.

6. Anderson K, Stowasser D, Freeman C, et al. Prescriber barriers and enablers to minimising potentially inappropriate medications in adults: a systematic review and thematic synthesis. BMJ open. 2014;4(12).

7. Sinnott C, Hugh SM, Boyce MB, et al. What to give the patient who has everything? A qualitative study of prescribing for multimorbidity in primary care. Br J Gen Pract. 2015;65(632):e184-e91.

8. Reeve E, To J, Hendrix I, et al. Patient Barriers to and Enablers of Deprescribing: a Systematic Review. Drugs Aging. 2013;30(10):793-807.

9. Tveden-Nyborg P, Bergmann TK, Jessen N, et al. BCPT policy for experimental and clinical studies. Basic Clin Pharmacol Toxicol. 2021;128(1):4-8.

10. McCarthy C, Clyne B, Boland F, et al. GP-delivered medication review of polypharmacy, deprescribing, and patient priorities in older people with multimorbidity in Irish primary care (SPPiRE Study): A cluster randomised controlled trial. PLoS Med. 2022;19(1):e1003862.

11. McCarthy C, Clyne B, Corrigan D, et al. Supporting prescribing in older people with multimorbidity and significant polypharmacy in primary care (SPPiRE): a cluster randomised controlled trial protocol and pilot. Implement Sci. 2017;12(1):99.

12. McCarthy C, Moriarty F, Wallace E, et al. The evolution of an evidence based intervention designed to improve prescribing and reduce polypharmacy in older people with multimorbidity and significant polypharmacy in primary care (SPPiRE). Journal of Comorbidity. 2020;10:2235042X20946243.

13. McCarthy C, Pericin I, Smith SM, et al. Patient and general practitioner experiences of implementing a medication review intervention in older people with multimorbidity: Process evaluation of the SPPiRE trial. Health Expect. 2022.

14. McCarthy C, Flood M, Clyne B, et al. Medication changes and potentially inappropriate prescribing in older patients with significant polypharmacy. Int J Clin Pharm. 2022.

15. Turner JP, Martin P, Zhang YZ, et al. Patients beliefs and attitudes towards deprescribing: Can deprescribing success be predicted? Res Social Adm Pharm. 2020;16(4):599-604.

16. Weir KR, Ailabouni NJ, Schneider CR, et al. Consumer Attitudes Towards Deprescribing: A Systematic Review and Meta-Analysis. The Journals of Gerontology: Series A. 2021;77(5):1020-34.

17. Achterhof AB, Rozsnyai Z, Reeve E, et al. Potentially inappropriate medication and attitudes of older adults towards deprescribing. PLoS One. 2020;15(10):e0240463.

18. Doherty AJ, Boland P, Reed J, et al. Barriers and facilitators to deprescribing in primary care: a systematic review. 2020;4(3):bjgpopen20X101096.

19. Ntani G, Inskip H, Osmond C, et al. Consequences of ignoring clustering in linear regression. BMC Med Res Methodol. 2021;21(1):139.

20. Stacey D, Légaré F, Col NF, et al. Decision aids for people facing health treatment or screening decisions. Cochrane Database Syst Rev. 2014(1):Cd001431.