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RESEARCH ARTICLE

Attitudes towards deprescribing among multi-ethnic community-dwelling older patients and caregivers in Malaysia: a cross-sectional questionnaire study

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Abstract

Background Deprescribing describes a process of medication regimen optimization with the aim to reduce adverse events and improve quality of life. There is limited research on perceptions of older adults, defined as those 60 years of age and older, about their willingness to cease a medication in developing countries. *Objective* To ascertain patients' attitudes, beliefs, perceptions, and experiences regarding the number of medications they were taking and their opinions regarding deprescribing. *Setting* A primary care health clinic and three community pharmacies in Malaysia. *Method* A multicenter cross-sectional study was conducted by administering the revised Patients' Attitudes Towards Deprescribing (rPATD) questionnaire to older adults aged 60 years and over or caregivers attending a health clinic and three community pharmacies in Malaysia. Descriptive results were reported for participants' characteristics and questionnaire responses. Analysis of correlation between participant characteristics and their responses was performed using Spearman's correlation. *Main outcome measure* Patients' and caregivers' attitudes and beliefs towards reducing medications and characteristics of patients such as age, gender, education level, number of medication taken and number of medical center managing the patient. *Results* 650 participants were approached and the response rate was 85.2%. A total of 554 participants completed the questionnaire (502 older adults and 52 caregivers). Older adults in the study were taking a median of three medications and/or supplements compared to four in caregiver recipients. 88.1% of older adults were satisfied with their current medication regimen and 67.7% would like to try stopping or reducing the dose of their medicines when their doctor recommended. 82.7% of caregivers were satisfied with their care recipient's current medications and 65.4% were willing to stop taking or reduce the number of drugs taken by their care recipient's upon doctor's recommendation. Older adults ($p = 0.003$) and those with lower education level ($p < 0.001$) were more willing to have their medications deprescribed. Other demographic characteristics such as gender, number of medication taken or number of doctors managing patient were not found to be correlated with willingness to stop a medication. *Conclusion* Older adults taking multiple medications for various medical conditions were largely accepting of a trial of cessation of medication.

Keywords Attitude · Caregiver · Deprescribing · Malaysia · Polypharmacy · Potentially inappropriate medication · Questionnaire

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Impact on practice

- Older individuals taking multiple medications for multiple medical conditions are prepared to agree to a trial of deprescribing.
- Patients with more advanced age and lower education level would more easily accept to have their medications deprescribed.
- Patients trust the doctors, pharmacists, and other health care professionals and are comfortable with professionals other than physicians in managing their illness. Health care professionals play an important role in deprescribing process.

Introduction

Medication-related problems, especially among older adults, defined as those 60 years of age and older [1], contribute a considerable burden of adverse drug events, disability, ill health, hospitalization, and even mortality [2]. Studies examining deprescribing, defined as the systematic process of identifying and discontinuing drugs, suggest that deprescribing can decrease adverse events and improve quality of life [3].

The World Health Organization's Guide to Good Prescribing recommends patients to be involved in prescribing process as patient-centered care brings improvements in health outcomes [4]. This is echoed in reviews which emphasized the significance of patient participation and shared decision making [5, 6]. Shared, informed decision making is central to delivering patient-centered care and can be an effective way of reaching consensus with regard to treatment of chronic diseases. When encountered with sparsity of evidence as to the appropriateness for deprescribing, patient values and preferences can be a principal shepherd for health care practitioners. A recent study highlighted that patients' belief in the importance of medications associated poorly with their prescribers' belief in importance, implying the necessity for recurrent dialogue between doctors and patients [7]. There are compelling reasons why patients should be involved throughout the deprescribing process. Jansen and colleagues drew from the psychology, communication and decision making literature to review how to enhance deprescribing through shared decision making. The authors recommended five steps; creating awareness that options exist, discussing the options and their benefits and harms, exploring patient preferences for the different options and formulating the decision. By enacting this process, the patient is less likely to be resistant to deprescribing as they will have been furbished with the information as to the reasons doctor recommends medication withdrawal. Patient-directed interventions are among the most successful strategies to medication discontinuation. One of the challenges in making informed, shared decisions surrounding continuation of a medication as opposed to deprescribing is the deficiency of available information and syntheses on benefits and harms of treatment options [6]. Jansen et al. [8] noted that evidence-based tools and resources are necessary to facilitate discussions on continued medication use versus deprescribing.

However, there is a growing body of evidence that older people's attitudes towards medicine can be internally contradictory: they may feel positive about taking their medicines [9], but yet prefer to take fewer medicines [10]. In older adults, their willingness to either tolerate polypharmacy (defined as five or more prescribed drugs) or discontinue a medicine is thought to be influenced by a myriad of factors, including the communication skills [9, 10], perceived experience of the clinician [11], and the extent of confidence of the patient in the doctor [9]. Another factor that is thought to increase the acceptance of deprescribing is the previous experience of an untoward or adverse effect of medications [9].

The direct involvement of patients and their caregivers in the choice and administration of drugs has been recognized to be very important, and many patients complain about the lacking of such opportunity in the decision-making process [12]. As such, a successful deprescribing should thus not only depend on evidence-based practice and guidelines, but also consider the patients' willingness. Findings from a study in Australia showed that over 90% of participants are hypothetically enthusiastic to stop taking a medicine if it is recommended by their clinician [13]. Caregivers also play an important role in constructing preferences and decision making in patient management [14].

The deprescribing process is recommended to begin when the medication is first prescribed, with the patient being apprised of the expected duration of therapy and the necessity for continuing review of appropriateness [15]. Reviewing the medication history is the foremost step of the patient-centered deprescribing process and is fundamental for any medication-optimizing activity. This is followed by identification of potentially inappropriate medications. Thirdly, prescriber determines whether medication can be stopped and discuss different priorities so that mutually agreed goals can be developed. Once it has been decided that a medication discontinuation can be attempted, appropriate planning and initiation of medication withdrawal are executed, for instance, tapering dose prior to cessation. The last process is monitoring and providing support during and after medication withdrawal and documentation of outcome, including whether the medication

is stopped or the dose is reduced as well as the process that is undertaken [16].

To date, deprescribing studies have been conducted across a number of countries with varied health systems, including North America, Europe, and Australasia [17]. Malaysia currently has a dichotomous health care system, which comprises a government-led and funded public sector, where patients paying only nominal fees for access to both outpatients and hospitalisations and a private sector where fees for consultation and medicines are borne by patients [18]. There is currently sparse evidence on the role of shared-decision making in deprescribing, especially on how older patients will be to accept the changes from low-middle income countries such as Malaysia. Thus far, there is no established guideline on deprescribing in Malaysia. In a recent study by Reeve et al., the authors demonstrated that older adults who had little concerns about stopping their medications, those whose medications were appropriate, in possession of a concession card or older adults having English as a first language were more likely to have their medication deprescribed, if their doctors said this was possible. The study revealed different participant characteristics were associated with willingness to have a medication deprescribed between older adults and caregivers. The magnitude of their characteristics on willingness to deprescribe are not equalized, and hence, distinctive approaches to discussing deprescribing with older adults and caregivers are indispensable [19].

Aim of the study

To explore quantitatively the attitudes, beliefs, and experiences of older people regarding their drug management, identify the willingness of older patients in Malaysia to have their medications deprescribed and identify the patients' characteristics (age, gender, education level, number of medication taken and number of medical center managing the patient) which could affect attitudes towards deprescribing.

Ethics approval

The study was approved by the Medical Research and Ethics Committee Malaysia (NMRR-17-1591-36723) and the Monash University Human Research Ethics Committee (2017-11335-14404).

Statement of human rights All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Method

Study setting

A multicenter cross-sectional study was conducted at a government primary care health clinic (equivalent to a general practitioner surgery in the UK or family doctor's office in the US) and three community pharmacies in Malaysia. The clinic is located in a suburb of Puchong, whose patient population generally comprises individuals with non-communicable diseases and multiple morbidities. The community pharmacies are typical high street stores which are frequented by the residents around them.

Participants

Potential participants were recruited using convenience sampling, i.e., non-random (non-probability) sampling from older patients aged 60 years and over or caregivers who visited these sites. All patients and caregivers who wished to participate in the study provided verbal informed consent. Eligible older adults were those aged 60 years and over and took at least one or more long-term regular use medications dispensed with a supply of 25 or more days and no indication to use 'as needed'. Participants who were unable to comprehend or complete the written questionnaire in English, Mandarin, or Malay Language were excluded from the study. Caregivers were eligible if they provided care to an older adult aged 60 years and over.

Sample size

A previous study by Tegegn and co-workers found that there was a 10% difference in the patients' satisfaction towards their medication using the Patients' Attitudes Towards Deprescribing (rPATD) questionnaire [20]. As such, we aimed to recruit a minimum of 190 participants in this study to achieve an alpha of 0.05 at 99% confidence interval.

Survey instrument

Participants were requested to complete the rPATD questionnaire which was developed by Reeve and colleagues [21]. The questionnaire had 22 items for older adults and 19 items for caregivers and had been validated to measure patients' attitudes and experiences pertaining to medication discontinuation.

The questionnaire has four domains: perceived burden of medication taking, belief in appropriateness of medication

use, concerns about stopping the medication, and level of involvement/knowledge of medications. A sum score could be generated, with a higher total score indicating greater perceived burden and concerns about stopping the medication. In the current study, the questionnaire was first translated into Malay Language and Mandarin by two independent bilingual translators. The version was then back translated into by another bilingual panel to English to ensure conceptual equivalence of translation. The version was then assessed to ensure if it was easily understood by ten older adults. Internal consistency of all factors was acceptable with Cronbach's alpha > 0.6.

Questionnaire administration

Data collection was conducted from July 1, 2017 to June 30, 2018. Eligible participants were approached when they visited the pharmacy unit of primary care health clinic or community pharmacies to obtain medications. After obtaining verbal informed consent, participants were asked to complete the questionnaire.

Statistical analyses

All data were coded and analyzed using IBM SPSS Statistics for Windows, Version 24.0 (Armonk, NY: IBM Corp. Released 2016). Descriptive results were reported for participants' characteristics and questionnaire responses. Comparison was made between scores of the major factors, namely burden factor (five items), appropriateness factor (five items), concerns about stopping factor (five items) and involvement factor (five items) for caregivers and older adults distinctly. Analysis of correlation between participant characteristics (aged 75 and over versus 60–74 years, gender, education level, number of medication taken and number of medical center managing the patient) and their responses was determined using Spearman's correlation. Statistical analyses of correlations between responses were performed on the five-point results. Due to the small sample sizes of caregivers who completed the questionnaire, only descriptive statistics were presented. A probability of < 0.05 was considered statistically significant for all tests.

Results

Participant characteristics

650 participants were approached and the response rate was 85.2%. A total of 336 older adults (median = 67 years; range = 60–93) from health clinic and 166 older adults (median = 66 years; range = 60–91) from community pharmacies participated in the study. These participants were mostly seen and managed by a single physician, had a median of two medical co-morbidities (range = 1–6) and managed using a median of three medications (range = 1–15), or approximately 1.5 medication per condition. Most of the participants usually self-managed their medications and lived with their family members or friends, with nearly one quarter of community-dwelling older adults reported to have received some assistance from family or friends (Table 1).

Another 52 responses were obtained from caregivers (32 from health clinic and 20 from community pharmacies). The care recipients had a median age of 72 years (range = 60–94), with a median of two medical conditions (range = 1–4), and were on a median of four medications (range = 1–10). The carers reported that the older adults they cared for lived with them, and were either their spouse or siblings, who usually managed their medications independently (Table 2).

Attitudes towards deprescribing

Older adults' perception

Most of the participants surveyed reported that they were satisfied with their current medications (n = 442, 88.1%). 33.7% (n = 169) of participants felt that they were taking a large number of medicines, and 26.9% (n = 135) felt taking daily medicines was very inconvenient and 33.1% (n = 166) felt medicines were a burden. 67.7% (n = 340) of the patients would like to try stopping or reducing the dose of their medicines, especially when their doctor recommended (Supplementary Table 1).

When stratified by study location, 66.3% (n = 110) of participants from community pharmacies felt that they spent a lot of money on medicines and 52.4% (n = 87) felt that the medicines were a burden, with half of them (n = 83, 50.0%) indicated they would like to try stopping or reducing the dose of their medicines. Analysis of the total score of each domain revealed greater perceived burden (17.7 ± 3.0 vs. 14.3 ± 6.8), concerns about stopping (17.0 ± 2.4 vs. 16.3 ± 5.8), and involvement among participants (12.9 ± 2.1 vs. 10.2 ± 4.1) from health clinic compared to community pharmacies.

Caregivers' perception

Similar to the older adults' responses, caregivers expressed a high level of satisfaction towards their care recipient's current medications (n = 43, 82.7%) (Supplementary Table 2). However, participants (n = 26, 50.0%) felt that they would

Table 1 Demographics characteristics of the older adults who participated in the current study, stratified by study site (Older adult's version). All data are presented as percentages unless otherwise specified

	Health clinic (n = 336)	Community pharmacies (n = 166)
Age (years)		
Median	67.0	66.0
Range	60–93	60–91
Gender, n (%)		
Male	167 (49.7)	84 (50.6)
Female	169 (50.3)	82 (49.4)
Ethnicity, n (%)		
Malay	92 (27.4)	36 (21.7)
Chinese	167 (49.7)	105 (63.2)
Indian	77 (22.9)	25 (15.1)
Education level, n (%)		
Primary	164 (48.8)	85 (51.3)
Secondary	140 (41.6)	53 (32.0)
Diploma	19 (5.7)	17 (10.3)
Degree or higher	13 (3.9)	11 (6.4)
Medical condition, n (%)		
Chronic pain	6 (1.8)	42 (25.3)
Hypertension	284 (84.5)	98 (59.0)
Diabetes mellitus	171 (50.9)	39 (23.5)
Reflux disease	10 (3.0)	3 (1.8)
Hyperlipidemia	208 (61.9)	44 (26.5)
Kidney disease	7 (2.1)	3 (1.8)
Arthritis	4 (1.2)	26 (15.7)
Eye issues (e.g. glaucoma)	2 (0.6)	9 (5.4)
Asthma	14 (4.2)	8 (4.8)
Stroke	3 (0.9)	4 (2.4)
Osteoporosis	8 (2.4)	16 (9.6)
Memory issues	5 (1.5)	9 (5.4)
Others	70 (20.8)	25 (15.1)
Number of medications and supplements taken daily		
Median	3.0	3.0
Range	1–15	1–10
Number of medical center being visited		
Median	1.0	1.0
Range	1–6	1–4
Medication management, n (%)		
Self-manage	305 (90.8)	123 (74.1)
Caregiver	1 (0.3)	3 (1.8)
Assistance from family or friends	30 (8.9)	40 (24.1)
Living status, n (%)		
At home alone	34 (10.1)	30 (18.1)
At home with family or friends	302 (89.9)	131 (78.9)
Nursing home or old folks home	0 (0.0)	1 (0.6)

like to be more involved in their care recipients' medication management. They also thought their care recipients were taking a large amount of drugs (n = 25, 48.1%) and expressed they were willing to stop taking or reduce the number of drugs taken by their care recipient's upon doctor's recommendation (n = 34, 65.4%). Comparison of responses from health clinic setting showed a higher mean score in all factors in comparison to community pharmacies (Supplementary Table 3). The individual scores for respondents by study location are presented in Supplementary 4 to 7.

Table 2 Demographics and characteristics of the older adults (caregivers of study participants) in health clinic and community pharmacy (Caregiver's version). All data are presented as percentages unless otherwise specified

	Health clinic (n = 32)	Community pharmacy (n = 20)
Age of care recipient (years)		
Median	74	68
Range	60–94	63–89
Gender, n (%)		
Male	9 (28.1)	10 (50.0)
Female	23 (71.9)	10 (50.0)
Ethnicity, n (%)		
Malay	7 (21.9)	1 (5.0)
Chinese	20 (62.5)	18 (90.0)
Indian	5 (15.6)	1 (5.0)
Relationship with care recipient, n (%)		
Spouse	3 (9.4)	5 (25.0)
Parents/Siblings	14 (43.8)	9 (45.0)
Other relatives	0 (0.0)	3 (15.0)
Non-relative	1 (3.1)	2 (10.0)
Medical condition, n (%)		
Chronic pain	0 (0.0)	2 (10.0)
Hypertension	29 (90.6)	15 (75.0)
Diabetes mellitus	21 (65.6)	6 (30.0)
Reflux disease	0 (0.0)	2 (10.0)
Hyperlipidemia	21 (65.6)	14 (70.0)
Kidney disease	0 (0.0)	0 (0.0)
Arthritis	1 (3.1)	0 (0.0)
Eye issues (e.g. glaucoma)	0 (0.0)	1 (5.0)
Asthma	1 (3.1)	0 (0.0)
Stroke	0 (0.0)	2 (10.0)
Osteoporosis	0 (0.0)	3 (15.0)
Memory issues	1 (3.1)	2 (10.0)
Others	5 (15.6)	4 (20.0)
Number of daily medications and supplements		
Median	4.0	4.5
Range	2–10	4–9
Number of medical center being visited		
Median	1.0	2.0
Range	1–4	1–3
Medication management, n (%)		
Self-manage	2 (6.3)	13 (65.0)
Caregiver	1 (3.1)	4 (20.0)
Assistance from family or friends	29 (90.6)	3 (15.0)
Living status, n (%)		
At home alone	3 (9.4)	2 (10.0)
At home with family or friends	0 (0.0)	17 (85.0)
Nursing home or old folks home	29 (90.6)	1 (5.0)

Influence of characteristics on willingness to deprescribe

We also examined the influence of participants' characteristics on their willingness to deprescribe (based upon Spearman's correlation with domain scores, Table 3). Analyses revealed that participants who are older (aged 75 and over) felt that they needed to be more

Table 3 Correlation of responses within the revised patients' attitude towards deprescribing domain scores with participants' demographics

Question	Burden score	Appropriateness score	Concerns about stopping score	Involvement score	Global score
Age	0.022; $p=0.6269$	0.054; $p=0.227$	−0.087; $p=0.051$	0.267; $p<0.001$	0.131; $p=0.003$
Gender	−0.031; $p=0.494$	−0.018; $p=0.685$	0.022; $p=0.615$	0.007; $p=0.869$	0.033; $p=0.466$
Educational level	0.070; $p=0.120$	0.045; $p=0.319$	0.118; $p=0.009$	−0.211; $p<0.001$	−0.158; $p<0.001$
Number of medication taken	−0.344; $p<0.001$	−0.219; $p<0.001$	−0.191; $p<0.001$	0.052; $p=0.241$	−0.035; $p=0.430$
Number of medical center managing the patient	−0.181; $p<0.001$	−0.130; $p=0.004$	−0.151; $p=0.001$	0.057; $p=0.207$	0.079; $p=0.081$

Greater concerns about stopping were associated with greater concerns about medicine in general

*p value based upon Spearman's correlation test

involved in the decision making of their medication ($p<0.001$) and were more willing to have their medications deprescribed ($p=0.003$). Among participants who had 1 doctor who managed their condition, they had lower scores of perceived burden and medication appropriateness. Other factors such as gender, number of regular medications or supplements, and number of medical center visited did not influence the willingness to stop a medication (Table 3).

Discussion

In the current study, nearly nine in every ten older adults expressed satisfaction with their medications. Interestingly, these participants (n = 374, 67.5%) were willing to deprescribe their medications if the doctor recommended so. This was likewise noted in the survey among carers, irrespective of health care settings. Findings of our study concur with existing research in Italy and Australia. In the study conducted at an Italian teaching hospital, 89% of in-patients from the geriatric and internal medicine wards expressed their willingness to have their medications deprescribed [22]. A similar, albeit lower rate was reported among older participants from an Australian tertiary referral teaching hospital [13]. These findings are noteworthy, considering that previous studies have shown that doctors generally do not initiate or consider to deprescribe the medications of older adults due to the perception that older adults are usually happy and satisfied with the medications they are taking as well as the fear that the patient may feel discouraged [17, 23]. However, results from this study as well as those in Australia and Italy suggest otherwise. As such, one of the ways forward to improve this would include decision aids to support doctors on the drugs which should be deprescribed. In addition, training on shared decision making can be given to help doctors in eliciting the older adults' preference as well as developing a treatment plan when dealing with several guidelines for one patient.

The study also showed most participants from community pharmacies believed they spent a lot of money on their medications compared to those attending the government health clinic (66.3 vs 28.0%). This could be due to the structure of the Malaysian health care delivery system, whereby only a nominal fee is imposed for each outpatient visit [24]. As such, the responses obtained may not truly reflect the actual situation since older adults who patronized community pharmacies would be required to pay for medication-related expenses. A previous study highlighted that medication costs might positively affect patients' attitudes to deprescribing in a resource-limited setting [20]. This was similarly reported in another study which showed that individuals who had to pay more for their medications were more likely to expressed willingness to have their medication deprescribed [25]. Our study findings, nonetheless, showed older adults in both settings were equally receptive towards deprescribing if their doctors said it was possible (71.0% in health clinic versus 60.2% in community pharmacies). As such, it is crucial for doctors to evaluate the cost implications in therapeutic decision making and drug selection for older patients since these patients were likely to receive prolonged medical care and thus lead to polypharmacy [26].

Further analyses revealed several measured factors that influenced attitudes towards medications and potential deprescribing. Factors which were found to influence older adults' willingness to deprescribe were the participant's age and education level. This is interesting given that thus far, none of the existing studies has reported such observation. There are several possible explanations that we believe may contribute to these findings. Firstly, most studies reported

that the number of medications increases as a person begin to age, mainly driven by higher use of cardioprotective agents (statins, anti-hypertensives, and oral hypoglycemic agents) [27] which would increase the willingness to deprescribe. Secondly, studies have shown that health literacy is an important factor in ensuring drug adherence among older adults [28, 29]. As such, it is not surprising that of older adults with lower educational level may be more willing to have their drugs deprescribe, as they may believe that the medications may not be functioning for them. This could also perhaps reflect the dilemma that most older people encounter, which is inadequacy of comprehension of the necessity to administer medications to maintain quality of life and control their health and the general dislike of taking medications [30]. The current study also highlights the possibility of using the rPATD questionnaire as guide to initiate a conversation with patients and their caregivers on the possibility of deprescribing [21]. Taking this into consideration, we suggest that doctors and physicians could target these specific groups of geriatric patients (those who are aged 75 years and above, as well as those with primary education levels and below) which were identified in this study for deprescribing as they have the highest risk of experiencing any adverse drug events and thus would benefit the most from cessation of potentially inappropriate medications [31].

Apart from the participants' characteristics noted in this study, the willingness to deprescribe is likely to differ depending on the medication class. All medical conditions and medications that participants in this study were taking were for chronic conditions and for long term. Therefore, the results of this study represented the attitudes, opinions, and beliefs of older individuals who use more medications for chronic conditions. Disparity in willingness of patients to deprescribe could be affected by medication classes and their predisposition to withdrawal effects [13]. For instance, a lower acceptance of deprescribing would be anticipated among patients who were taking drugs involving opioids and benzodiazepines [32] compared to anti-hypertensive medications [33]. As such, the questionnaire could be deployed in other settings to confirm the generalizability and differences in beliefs in specified groups of populations.

More than half of the participants reported that they would always ask the doctor, pharmacist, or other health care professional if there was uncertainty about their medicines. Hence, there appears to be roles and responsibilities for health professionals other than doctors in deprescribing. Contribution of these professions in prescribing has been recognized over the past few decades in many developed nations such as Australia, Ireland, New Zealand, United Kingdom, and United States [34], and involvement of non-physician health professionals may enable the implementation of deprescribing into clinical practice [35]. For example, pharmacists are now at the forefront of medication safety and their contribution through medication reviews to reduce potentially inappropriate medications have been well recognised [36]. As such, one of the future roles of pharmacists could include leading a healthcare team to deprescribe medications with the ultimate aim of improving medication safety in older adults. It is heartening to note that there are several clinical trials which are currently underway examining deprescribing in nursing homes for older adults which are led by pharmacists [37, 38]. If successful, it will herald a tremendous advancement in unravelling issues related to pharmacotherapy, especially among older adults. Indeed, the high level of willingness of older adults (67.7%) and carers (64.8%) to decrease the number of medications taken reported in this study supports further research into deprescribing, particularly to address the concern of potentially inappropriate medication [5].

The use of fixed dose combination (FDC) drug therapies may be a practical way of reducing the number of medications administered by older patients compared with the use of corresponding free-drug regimens [30]. In multiple comorbidities receiving complex treatment regimens, FDC enhances therapeutic efficacy and safety, improves compliance and adherence, reduces cost, and improves quality of life of patients than single drug therapies [39, 40]. Use of FDC is advocated by the British Hypertension Society as a rational way to reduce the number of medications in hypertensive patients [41]. In older adult population with moderately limited education status, the role of the doctor is very important to promote deprescribing. Unfortunately, the scarcity of evidence on the safety and efficacy of deprescribing is a major barrier to the practice of deprescribing [42]. Hence, it is important for health care professionals to continuously engage with their patients on how to optimize and simplify their patients' dosage regimens. Indeed, this should ideally also involve the pharmacists, whom are drug experts and have been shown to be instrumental in identifying and resolving drug related problems among the older adults, especially those living in nursing homes.

This study has several strengths. To our best knowledge this is the first study in an Asian lower middle income country assessing older adults' and caregivers' perception and willingness towards deprescribing using a validated multidimensional questionnaire in a relatively large number of participants with cultural and linguistically diverse backgrounds and mostly with lower educational attainment. Nevertheless, the results should be interpreted with caution due to the limitations. The questionnaire was structured for quantitative research, which does not permit thorough investigation of patients' and caregivers' attitudes. There was potential bias in sample selection as the study was only conducted in four sites in Klang Valley, Peninsula Malaysia which is an urban area and thus may not reflect the general responses of the overall Malaysian population [43]. We hoped that our

broad inclusion criteria would have helped in increasing the number of samples collected, however, our study only recruited a small number of responses from the carers. This could be due to the timing of the study, which was conducted during working days, where most of the carers of the older adults might be working and thus reduced response rates were received. While participants in this study were prescribed with a median of 3 medications, we have very little additional information on the appropriateness of such medications given. This is due to the structure of the healthcare system in Malaysia, where there is no centrally managed healthcare database. Nevertheless, the findings show that patients were willing to have one of their medications deprescribed. The data builds on existing work to create a patient-centered approach and it is hoped that it will assist health care practitioners in patient-centered oligopharmacy and polypharmacy management towards overall medicines optimization for patient benefits [2, 3, 44].

The findings of our study present several areas that future deprescribing studies can address. Regardless of the study design or patient population, sharing of data and research collaboration among the international deprescribing community are crucial. This is achievable via a clinical trials network for deprescribing or special interest groups for deprescribing in specific disease states. Such concerted initiatives will prevent the duplication of work, promote collaborations, and augment capability to conduct deprescribing studies. In different settings of health care facilities, similar study can be conducted to explore the correlations between different groups of participant characteristics or attitudes and their willingness to have a medication deprescribed among the older adults and caregivers. The research is designed to target personalized medicine and the data garnered may address clinical issues that arise from deprescribing process and tailor deprescribing conversations towards the most important barriers and enablers for each individual patient. It is recommended to investigate whether dyadic patient-caregiver enrolment would yield dissimilar attitudes towards deprescribing. In tandem with the need for training and educational materials for older adults and caregivers in medication decision making, it is fabulous to develop educational tools or decision aids for health care providers to intensify their ability in negotiating medicine decision making when multiple parties are involved. Further studies are required to boost knowledge about the advantages and harms of deprescribing medication classes (concentrating on clinical outcomes), generate guidance on how to manage withdrawal effects with the highest quality evidence based medicine, comprehend patient experience, encourage shared decisions, and facilitate development, implementation, and evaluation of interventions that are feasible, sustainable, and cost-effective. The overall aim of such studies is to optimize deprescribing in practice, and as such improve patient care by diminishing medication-elicited impairment.

Conclusion

Most of the older patients were satisfied with their current treatment regimens medications. However, the majority was willing to reduce one or more of their medications if their doctors said it was possible. As such, the rPATD questionnaire can be used as a conversational toolkit for deprescribing. This should ideally involve both physicians and other health care providers such as pharmacists and nurses who can help clarify on the importance of pharmacotherapy optimization. Further study with sufficiently large number of study participants and a qualitative study are warranted to completely elucidate the attitudes towards deprescribing among patients with different disease morbidities so that the findings can have significant impact on older adults' health in Asia Pacific region.

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Conflicts of interest Kok Pim Kua, Pui San Saw, and Shaun Wen Huey Lee declare that they have no conflict of interest.

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