



Attitudes and beliefs of older adults and caregivers towards deprescribing in French-speaking countries: a multicenter cross-sectional study

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Abstract

Purpose Successful deprescribing requires understanding the attitudes of older adults and caregivers towards this process. This study aimed to capture these attitudes in four French-speaking countries and to investigate associated factors.

Methods A multicenter cross-sectional study was conducted by administering the French version of the revised Patients' Attitudes Towards Deprescribing (rPATD) questionnaire in Belgium, Canada, France, and Switzerland. Community-dwelling or nursing home older adults ≥ 65 years taking ≥ 1 prescribed medications and caregivers of older adults with similar characteristics were included. Multivariate logistic regressions were carried out to examine factors associated with willingness to deprescribe.

Results A total of 367 older adults (79.3 ± 8.7 years, 63% community-dwelling, 54% ≥ 5 medications) and 255 unrelated caregivers (64.4 ± 12.6 years) of care recipients (83.4 ± 7.9 years, 52% community-dwelling, 69% ≥ 5 medications) answered the questionnaire. Among them, 87.5% older adults and 75.6% caregivers would be willing to stop medications if the physician said it was possible. Reluctance to stop a medication taken for a long time was expressed by 46% of both older adults and caregivers. A low score for the factor "concerns about stopping" (older adults: aOR: 0.21; 95% CI: 0.07–0.59), and a high score for the factor "involvement" (older adults: aOR: 2.66; 95% CI: 1.01–7.07; caregivers: aOR: 11.28; 95% CI: 1.48–85.91) were associated with willingness to deprescribe.

Conclusions A significant proportion of older adults and caregivers of French-speaking countries are open to deprescribing. Despite this apparent willingness, deprescribing conversations in clinical practice remains marginal, emphasizing the importance of optimizing the integration of existing tools such as rPATD.

Keywords Attitudes · Older adults · Caregivers · Deprescribing · Polypharmacy

Introduction

Polypharmacy is a challenging and growing issue among multimorbid older adults. The use of multiple medications has been associated with a number of adverse events including preventable adverse drug reactions, inappropriate medication use, and thus significant financial costs [1–3]. This is a universal problem affecting all industrialized countries. French-speaking countries, such as Belgium, Canada, France, and Switzerland, are also greatly exposed

to polypharmacy (range: 53 to 79.8%) and potentially inappropriate medication (PIM) use (range: 33 to 56.7%) [4–13], as well as an increase of the aging population. Thus, reducing the burden of polypharmacy and PIM use remains challenging in these four countries, all concerned by a universal healthcare insurance system.

The process of withdrawing a medication under the recommendation of a healthcare professional to help counter polypharmacy [14], known as deprescribing, may be a potential strategy to reverse the clinical and economic burdens of polypharmacy and, consequently, PIMs. Previous studies support that deprescribing interventions are associated with positive health outcomes [3, 15–19]. In fact, deprescribing has been shown to be effective in reducing the use

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of PIMs, without causing additional emergency room visits or hospitalizations [3, 15, 17, 20].

Successful deprescribing interventions should be patient-centered considering patients' beliefs, goals, and preferences and rely on a collaboration between prescribers, older adults, caregivers, and other healthcare professionals [21]. Both older adults and caregivers have reported willingness to be involved in the decision-making process about their medications [21]. However, as reported by physicians, older adults and caregivers have expressed reluctance towards withdrawing medications, which represents an important barrier to deprescribing in clinical practice [21]. Thus, a better understanding of their attitudes and beliefs towards deprescribing would be conducive to identifying and tackling existing barriers, which constitutes a prerequisite for implementing successful deprescribing interventions into clinical practice, developing appropriate guidelines and educational materials for patients.

The revised Patients' Attitudes Towards Deprescribing (rPATD) questionnaire was developed by Reeve et al. [22] to capture attitudes and beliefs towards deprescribing among older adults and caregivers. This original English questionnaire was used internationally in different countries and settings and was translated if needed in different languages [23–28]. Previous international studies have reported older adults' and caregivers' openness to deprescribing, but few have concurrently assessed older adults' and caregivers' attitudes. To our knowledge, only one included French-speaking participants and none have included populations from multiple countries, to increase the external validity of study results regarding perceptions of deprescribing [26, 28–33]. The recent validation of the rPATD questionnaire in French [34] allows the assessment of attitudes towards deprescribing in both older adults and caregivers among French-speaking countries and thus may permit to position these French-speaking countries on their openness to deprescribing compared to other countries.

This international study aimed to (i) explore attitudes and beliefs of older adults and caregivers towards deprescribing in four French-speaking countries (Belgium, Canada, France, and Switzerland) and (ii) to investigate factors associated with these attitudes.

Methods

Study population and recruitment

Older adults and caregivers were recruited in community pharmacies, hospital outpatient clinics, general practitioner clinics, residential aged care facilities, institutions for independent elders, and community organizations from July 1, 2018, to March 1, 2019, in four French-speaking countries

(Belgium, Canada (province of Quebec), France, and Switzerland). To participate in this study, older adults had to be at least 65 years of age, taking at least one prescribed medication for the past 3 months. Older adults who were hospitalized, unable to complete the questionnaire for medical reasons (e.g., cognitive decline), or unable to speak and understand French were not eligible. To be included, caregivers had to be at least 18 years of age and caring for an older adult with similar characteristics described above. Caregivers unable to speak and understand French were excluded. Older adults and caregivers were recruited independently, that is, they were not paired.

Survey and data collection

A survey was conducted among caregivers and older adults using the French version of the rPATD questionnaire (older adults and caregivers' versions) [34]. The version for older adults consists of two sections: the first one collects sociodemographic data and information on medication habits and the second contains 22 statements to characterize their attitudes and beliefs towards deprescribing and other medication-related themes. Similarly, the version for caregivers also consists of two sections: the first one collects sociodemographic information on the caregiver and their care receiver, as well as current medication habits of the latter, and the second contains 19 statements on the same themes as the older adults' version. Of note, the older adults and the caregivers' versions include similar items, except for three items that were omitted in the caregivers' version due to the absence of equivalent items compared to the older adults' version (i.e., inconvenience to take medications every day, worries about missing out on future benefits, and good understanding of the reasons why each medicine was prescribed). These statements, in both versions, are distributed into the following four dimensions or factors: burden factor, appropriateness factor, concerns about stopping factor, and involvement factor. Each dimension contains four to five questions. In addition, two global questions cover the willingness to stop medications and the general satisfaction with current medications. The participants rated their agreement with each statement using a 5-point Likert scale with a scoring system (5 = strongly agree, 4 = agree, 3 = unsure, 2 = disagree, and 1 = strongly disagree). Thus, an average score from 1 to 5 was calculated for each dimension [33]. A higher score indicates more extensive burden, concerns about stopping, and involvement in medications with the exception of the appropriateness factor for which the score system is reversed so that a higher score indicates stronger beliefs in appropriateness of medications (agreements to the questions included in the appropriateness factor represented a lack of belief in appropriateness of medications) [33]. The paper versions of questionnaires were distributed by

researchers or healthcare professionals for self-completion by participants. When necessary, a researcher could be made available to assist with the completion of the older adults' version of the questionnaire to clarify questions (notably for older adults living in institutions where researchers or healthcare professionals could ask questions to participants and recorded participants' responses in the questionnaires). All data were recorded into an "electronic case report form" (eCRF).

Sample size

Sample size (275 older adults and 240 caregivers) was previously calculated and used for the study aimed at validating the cross-cultural adaptation and psychometric properties of the rPATD questionnaire in French [34]. Planned distribution of participants among the four countries was based on the older adults' residence (community dwelling versus institutions) and the likelihood of recruitment in each context. In Switzerland, due to the limited possibility to recruit in the community settings, Swiss older adults and caregivers were only recruited in institutions.

Statistical analysis

Descriptive statistics were conducted to describe responses and factor scores to the French version of the older adults' and caregivers' rPATD questionnaire. For each response, the categories of agreement "strongly agree"/ "agree" and "strongly disagree"/ "disagree"/ "unsure" were respectively grouped for statistical analyses. For each factor, a mean score ranging from 1 to 5 was calculated and categorized as follows: low score (mean factor score between 1 and < 2), moderate score (≥ 2 and < 4), and high score (≥ 4). Multivariate logistic regression analyses were also performed to investigate the association between the responses to the two global questions of the questionnaire (dependent variables) and participants' characteristics (independent variables). The categorical dependent variable was divided into the two categories listed above ("strongly agree/agree" and "strongly disagree/disagree/unsure"); the latter was used as the reference category in models. Among participants' characteristics (e.g., sex, age, number of medications, living arrangement, country), values of the four factor scores were also introduced in multivariate models as independent variables and categorized as "high score" (value of a factor score for a given subject $\geq$ median of the corresponding factor score) versus "low score" (value < median). Participants with at least one missing data in questionnaires were excluded from the regression analyses (that is, 31.8% and 22.7% of the total sample of older adults and caregivers, respectively). All analyses were performed with SAS Studio version 3.8, and statistical significance was set up at 0.05.

Results

Characteristics of the study population

Descriptive characteristics of older adults and their care recipients

A total of 367 older adults and 255 unrelated caregivers were recruited: 101 older adults (27.5%) and 40 caregivers (15.7%) in Belgium, 110 (30.0%) and 95 (37.3%) respectively in Canada, 83 (22.6%) and 73 (28.6%) respectively in France, and 73 (19.9%) and 47 (18.4%) respectively in Switzerland (Table 1 and Table 4 in the Appendix). Globally, the median age of older adults was 80 years (IQR 72–86), and most of participants were women (63.2%) and lived in the community (63.1%), except for participants recruited in Switzerland where all older adults were recruited in an institution due to the limited possibility to recruit in the community. For further details, the distribution of participants for each country according to living arrangement is presented in Table 4 and Table 5 in the Appendix. More than half (53.5%) of older individuals were taking at least five and more medications regularly. The majority self-managed their medications (64.0%), and a third of them (34.1%) used some form of drug administration aids (e.g., use of pillbox).

The median age of caregivers was 65 years (IQR 57–74), and most of them were women (74.9%) and more often children (35.4%), spouses (32.7%), or other relatives (excluding siblings) (21.7%) (Tables 1 and Table 5 in the Appendix). Concerning care recipients of surveyed caregivers, their median age was 84 years (IQR 78–89) and they were mostly women (65%). Living arrangements of care recipients were divided between the community (52.2%) and institutions (47.8%). A higher proportion of care recipients were taking more than five regular medications (68.9%) (excluding care recipients whose number of medications is not known to their caregivers). In 26.6% of cases, caregivers did not know the number of regular medications taken by their care recipients. The majority of care recipients received assistance to manage their medications: 29.4% received assistance by their caregivers while 53.0% by paid carers (Table 1).

Attitudes towards deprescribing

Older adults' and caregivers' responses to the questionnaire

A significant proportion of older adults (87.5%) would be willing to stop one or more of their medications if the doctor said it was possible, and 28.6% would like that their doctor to reduce the dose of one or more of their medications

(Fig. 1). However, 46.0% of them would be reluctant to stop a medication that they had been taking for a long time and 94.2% were satisfied with their current medications. The same tendency was observed in caregivers' responses, a majority of caregivers (75.6%) would be willing to stop at least one of the medications taken by their care recipient if the doctor deemed it possible, and 24.0% of them would like the doctor to reduce the dose of one or more of their care recipient's medications (Fig. 2). Yet, 46.4% expressed reluctance towards stopping a medication that their care recipient had been taking for a long time, and 76.3% were satisfied with care recipient's current medications.

Factor scores for older adults and caregivers

Globally, similar median factor scores were found for both older adults and caregivers (Table 2). They presented a high score for the involvement factor (older adults: median 4.2, IQR 3.6–4.8; caregivers: 4.3, IQR 3.3–4.8) and the appropriateness factor (older adults: 3.8, IQR 3.0–4.8; caregivers: 3.4, IQR 2.8–4.2). On the contrary, burden factor (older adults: 2.2, IQR 1.4–3.2; caregivers: 2.8, IQR 2.0–3.6) and concerns about stopping factor (older adults: 2.2, IQR 1.6–3.0; caregivers: 2.5, IQR 2.0–3.5) scores were both moderate.

Associations between the two global questions of the French rPATD and participants' characteristics including factor scores

In older adults, the likelihood of willingness to have a medication deprescribed was significantly associated with a low score to the concerns about stopping factor (adjusted odds ratio (OR): 0.21; 95% CI 0.07–0.59) and a high involvement factor score (OR: 2.66; 95% CI 1.01–7.07) (Table 3). Similarly, caregivers were more likely to be willing to have one or more of their care recipient's medicines deprescribed if they presented a high involvement factor score (OR: 5.22; 95% CI 2.10–12.95).

Concerning the satisfaction with medications, older adults with a high appropriateness factor score were more likely satisfied with their current medications (OR: 11.28, 95% CI 1.48–85.91). In the caregivers' models, this association with the question relating to the satisfaction of the care recipients' medications was also found (OR: 12.96; 95% CI 3.52–47.11) as well as other significant associations not found in older adults' models. Caregivers with a low burden factor score (OR: 0.11; 95% CI 0.02–0.47) and a high concern about stopping factor score (OR: 4.43; 95% CI 1.28–15.31) were more likely satisfied with their care recipients' medications (Table 3).



Fig. 1 Older adults' responses to the French rPATD questionnaire



Fig. 2 Caregivers' responses to the French rPATD questionnaire

Few significant associations emerged with sociodemographic characteristics' participants. Older adults who used some form of a drug administration aid (i.e., pill box) would be more willing to stop one of more of their medications than those who do not. Caregivers were less likely to be satisfied with the current medications of their care recipient if their care recipients were aged between 75 and 84 years old, compared to those aged 65–74 years (OR: 0.11, 95% CI 0.01–0.87).

Discussion

The results showed that a large proportion of older adults (88%) and caregivers (76%) in the four French-speaking countries were open to deprescribing. In addition, both subgroups had moderate concerns about stopping medications and perceived burden of medications. However, certain barriers remain, as 46% of older adults and 46% of caregivers would be reluctant to stop a medication that has been taken for a long time. Furthermore, older adults (92%) and caregivers (76%) were globally satisfied with the current medications and believed strongly in their appropriateness as highlighted by a high appropriateness factor score, which may constitute an important barrier.

Similar positive attitudes towards deprescribing were reported in other countries. A recent meta-analysis of 40 studies conducted in 17 countries showed that 84% (95% CI 81–88%) of older adults and 80% (95% CI 74–86%) of caregivers would be willing to stop a medication if the doctor said it was possible [23]. Another meta-analysis involving 29 studies reported similar results, where 87.6% (95% CI 83.3–91.4%) of older adults expressed the willingness to discontinue medications, but a smaller proportion of willingness to deprescribe care recipients' medications was found among caregivers (74.8%; 95% CI 49.8–93.8%) [24]. In addition to this apparent openness to deprescribing, the moderate concerns about stopping medications and perceived burden of medications reported in both older adults and caregivers in our study, as well as the high involvement in medication management, may be conducive to deprescribing. Nevertheless, despite these positive attitudes inclined to deprescribing worldwide, some degree of reluctance concerning the cessation of a medication that has been taken for a long time was also found in past studies where 25% and 52% of older adults and 35 to 54% of caregivers were reluctant to the withdrawal of a medication taken for a long time [23]. Likewise, the high belief in appropriateness of medications in our study, a potential obstacle to deprescribing, was also observed elsewhere, with a significant proportion

of participants (older adults and caregivers) who reported a high level of satisfaction with current medications (range: 67 to 93% for older adults and 79 to 86% for caregivers) [23, 24]. Of note, higher scores were found in caregivers for the perceived burden of medications and the concerns about stopping medications; this is in line with prior studies [24].

In our study, the willingness to have a medication deprescribed was significantly associated with two factors: a higher value for the involvement factor for both older adults and caregivers, as well as a low value for the concern about stopping factor, only for older adults. These results were also found in a cross-sectional study conducted in Croatia [27]. Indeed, participants who want to be involved in discussions regarding medication management and who have fewer concerns about drug discontinuation are probably more likely to be open to deprescribing. In addition, our analyses showed that older adults and caregivers with high belief in the appropriateness of medications were more likely satisfied with medications. In light of these results, targeting the individuals with a high level of involvement in medication management, high concerns about stopping medications and a high degree of belief in the appropriateness of medications may be an optimal way to tackle the barriers of deprescribing and to focus on the levers.

Among patients' characteristics, older adults living in Switzerland had greater odds of being willing to have a medication deprescribed than those living in Canada. This result may be related to the inclusion of older adults in Switzerland only in institutions (see the "Methods" section). Indeed, this finding is not surprising given that institutionalized older adults may express general indifference about medications they are taking due to their lack of involvement in the decision-making process and their great trust in healthcare professionals' decisions regarding medication management [35, 36]. In our study, no significant associations were found with age, number of medications, or the level of education. This is consistent with previous research where the willingness to have a medication deprescribed was irrespective of the sociodemographic characteristics of participants and the socioeconomic status of the study country [24].

Despite their openness to deprescribing when recommended by the physician, older adults and caregivers expressed strong belief in the appropriateness of their medications and their satisfaction. These contradictory beliefs were also observed in past studies [23]. These paradoxical statements illustrate perhaps the influence of a strong professional-patient relationship. Older adults, and more so caregivers, trust the recommendations of prescribers [37]. Deprescribing may be more accepted if the recommendations come from the physician they trust [38], and this trusting may facilitate the alignment of the deprescribing process with values, goals, and preferences of patients; these elements are essential for the implementation of successful deprescribing

interventions [39]. In addition, the high involvement factor scores express that older adults and caregivers especially are interested in being involved in medication management. Thus, there is a strong opportunity for healthcare professionals to engage in a collaborative partnership with older patients and families to optimize medication regimen, reduce polypharmacy, and deprescribe when it is appropriate.

Interestingly, the moderate burden factor scores indicate that older adults and caregivers did not perceive an important medication-related burden. However, patients may minimize the burden because they view their medication regimen as a necessity, an opinion that was expressed by certain older adults during the recruitment process and outlined in a previous review [40]. This desire to take less medication despite satisfaction and the certain degree of reluctance to stop a medicine that has been taken for a long time in our study may suggest that some barriers remain to be addressed in order to fully implement successful deprescribing interventions. Reeve et al. [41] suggest that the discussion should not be focusing only on deprescribing but also on medications in general. A study showed that a minority of older adults in Canada were aware of the term "deprescribing," and suggested that informing patients about the potential harms of medications and using the term "deprescribing" could increase awareness [42]. This lack of awareness was apparent during our recruitment process when individuals appeared uneasy upon hearing the term "deprescribing." Therefore, further educational interventions from healthcare providers should be encouraged as outlined in the D-PRESCRIBE trial [43]. Indeed, engaging older adults in the shared decision-making process may lead to the discontinuation of long-term medications [23].

It should be noted that this widespread willingness towards deprescribing should be put in relation with the effective initiation of a deprescribing conversation in real-life clinical practice, due to the low predictive ability of the rPATD [23, 24, 44]. In this sense, future research is needed into how to optimize the translation of deprescribing in practice, notably identifying factors that influence the initiation of a deprescribing conversation and how tools may be more efficiently used by healthcare professionals to communicate and engage deprescribing in a shared decision-making process.

Strengths and limitations

Thanks to the multicentric design, we were able to recruit a large sample size of participants through different facilities and organizations in four countries allowing for high external validity among French-speaking older adults and caregivers in different contexts. However, there are some limitations in the present study. Older adults and caregivers who have a particular interest in being involved in medication-related decisions may have been more inclined to respond

to the questionnaire, leading to a possible volunteer bias. In addition, though the questionnaire has been validated, certain statements may have been interpreted differently which would have influenced the responses. For example, in the statement “I would like to try stopping one of my medicines to see how I feel without it,” the person making the decision to stop the medication, the doctor versus the patient themselves, is open to interpretation. We used a conservative definition of deprescribing, considering only withdrawal, but not reduction of the dose, which might also be clinically relevant, especially for patients with the most severe polypharmacy. Finally, a social desirability bias may have occurred particularly in the cases where older adults required assistance to complete the questionnaire.

Conclusion

In this international study, both older adults and caregivers seem globally open to deprescribing, with a willingness to be involved in the process. However, certain barriers

remain and will need to be further addressed by clinicians. These findings reveal a strong opportunity for healthcare professionals to discuss deprescribing and implement interventions on a very large scale in French-speaking countries in clinical practice and research activities. These interventions should notably target those individuals who are least open to deprescribing and satisfied with medications, for example those with a high score for the concerns about stopping factor and the appropriateness factor. Nevertheless, despite this apparent willingness towards deprescribing, there is probably great value in looking how to optimize translation of deprescribing in practice with existing tools such as the rPATD, given that the willingness to stop medications is not always followed by an initiation of deprescribing conversations in real-life clinical practice.

Appendix

Table 1 Characteristics of older adults, caregivers, and their care recipients

Characteristic ^a of older adults	Total (<i>n</i> = 367)	Characteristic ^a of caregivers and their respective care recipients	Total (<i>n</i> = 255)
Countries, <i>n</i>		Countries, <i>n</i>	
Belgium	101	Belgium	40
Canada	110	Canada	95
France	83	France	73
Switzerland	73	Switzerland	47
		Age of caregivers, years	
		Median (IQR)	65 (57–74)
		Sex of caregivers, <i>n</i> (%)	
		Male	64 (25.1)
		Female	191 (74.9)
Age, years		Age of care recipients, years	
Median (IQR)	80 (72–86)	Median (IQR)	84 (78–89)
Sex, <i>n</i> (%)		Sex of care recipients, <i>n</i> (%)	
Male	135 (36.8)	Male	89 (35.0)
Female	232 (63.2)	Female	165 (65.0)
Living arrangement, <i>n</i> (%)		Living arrangement of care recipients, <i>n</i> (%)	
Community	231 (63.1)	Community	132 (52.2)
Institution ^b	135 (36.9)	Institution ^b	121 (47.8)
Number of regular medications		Number of regular medications taken by care recipients	
Median (IQR)	5.0 (3–7)	Median (IQR)	6 (4–8)
<i>n</i> (%)		<i>n</i> (%)	
1–4	146 (46.5)	1–4	55 (22.8)
5–9	134 (42.7)	5–9	88 (36.5)
≥ 10	34 (10.8)	≥ 10	34 (14.1)
		Do not know (according to caregivers)	64 (26.6)

Table 1 (continued)

Characteristic ^a of older adults	Total (<i>n</i> = 367)	Characteristic ^a of caregivers and their respective care recipients	Total (<i>n</i> = 255)
Use of some form of administration aid, <i>n</i> (%)		Use of a pill box, <i>n</i> (%)	
Yes	124 (34.1)	Yes	116 (48.3)
No	240 (65.9)	No	124 (51.7)
Medication management^c, <i>n</i> (%)		Medication management^c of care recipients, <i>n</i> (%)	
Spouse	13 (3.5)	Caregiver	75 (29.4)
Self-management	325 (64.0)	Self-management	53 (20.8)
Other relative	7 (1.9)	Relative	18 (7.1)
Paid carer	123 (33.5)	Paid carer	134 (52.6)
Other non-relative	0	Other non-relative	11 (4.3)
		Relationship of care recipient, <i>n</i> (%)	
		Spouse	83 (32.7)
		Children	90 (35.4)
		Sibling	14 (5.5)
		Other relative	55 (21.7)
		Other non-relative	12 (4.7)
		Level of education of caregivers, <i>n</i> (%)	
		Primary education (elementary school)	21 (8.3)
		Lower secondary education	63 (24.8)
		Upper secondary education (high school)	86 (33.9)
		Higher education (university)	84 (33.0)
Level of education, <i>n</i> (%)		Level of education of care recipients, <i>n</i> (%)	
Primary education (elementary school)	84 (23.1)	Primary education (elementary school)	104 (40.8)
Lower secondary education	98 (26.9)	Lower secondary education	64 (25.1)
Upper secondary education	86 (23.6)	Upper secondary education	48 (18.8)
Higher education (university)	96 (26.4)	Higher education (university)	28 (11.0)
		No schooling	2 (0.8)
		Do not know (according to caregivers)	9 (3.5)
Help to complete questionnaire, <i>n</i> (%)			
Yes	183 (53.7)	NA	
No	158 (46.3)	NA	

NA not applicable

^aIndividuals without missing data for the corresponding question^bResidential aged care facilities, institutions for independent elders, and community organizations^cMultiple responses to this question were allowed**Table 2** Factor scores in older adults and caregivers

Factors ^a	Older adults			Caregivers		
	<i>N</i> ^b	Mean (SD)	Median (IQR)	<i>N</i> ^b	Mean (SD)	Median (IQR)
Burden	342	2.4 (1.1)	2.2 (1.4–3.2)	230	2.8 (1.0)	2.8 (2.0–3.6)
Appropriateness	356	3.7 (1.1)	3.8 (3.0–4.8)	242	3.2 (0.9)	3.4 (2.8–4.2)
Concerns about stopping	350	2.3 (0.9)	2.2 (1.6–3.0)	238	2.8 (1.0)	2.5 (2.0–3.5)
Involvement	354	4.1 (1.0)	4.2 (3.6–4.8)	243	4.0 (1.0)	4.3 (3.3–4.8)

SD standard derivation, IQR interquartile range

^aFactor scores range between 1 and 5. Higher scores indicate greater perceived burden of medications, belief in appropriateness of medications, concerns about stopping, and involvement in medication management^bNumber of individuals without missing data for all the questions in the corresponding factor

Table 3 Multivariate logistic regression analyses of the association between the two global questions of the French rPATD questionnaire and participants' characteristics

	Willingness to have a medication deprescribed Strongly agree/agree vs strongly disagree/disagree/ unsure aOR (95% CI)	Satisfaction with current medications Strongly agree/agree vs strongly disagree/ disagree/unsure aOR (95% CI)
Older adults	N^a = 250	N^a = 250
Age, years		
65–74	1.00	1.00
75–84	0.55 (0.19–1.61)	0.93 (0.16–5.30)
85 and older	0.56 (0.15–2.14)	16.56 (0.90–304.93)
Sex		
Male	1.00	1.00
Female	0.71 (0.26–1.95)	0.41 (0.07–2.42)
Living arrangement		
Community	1.00	1.00
Institution	0.32 (0.06–1.64)	0.28 (0.01–5.68)
Countries		
Canada	1.00	1.00
Belgium	0.75 (0.25–2.23)	0.71 (0.12–4.17)
France	1.15 (0.35–3.80)	NA ^b
Switzerland	56.94 (4.04–802.70)	6.63 (0.31–140.34)
Level of education		
Primary education (elementary school)	1.00	1.00
Lower secondary education	2.52 (0.71–8.94)	15.62 (0.78–310.25)
Upper secondary education	2.60 (0.65–10.44)	2.38 (0.28–20.04)
Higher education (university)	1.52 (0.38–6.00)	2.47 (0.23–25.69)
Number of different medications		
1–4	1.00	1.00
5–9	0.85 (0.30–2.40)	1.82 (0.29–11.48)
10 and more	1.04 (0.17–6.49)	9.79 (0.30–311.73)
Medication management^c		
Other ^d	1.00	1.00
Self-management	2.23 (0.52–9.55)	5.70 (0.20–160.08)
Use of some form of administration aid		
No	1.00	1.00
Yes	3.78 (1.27–11.2)	1.50 (0.20–10.99)
Factor scores^c		
Burden factor (high vs low score)	1.43 (0.52–9.55)	0.37 (0.06–2.21)
Concern factor (high vs low score)	0.21 (0.07–0.59)	1.29 (0.27–6.21)
Appropriateness factor (high vs low score)	0.63 (0.23–1.75)	11.28 (1.48–85.91)
Involvement factor (high vs low score)	2.66 (1.01–7.07)	5.31 (0.94–29.90)
Help to complete questionnaire		
No	1.00	1.00
Yes	2.42 (0.81–7.21)	3.76 (0.33–42.15)
Caregivers	N^a = 197	N^a = 197
Age of caregivers, years		
25–64	1.00	1.00
65–74	0.70 (0.23–2.09)	1.19 (0.24–5.89)
75 and older	0.22 (0.03–1.26)	3.45 (0.40–29.35)
Age of care recipients, years		
65–74	1.00	1.00
75–84	1.60 (0.31–8.17)	0.11 (0.01–0.87)

Table 3 (continued)

	Willingness to have a medication deprescribed Strongly agree/agree vs strongly disagree/disagree/ unsure aOR (95% CI)	Satisfaction with current medications Strongly agree/agree vs strongly disagree/ disagree/unsure aOR (95% CI)
85 and older	0.97 (0.17–5.51)	0.21 (0.02–1.90)
Sex of caregivers		
Male	1.00	1.00
Female	0.55 (0.20–1.52)	0.39 (0.09–1.57)
Sex of care recipients		
Male	1.00	1.00
Female	1.23 (0.42–3.63)	0.99 (0.24–4.07)
Living arrangement		
Community	1.00	1.00
Institution ^d	1.60 (0.41–6.29)	0.40 (0.05–2.95)
Countries		
Canada	1.00	1.00
Belgium	1.85 (0.49–7.01)	1.31 (0.30–5.68)
France	0.96 (0.29–3.23)	1.11 (0.37–3.34)
Switzerland	0.56 (0.14–2.14)	0.28 (0.08–1.01)
Level of education of caregivers		
Primary education (elementary school)	1.00	1.00
Lower secondary education	0.95 (0.17–5.10)	0.44 (0.04–4.42)
Upper secondary education	1.85 (0.33–10.14)	0.12 (0.01–1.35)
Higher education (university)	1.91 (0.34–10.50)	0.49 (0.04–5.40)
Number of different care recipient medications		
1–4	1.00	1.00
5–9	1.63 (0.51–5.23)	0.38 (0.04–3.28)
10 and more	3.62 (0.67–19.44)	0.15 (0.01–1.79)
Medication management		
Other ^d	1.00	1.00
Self-management (care recipient)	0.98 (0.25–3.80)	0.14 (0.01–1.11)
Caregiver	2.57 (0.62–19.65)	0.30 (0.04–2.24)
Use of some form of administration aid		
No	1.00	1.00
Yes	1.29 (0.52–3.21)	2.19 (0.57–8.46)
Relationship of care recipient		
Spouse	1.00	1.00
Children	0.71 (0.10–4.80)	7.92 (0.68–91.79)
Sibling	0.86 (0.13–5.48)	0.14 (0.01–2.01)
Other relative	1.12 (0.16–7.42)	3.10 (0.26–36.19)
Other non-relative	0.81 (0.06–9.71)	0.23 (0.01–3.46)
Factor scores^c		
Burden factor (high vs low score)	0.69 (0.25–3.80)	0.11 (0.02–0.47)
Concern factor (high vs low score)	0.77 (0.33–1.78)	4.43 (1.28–15.31)
Appropriateness factor (high vs low score)	0.47 (0.18–1.19)	12.96 (3.52–47.11)
Involvement factor (high vs low score)	5.22 (2.10–12.95)	1.12 (0.37–3.35)

aOR adjusted odds ratio, NA non-applicable

^aAnalyses in individuals without missing data for each corresponding question.^bInfinite values due to 0 response in the category “Strongly disagree/disagree” at the corresponding question in participants of France^cHigh score corresponds to individuals with a score for a factor superior or equal to the median of the corresponding factor score; low score corresponding to individuals with a score for a factor inferior to the median of the corresponding factor score^dOthers including spouse, other relative, paid carer, and other non-relative

Table 4 Characteristics of older adults by countries

Characteristic ^a	Total (<i>n</i> = 367)	Belgium (<i>n</i> = 101)	Canada (<i>n</i> = 110)	France (<i>n</i> = 83)	Switzerland (<i>n</i> = 73)
Age, years					
Median (IQR)	80 (72–86)	80 (72–85)	74 (69–80)	80 (71–86)	87 (81–91)
Sex, <i>n</i> (%)					
Male	135 (36.8)	43 (42.6)	41 (37.3)	28 (33.7)	23 (31.5)
Female	232 (63.2)	58 (57.4)	69 (62.7)	55 (66.3)	50 (68.5)
Living arrangement, <i>n</i> (%)					
Community	231 (63.1)	73 (73.0)	91 (82.7)	67 (80.7)	0
Institution ^b	135 (36.9)	27 (27.0)	19 (17.3)	16 (19.3)	73 (100)
Number of regular medications					
Median (IQR)	5.0 (3–7)	5.0 (3–7)	4.0 (2–6)	6.0 (3–8)	5.1 (2.4)
<i>n</i> (%)					
1–4	146 (46.5)	39 (42.9)	59 (56.2)	26 (36.6)	22 (46.8)
5–9	134 (42.7)	40 (43.9)	38 (36.2)	36 (50.7)	20 (42.6)
≥ 10	34 (10.8)	12 (13.2)	8 (7.6)	9 (12.7)	5 (10.6)
Use of some form of administration aid, <i>n</i> (%)					
Yes	124 (34.1)	42 (42.0)	32 (38.6)	49 (45.4)	1 (1.4)
No	240 (65.9)	58 (58.0)	51 (61.4)	59 (54.6)	72 (98.6)
Medication management^c, <i>n</i> (%)					
Self-management	325 (64.0)	67 (66.3)	102 (92.7)	65 (78.3)	1 (1.4)
Spouse	13 (3.5)	5 (5.0)	3 (2.7)	5 (2.9)	0
Other relative	7 (1.9)	6 (5.9)	0	1 (1.2)	0
Paid carer	123 (33.5)	25 (24.8)	7 (6.4)	19 (22.9)	72 (98.6)
Other non-relative	0	0	0	0	0
Level of education, <i>n</i> (%)					
Primary education (elementary school)	84 (23.1)	13 (13.0)	11 (24.9)	34 (41.0)	26 (35.6)
Lower secondary education	98 (26.9)	26 (26.0)	32 (29.6)	26 (31.3)	14 (19.2)
Upper secondary education	86 (23.6)	25 (25.0)	26 (24.1)	10 (12.0)	25 (34.2)
Higher education (university)	96 (26.4)	36 (36.0)	39 (36.1)	13 (15.7)	8 (11.0)
Help to complete questionnaire, <i>n</i> (%)					
Yes	183 (53.7)	44 (50.0)	33 (32.3)	33 (42.3)	73 (100)
No	158 (46.3)	44 (50.0)	69 (67.7)	45 (57.7)	0

^aIndividuals without missing data for the corresponding question^bResidential aged care facilities, institutions for independent elders, and community organizations^cMultiple responses to this question were allowed

Table 5 Characteristics of caregivers and their respective care recipients by countries

Characteristic ^a	Total (<i>n</i> = 255)	Belgium (<i>n</i> = 40)	Canada (<i>n</i> = 95)	France (<i>n</i> = 73)	Switzerland (<i>n</i> = 47)
Age of caregivers, years					
Median (IQR)	65 (57–74)	58 (50.5–67)	70 (63–76)	65 (58–73)	57 (51–65)
Sex of caregivers, <i>n</i> (%)					
Male	64 (25.1)	11 (27.5)	20 (21.1)	20 (21.9)	17 (36.2)
Female	191 (74.9)	29 (72.5)	75 (78.9)	57 (78.1)	30 (63.8)
Age of care recipients					
Median (IQR)	84 (78–89)	83 (80–88)	81 (73–85)	86 (83–90)	81 (73–85)
Sex of care recipients, <i>n</i> (%)					
Male	89 (35.0)	14 (35.0)	45 (47.9)	21 (28.8)	9 (19.1)
Female	165 (65.0)	26 (65.0)	49 (52.1)	52 (71.2)	38 (80.9)
Living arrangement of care recipients, <i>n</i> (%)					
Community	132 (52.2)	34 (85.0)	48 (51.6)	50 (68.5)	0
Institution ^b	121 (47.8)	6 (15.0)	45 (48.4)	23 (31.5)	47 (100)
Number of regular medications taken by care recipients					
Median (IQR)	6 (4–8)	7.5 (4.5–10.0)	5.5 (4–8)	6.0 (5–8)	4 (4–6)
<i>n</i> (%)					
1–4	55 (22.8)	8 (21.6)	24 (27.9)	11 (15.5)	12 (25.5)
5–9	88 (36.5)	15 (40.5)	36 (41.9)	30 (42.3)	7 (14.9)
≥ 10	34 (14.1)	9 (24.3)	14 (16.3)	9 (12.7)	2 (4.3)
Do not know (according to caregivers)	64 (26.6)	5 (13.5)	12 (14.0)	21 (29.6)	26 (55.3)
Use of some form of administration aid, <i>n</i> (%)					
Yes	116 (48.3)	22 (55.0)	38 (53.5)	51 (60.0)	5 (11.4)
No	124 (51.7)	18 (45.0)	33 (46.5)	34 (40.0)	39 (88.6)
Medication management^c of care recipients, <i>n</i> (%)					
Caregiver	75 (29.4)	17 (42.5)	27 (28.4)	30 (41.1)	1 (2.1)
Self-management	53 (20.8)	10 (25.0)	32 (33.7)	10 (13.7)	1 (2.1)
Relative	18 (7.1)	6 (15.0)	6 (6.3)	5 (6.9)	1 (2.1)
Paid carer	134 (52.6)	11 (27.5)	37 (39.0)	41 (56.2)	45 (95.7)
Other non-relative	11 (4.3)	0	7 (7.4)	3 (4.1)	1 (2.1)
Relationship of care recipient, <i>n</i> (%)					
Spouse	83 (32.7)	12 (30.0)	48 (51.0)	18 (24.7)	5 (10.7)
Children	90 (35.4)	17 (42.5)	11 (11.7)	36 (49.3)	26 (55.3)
Sibling	14 (5.5)	0	11 (11.7)	3 (4.1)	0
Other relative	55 (21.7)	8 (20.0)	20 (21.3)	12 (16.4)	15 (31.9)
Other non-relative	12 (4.7)	3 (7.5)	4 (4.3)	4 (5.5)	1 (2.1)
Level of education of caregivers, <i>n</i> (%)					
Primary education (elementary school)	21 (8.3)	3 (7.5)	6 (6.3)	10 (13.9)	2 (4.3)
Lower secondary education	63 (24.8)	6 (15.0)	28 (29.5)	24 (33.3)	5 (10.6)
Upper secondary education	86 (33.9)	14 (35.0)	26 (27.4)	19 (26.4)	27 (57.4)
Higher education (university)	84 (33.0)	17 (42.5)	35 (36.8)	19 (26.4)	13 (27.7)
Level of education of care recipients, <i>n</i> (%)					
No schooling	2 (0.8)	0	2 (2.1)	0	0
Primary education (elementary school)	104 (40.8)	13 (32.5)	30 (31.6)	41 (56.2)	20 (42.6)
Lower secondary education	64 (25.1)	9 (22.5)	30 (31.6)	22 (30.1)	3 (6.4)
Upper secondary education	48 (18.8)	9 (22.5)	14 (14.7)	6 (8.2)	19 (40.4)
Higher education (university)	28 (11.0)	6 (15.0)	16 (16.8)	2 (2.8)	4 (8.5)
Do not know (according to caregivers)	9 (3.5)	3 (7.5)	3 (3.2)	2 (2.7)	1 (2.1)

^aIndividuals without missing data for this question^bResidential aged care facilities, institutions for independent elders, and community organizations^cMultiple responses to this question were allowed

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Availability of data and material The datasets generated and analyzed during the study are available upon request from the corresponding author.

Declarations

Ethics approval and consent to participate The Ethical Review Boards of the University Hospital of Limoges (no. 268/2018/24), the University Hospital of UCL Namur (NUB B039201836742), and the University of Quebec at Rimouski (CER-101–745) approved the study. Ethical approval was not required for Switzerland. Consent forms were signed in Belgium but were not required in France as the survey was considered a human and social study nor in Quebec (Canada) where consent was manifest when participants agreed to complete the questionnaire. Participants' responses to the questionnaire were anonymous.

Competing interests The authors declare no competing interests.

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