# Deprescribing and reduction of inappropriate polypharmacy in resource limited settings: Older patients' perception in an Ethiopia University Hospital.

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**Deprescribing and reduction of inappropriate polypharmacy in resource limited settings:**

**Older patients' perception in an Ethiopia University Hospital**

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**Abstract**

**Objectives:** We assessed whether socio-demographic and clinical data were associated with older patients' attitude towards deprescribing of inappropriate medications.

**Design** This was Institutional-based quantitative cross-sectional survey.

**Setting** Data collection was conducted the outpatient clinics of University of Gondar referral and teaching hospital (UoGRTH) in Ethiopia.

**Participants** Older patients aged 65 or greater with at least one medication were enrolled in the study from March 1 to June 30, 2017. Exclusion criteria were patients who had severe physical or psychological problems and those who refused to participate. Of 351 eligible participants, 316 elderly patients completed the survey data.

**Main outcome measures:** Older patients' attitude towards deprescribing was measured using the validated tool of revised Patients' Attitudes towards Deprescribing (rPATD) for older patients. Predictive variables were Sociodemographic and clinical data such as comorbidity and polypharmacy. Older patients' attitude towards deprescribing was an interest of outcome.

**Results** Of 316 older patients enrolled in this study, most of them (65.2%) have overall poor attitude towards deprescribing. There was a significant difference among polypharmacy and non-polypharmacy in appropriateness factors overall score (10.94 ± 1.98 Vs. 10.16 ± 2.09, P= 0.009). Moreover, patients with polypharmacy had more burden factor score than non − polypharmacy patients (12.71 ± 2.58 Vs. 10.95 ± 3.23 respectively, P= < 0.0001). Patients who are unable to read and write are more likely to have poor attitude towards deprescribing (AOR [0.219(0.077-0.622), P-value= 0.004]. A one unit increase in patient's number of medications will result in 1.2 increases to good attitude to deprescribing; AOR [1.211(1.026-1.430), P-value= 0.023].

**Conclusion:** About 65.2% older patients have overall poor attitude toward discontinuing medications (deprescribing). Polypharmacy and educational status were identified as the common risk factors to patients' willingness to deprescribing. Health care providers should be proactive to discuss, evaluate and decision making of potentially in appropriate medications.

Key words: Attitude; medication discontinuation; Deprescribing; Polypharmacy; Elderly; rPATD

**Strengths and limitations of this study**

- Older patients' attitude towards deprescribing  and their willingness to stop medicines has been assessed for the first time in resource limited setting like  Ethiopia

- This study utilized a validated multidimensional questionnaire in relatively large number of patients.

- The type of disease they have, the medicine category, type and duration of the medication might affect   patients' willingness and perception towards deprescribing.

- Owing to the interviewer based questionnaire structured for quantitative research, it does not permit in-depth investigation of patient attitude.

-  Care givers for older patients have not been included as they may affect on the preference and willingness to stop medicines.

**Introduction**

Polypharmacy often defined as the use of five or more medications, has been linked with pervasive adverse drug events and ultimately leads to increased morbidity, mortality and healthcare costs [1-3]. Polypharmacy-related adverse drug events (ADEs) are very common and estimated to occur in 25% of ambulatory care patients [3].

De-prescribing, one of the approaches to prevent polypharmacy-related ADEs, is a process of detecting and stopping medications when the actual or potential harms exceeds the actual or potential benefits taking into consideration a variety of factors including the individual patient's therapeutic care plans, level of functioning and needs [4]. Deprescribing has a number of benefits to the patient including reducing costs associated with medicines and their ADEs, improving

adherence and overall quality of life [5]. This is especially true in resource limited countries such as Ethiopia, where the main source of drug expenditure is patients' out of pocket money and a significant percentage of the population purchase medicines from private drug retail outlets [6].

While concepts such as adherence and medication reconciliation receive considerable attention, and covered by a wide range of literatures worldwide, little attention has been given to the concept of de-prescribing and reduction of inappropriate polypharmacy [7]. Despite the prescribers' positive attitude on de-prescribing [8], many factors including clinical uncertainty and shared responsibility with other healthcare providers severely impede clinicians' ability to proactivity discontinue medications [9]. Moreover, patient perspectives on deprescribing and their communication with clinicians are equally important in evidence based medication discontinuation process.

Several studies conducted in developed countries regarding older people's attitudes toward deprescribing reported a higher rate of willingness to discontinue their medications ranging from 40.5% to 90% [10-12]. However, no previous study has explored the attitudes of Ethiopian older patients regarding their medications and deprescribing. It is also uncertain how patients would respond to a suggestion from a clinician to intentionally discontinue a medication. Taking the global evidence into consideration and due to lack of data in Ethiopia, we sought to identify Ethiopian older patients' willingness to have their medications deprescribed.

**Methods**
**Study design and setting**
Institutional-based quantitative cross-sectional survey was conducted from March 1 to June 30, 2017 at University of Gondar referral and teaching hospital (UoGRTH), Ethiopia. The hospital is located in Gondar town, northwest Ethiopia, 738km away from Addis Ababa and it's the only

referral and teaching center in the area to which majority of patients with chronic diseases including hypertension, diabetes mellitus, cancer and asthma are referred.

**Participants**

All elderly ($\geq$ 65 years) patients who has been taking at least one medication regardless of their diagnosis and who visited the outpatient clinic of University of Gondar referral and teaching hospital (UoGRTH) for follow-up and medication refill were our study population. Patients who had severe physical or psychological problems which leads to inability to complete the interview and those who refused to participate were excluded from the survey. Of 351 eligible participants obtained during the study period, 316 elderly patients completed the survey data.

**Survey instrument**

Data was collected by three of the principal investigators through interviewer-administered questionnaire. The investigators were properly trained on the instrument and ways of approaching the patients and securing their permission for interview prior to the data collection process. We used Revised Patients' Attitudes towards Deprescribing (rPATD) questionnaire [13]. It is a validated multidimensional questionnaire which measure patients' attitudes, knowledge and experiences related to medication discontinuation. A 4-point Likert response scale was used (strongly agree, agree, disagree and strongly disagree) in rPATD questionnaire. The rPATD questionnaire has four major factors including Burden factor (4 items); Appropriateness factor (5 items); Concerns about stopping factor (4 items); Involvement factor (4items) and additional two global questions are also considered. The previously validated tool - Belief in Medicine use Questionnaire (BMQ)-Overuse [14] was utilized for comparison and validation of the rPATD questionnaire. The questionnaire, first prepared in English, was translated to Amharic language and back to English so as to ensure that the translated version

gives the proper meaning. It was further pre-tested on 25 elderly patients, who were not included in the final analysis, and slight modifications were instituted before the commencement of the actual survey. Polypharmacy was defined as the use of ≤5 regular medications.

**Statistical analysis**

All the statistical analyses were done using Statistical Package for Social Sciences (SPSS) software version 21.0 for Windows (SPSS Inc., Chicago, IL). Frequencies and percentages were used to express different variables. Data were screened for normality and homogeneity using the Shapiro–Wilk and Levene tests respectively. Respondents were stratified by polypharmacy status to examine attitudes toward deprescribing in patients with polypharmacy.Binary logistic regression was performed to assess the association between attitude towards deprescribing and predictor variables. The level of statistical significance was defined as p<0.05 and all tests were two-tailed.

**Operational definitions:**

Deprescribing: is a process of optimization of medication regimens through termination of potentially in appropriate medications. It is the planned and supervised process of dose reduction or stopping of medication that might be causing harm or might not be longer providing benefit.

Poly pharmacy: Polypharmacy is defined as the practice of prescribing five or more medications to the same person.

Poor attitude: The rPATD questionnaire having 19 items may score ranging from the lowest point of 19 up to the highest 76 and those scored below 50% of the total score taken as a cut of point for poor attitude.

Good attitude: The rPATD score range from the lowest point of 19 up to the highest 76 and the rPATD score above 50% of the total score taken as a cut of point for good attitude.

**Ethical Consideration**

This study was approved by the Ethical committee of School of Pharmacy, University of Gondar with an approval number of UoG-SoP-131/2017. Written informed consent from the respondents was also obtained before conducting this study. Participants' information obtained was kept confidential.

**Results**

Out of 351 patients approached, 316 of them completed the questionnaire, giving a response rate of 90 %. Most of the participants were men (173 individuals, 54.92 %) and the mean age was 71.36 ± 6.09 years. The mean number of their daily medications was 3.43 ± 1.50. From the total number of participants, 62 (19.7%) were on polypharmacy. The most common comorbidities in polypharmacy groups were hypertension, diabetes mellitus and asthma. While in non – polypharmacy study participants, hypertension, heart failure and chronic kidney disease were more prominent. Details of socio characteristics of the study participants is tabulated in Table 1.

**Table 1:** Sociodemographic and clinical characteristics of study participants, UoGRTH, Ethiopia (n = 316).

| Variable | Polypharmacy n (%) | |
| --- | --- | --- |
| | Yes (n=62) | No (n=253) |
| **Gender** | | |
| Male | 35 (56.45 %) | 138 (54.55 %) |
| Female | 27 (43.55%) | 115 (45.45%) |
| **Age (Mean ± SD)** | 69.87 ± 10.11 | 71.50 ± 6.31 |
| **Educational status** | | |
| Unable to read and to write | 37 (59.68 %) | 165 (65.22 %) |
| Primary school | 13 (20.97 %) | 49 (19.37 %) |
| Secondary School | 5 (8.06 %) | 26 (10.28 %) |
| Higher education | 7 (11.29 %) | 13 (5.14 %) |

| Comorbidity | | |
|---|---|---|
| Hypertension | 27 (43.55 %) | 67 (26.48 %) |
| Heart failure | 6 (9.68 %) | 22 (8.70 %) |
| Diabetes Mellitus | 8 (12.90 %) | 13 (5.14 %) |
| Chronic kidney disease | 3 (4.84 %) | 20 (7.91 %) |
| Asthma | 5 (8.06 %) | 10 (3.95 %) |
| Rheumatoid Heart Disease | 2 (3.23 %) | 14 (5.53 %) |
| Others | 11 (17.74 %) | 107 (42.29 %) |
| **Charlson Comorbidity index (Mean ± SD)** | 2.44 ± 0.90 | 1.85 ± 0.87 |
| **Number of Medication (Mean ± SD)** | 5.85 ± 1.32 | 2.85 ± 0.76 |

Of 316 older patients, majority of the participants (65.2%) have overall poor attitude towards deprescribing. Figure 1 describes the percentage for Patient perception of deprescribing sub scores. Most of the patients had concerns about stopping factors as it is evidenced by 67.7% polypharmacy and 68.6% non – polypharmacy groups. The least concern was on the general questions on deprescribing (24.35 % of polypharmacy and 24.50 % of non – polypharmacy groups).
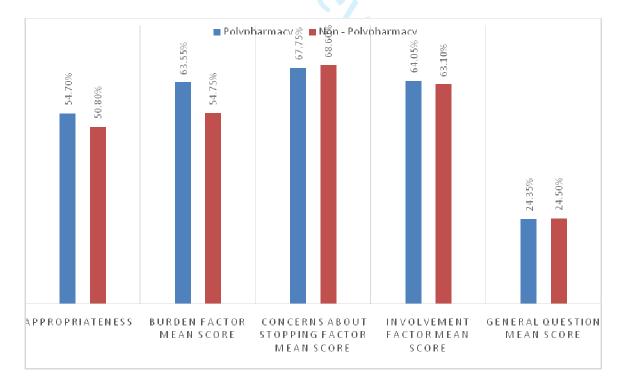


**Figure 1:** Percentage of the mean scores for rPATD sub scores

There was a significant difference among polypharmacy and non-polypharmacy in appropriateness factors overall score (10.94 ± 1.98 Vs. 10.16 ± 2.09, P= 0.009). There was also a significant difference among the two groups to the question "I would like my doctor to reduce the dose of one or more of my medicines" (mean score of 2.48 ± 1.13 for polypharmacy groups and 2.01 ± 1.02 for non – polypharmacy groups, P value= 0.001). Moreover, patients with polypharmacy had more burden than non – polypharmacy patients (12.71 ± 2.58 Vs. 10.95 ± 3.23 respectively, P= < 0.0001). (Table 2)

**Table 2:** Distribution of rPATD sub scores among study participants, UoGRTH, Ethiopia (n = 316).

| Variable | Poly Pharmacy | | P- Value |
| --- | --- | --- | --- |
| | Yes (n=62) | No (n=253) | |
| **Appropriateness Factor overall score** | 10.94 ± 1.98 | 10.16 ± 2.09 | **0.009*** |
| I feel that I may be taking one or more medicines that I no longer need | 2.00 ± 0.87 | 1.90 ± 0.97 | 0.417 |
| I would like to try stopping one of my medicines to see how I feel without it | 1.31 ± 0.69 | 1.31 ± 0.73 | 0.955 |
| I would like my doctor to reduce the dose of one or more of my medicines | 2.48 ± 1.13 | 2.01 ± 1.02 | **0.001*** |
| I think one or more of my medicines may not be working | 2.90 ± 0.43 | 2.89 ± 0.40 | 0.811 |
| I believe one or more of my medicines may be currently giving me side effects | 2.24 ± 1.02 | 2.06 ± 0.91 | 0.191 |
| **Burden factor -overall score** | 12.71 ± 2.58 | 10.95 ± 3.23 | **<0.0001*** |
| I spent a lot of money to medicines | 2.94 ± 1.23 | 2.78 ± 1.24 | 0.372 |
| Taking my medicines every day is very inconvenient | 2.37 ± 0.96 | 2.10 ± 1.54 | 0.191 |
| I feel that I am taking a large number of medicines | 2.84 ± 0.94 | 2.18 ± 0.93 | **<0.0001*** |
| I feel that my medicines are a burden to me | 2.45 ± 0.86 | 1.96 ± 0.92 | **<0.0001*** |
| Sometimes I think I take too many medicines | 2.11 ± 0.96 | 1.92 ± 0.92 | 0.152 |
| **Concerns about stopping Factor score** | 13.55 ± 2.12 | 13.72 ± 2.37 | 0.612 |
| **Involvement Factor score** | 12.81 ± 3.25 | 12.62 ± 3.13 | 0.671 |

| General Questions score | | | 4.87 ± 1.14 | 4.90 ± 1.11 | 0.868 |

*statistically significant (p<0.05)

The descriptive analysis of patients' response to each questions of rPATD questionnaire has been

described in table 3.

**Table 3:** Percentage distribution of patients' response to the survey questions, UoGRTH,

Ethiopia (n = 316).

| Survey questions | Strongly disagree | Disagree | Agree | Strongly agree |
|---|---|---|---|---|
| **Burden Factor** | | | | |
| I Spent a lot of money to medicines | 87(27) | 15(4.7) | 84(26.6) | 130(41.1) |
| Taking my medicines every day is very inconvenient | 104(32.9) | 92(29.1) | 107(33.9) | 13(4.1) |
| I feel that I am taking a large number of medicine | 88(27.8) | 68(21.5) | 135(42.7) | 25(7.9) |
| I feel that my medicines are a burden to me | 114(36.1) | 80(25.4) | 110(34.8) | 12(3.8) |
| Sometimes I think I take too many medicines | 134(42.4) | 69(21.8) | 105(33.2) | 8(2.5) |
| **Appropriateness Factor** | | | | |
| I feel that I may be taking one or medicines that I no longer need | 95(30.1) | 12(3.8) | 144(45.6) | 65(20.6) |
| I wants to stop and try one of my medicines to see how I feel without it | 257(81.3) | 29(9.2) | 21(6.6) | 9(2.8) |
| I would like my doctor to reduce the dose of one or more my medicines | 104(32.9) | 30(9.5) | 133(42.1) | 49(15.5) |
| I think one or more of my medicines may not be working | 7(2.2) | 24(7.6) | 281(88.9) | 4(1.3) |
| I believe one or more of my medicines may be currently giving me side effects | 121(38.3) | 11(3.5) | 114(36.1) | 70(22.2) |
| **Concerns about stopping factor** | | | | |
| I not agree to stop the medicine which I took for a long period of time | 109(34.5) | 119(37.7) | 65(20.6) | 23(7.3) |
| If I stop one of the medicines which I take I believe that I will not be healthy | 9(2.8) | 25(7.9) | 122(38.6) | 160(50.6) |
| If there is a change in the medicine, I feel not happy | 87(27.5) | 81(25.6) | 132(41.8) | 16(5.1) |
| If my doctor wants to stop my medicines I feel that I am hopeless | 146(46.2) | 82(25.9) | 63(19.9) | 25(7.9) |
| I have a bad experience of medicine discontinuation before | 186(58.9) | 47(14.9) | 45(14.2) | 38(12.0) |
| **Involvement Factor** | | | | |
| I have a good knowledge for each medicine that are prescribed for me | 59(18.7) | 44(13.9) | 168(53.2) | 45(14.2) |

| | | | | |
|---|---|---|---|---|
| I have a good knowledge about my drug and I would document if there is any change on my drug | 114(36.1) | 126(39.9) | 65(20.6) | 11(3.5) |
| I am interested to know about the medicines | 71(22.5) | 54(17.1) | 162(51.3) | 29(9.2) |
| I participate with my doctor when decisions are made on my drug | 32(10.1) | 93(29.4) | 165(52.2) | 26(8.2) |
| I always ask my doctor /a pharmacist if there is any miss-understanding | 19(6.0) | 40(12.7) | 161(50.9) | 96(30.4) |
| **General Questions** | | | | |
| I agree to stop one of the medicines if my doctor ordered/asked me to stop | 22(7.0) | 36(11.4) | 74(23.4) | 184(58.2) |
| I am very happy about the medicines which I am taking | 9(2.8) | 16(5.1) | 120(38.0) | 171(54.1) |

Patients who are unable to read and write have 78.1% less to good attitude towards deprescribing

as compared with those patients who are attending higher education; AOR [0.219(0.077-0.622),

P-value= 0.004]. Increase by one medicine in patient's number of medications will result 1.2

increases to good attitude to deprescribing; AOR [1.211(1.026-1.430), P-value= 0.023].(Table 4)

Table 4: Binary logistic regression test for Attitude of elderly patients towards deprescribing at Gondar University Hospital, 2017 (N=316)

| Variable | Attitude to deprescribing | | Crude OR | p-value | Adjusted OR | p-value |
|---|---|---|---|---|---|---|
| | Poor | Good | | | | |
| **Sex** | | | | | | 0.938 |
| Male | 107 | 66 | 1.388(0.868-2.219) | 0.171 | 0.979(0.570-1.681) | |
| Female | 99 | 44 | 1 | | 1 | |
| **Age** | | | | 0.175 | | 0.173 |
| 65-69 | 86 | 56 | 1.682(0.797-3.549) | 0.172 | 1.660(0.752-3.667) | 0.210 |
| 70-74 | 65 | 25 | 0.994(0.442-2.234) | 0.988 | 1.001(0.425-2.357) | 0.997 |
| 75-79 | 24 | 17 | 1.830(0.736-4.551) | 0.194 | 2.101(0.802-5.503) | 0.131 |
| ≥80 | 31 | 12 | 1 | | 1 | |
| **Educational status** | | | | 0.000** | | 0.002** |
| Unable to read and write | 149 | 53 | 0.192(0.073-0.506) | 0.001** | 0.219(0.077-0.622) | 0.004* |
| Primary school | 34 | 28 | 0.443(0.156-1.262) | 0.128 | 0.506(0.168-1.523) | 0.225 |
| Secondary school | 16 | 16 | 0.538(0.170-1.702) | 0.292 | 0.596(0.177-2.010) | 0.404 |
| Higher education | 7 | 13 | 1 | | 1 | |
| **Comorbidty** | | | | 0.251 | | 0.619 |
| Hypertension | 57 | 37 | 1.235(0.705-2.163) | 0.461 | 0.960(0.520-1.772) | 0.895 |
| Heart failure | 18 | 10 | 0.519(0.195-1.381) | 0.189 | 0.512(0.184-1.421) | 0.199 |
| Diabetes mellitus | 17 | 4 | 1.729(0.678-4.410) | 0.251 | 1.468(0.551-3.915) | 0.443 |
| Chronic kidney disease | 17 | 6 | 0.671(0.246-1.834) | 0.437 | 0.614(0.216-1.747) | 0.360 |
| Asthma | 10 | 5 | 1.665(0.564-4.914) | 0.356 | 0.997(0.303-3.285) | 0.996 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Rheumatic heart disease | 9 | 7 | 0.439(0.118-1.629) | 0.218 | 0.481(0.123-1.886) | 0.293 |
| Others | 78 | 41 | 1 | | 1 | |
| **Number of medications** | | | 1.180(1.013-1.375) | **0.034*** | 1.211(1.026-1.430) | **0.023*** |

 *P-value < 0.05, ** p-value<0.01

 OR- Odds ratio

**Discussion**

Elderly patients are prone to multi-morbidity with high medication regimens complexity needing stopping of medications, a growing concept so called deprescribing [11]. Elderly patients receiving many medications with their underlined medical illness are vulnerable to re-hospitalization, drug induced complications and morbidity. Moreover, polypharmacy compromises patient adherence and lead to incur additional costs to manage unnecessary adverse outcomes [15-20]. Hence, mutual agreement between patients and clinical practitioners should be sought to optimize the elderly 'patients' medication regimen keeping with few numbers of medications [21]. To our knowledge, this is a first study to have been conducted on this study area in resource limited settings like Ethiopia.

The mean number of daily medications of elderly patients in this study was 3.43 ± 1.50. Findings from Kalogianis MJ et al. study conducted in Australia shows total number of medications per patient was 14.6 ± 5.3, which is a lot higher than our result [10]. The Australian study included all potential regular and complementary medicines which may explain the difference in average medications per patient.

Majority (81.6%) of the patients agreed to stop one of the medicines if their doctor ordered/asked them to stop. This is consistent with previous studies conducted by Mona et al [10] and Reeve et al [11] having 80% and 89% of patients' willingness rate to stop their medicines, respectively. This previews the importance of proactive engagement of health care professionals in

deprescribing process for elderly patients and should discuss with their patients on how to optimize and simplify the dosage regimens.

In our study, most of patients with polypharmacy had more concerns on appropriateness and burden of the medications they took as compared with their non polypharmacy counterparts. This shows patients on polypharmacy are more willing to have one of the medications deprescribed owing to patients complain on appropriateness, having a large number of medicines, feeling of medicines burden. In contrast, a study conducted in aged care facility highlighted that the desire to stop medications was not influenced by the number of medicines taken [10]. This disparity may be explained by number of medications being a pushing factor to deprescribing in our study. As stated by various studies [10, 11, 22, 23], the variation might also be attributable to the difference in study settings like aged care facility center and usual care in our study.

Two third of patients believe that they spent a lot of money to medicines; one of the single most indicator to patients medications burden. In this regard medications costs are contributing to the patients to have positive attitude to deprescribing as they are willing to reduce one of the medicines. Other study has reported that patients having to pay less for their medications would influence their willingness to have medications deprescribed and paying more encourage deprescribing [10]. It is always important to consider cost implications in therapeutic decision making and drug selection in elderly patients as those patients are prone to prolonged care, polypharmacy and less productivity to handle their therapeutic expenses [24].

Majority of the respondents feel that they took at least one of the medicines neither needed longer nor working anymore. Despite of this perception, elderly patients are solely dependent on the physician decision and look to hear the likelihood of stopping the medicine from the doctor side [11].

Overall attitude towards deprescribing is significantly related with only two of the predictor variables; educational status and the number of medications taken by the patients. Those who are not able to read and write had poor attitude towards deprescribing as compared with those who attended higher education. On the contrary, every increase in a number of medicines was associated with 21% increase to good attitude towards deprescribing. This is supported by one study; patient willingness to stop medication was correlated with a desire to take few medicines and the feeling of taking a large number of medications and being less comfortable with current medications [11].

Majority of the elderly patients have curiosity to know about their medicines, ask their healthcare provider and involve in the clinical decision making process. This is very important to patient–provider relationships, encircling on the sub-themes of trust, relying on expertise and shared decision making which are imperative to better patient outcomes. In spite of these, majority of elderly patients do not have good knowledge of their medicines and merely dependent on the health care providers to initiate decisions about their medications. Moreover, many patients who have a preference to take fewer medicines do not share their beliefs with providers and waiting for provider initiated medication discontinuation [25]. Thus health professionals should use a patient centered approach to outweigh the risks and benefits of every medicine against the particular goals of the elderly patient, with the aim of minimizing the total number of prescribed medicines [26].

### Strengths and Limitations

This is the first study in Ethiopia to assess elderly patients' perception towards deprescribing and their willingness to stop medicines by using validated multidimensional questionnaire in relatively large number of patients. Despite of this, it is interviewer based questionnaire

structured for quantitative research, which does not permit in-depth investigation of patient attitude. The type of disease they have, the medicine category, type and duration of the medication might affect patients' willingness and perception towards deprecribing.

**Conclusion**

About 65.2% older patients have overall poor attitude toward discontinuing medications (deprescribing). However, they are willing to stop their medications if the doctor said it is possible. Most of the patients who are in polypharmacy doubt the necessity of all the medicines and feel that a lot of burden in terms of medication expenses. Polypharmacy was the common driving factor to patients' willingness to deprescribing. Elderly patients are found to be exclusively dependent on the clinician's decision to deprescribing. Therefore, health care providers should be proactive to discuss, evaluate and decision making of potentially in appropriate medications. Further study with potentially large number of study participants and qualitative study is warranted to fully evaluate the deprescribing attitude in different disease categories and prospective significance to Ethiopian elderly patients' health.

**Competing interests** None declared.

**Patient consent** Obtained.

**Ethics approval**   Ethical committee of School of Pharmacy, University of Gondar

**Provenance and peer review** not commissioned; externally peer reviewed.

**Data sharing statement** No additional data are available

### References

1. Bushardt RL, Massey EB, Simpson TW, Ariail JC, Simpson KN. Polypharmacy: misleading, but manageable. *ClinInterv Aging.* 2008;3(2):383-389.

2. Nebeker JR, Barach P, Samore MH. Clarifying adverse drug events: a clinician's guide to terminology, documentation, and reporting. *Ann Intern Med.* 2004;140(10):795-801.

3. Gandhi TK, Weingart SN, Borus J, et al. Adverse drug events in ambulatory care. *N Engl J Med.* 2003;348(16):1556-1564.

4. Scott IA, Hilmer SN, Reeve E, et al. Reducing inappropriate polypharmacy: the process of deprescribing. *JAMA Intern Med.* 2015;175(5):827-834. doi:10.1001/jamainternmed.2015.0324.

5. Reeve E, Wiese MD. Benefits of deprescribing on patients' adherence to medications. Int J Clin Pharm 2014;36:26–9

6. Center for national health development in Ethiopia. http://cnhde.ei.columbia.edu/healthsystem

7. Iyer S, Naganathan V, McLachlan AJ, Le Couteur DG. Medication withdrawal trials in people aged 65 years and older: a systematic review. Drugs Aging 2008;25:1021–31

8. Linsky A, Simon SR, Marcello TB, Bokhour B. Clinical provider  perceptions of proactive medication discontinuation. *Am J Manag Care.* 2015;21(4):277-283

9. Phillips LS, Branch WT, Cook CB, et al. Clinical inertia. *Ann Intern Med.* 2001;135(9):825-834

10. Kalogianis MJ, Wimmer BC, Turner JP, et al. Are residents of aged care facilities willing to have their medications deprescribed? Research in Social and Administrative Pharmacy 12 (2016) 784–788. http://dx.doi.org/10.1016/j.sapharm.2015.12.004.

11. Reeve E, Wiese M, Hendrix I, et al. People's attitudes, beliefs and experiences regarding polypharmacy and willingness to deprescribe. J Am GeriatrSoc.2013;61:1508–1514

12. Qi K, Reeve E, Hilmer SN, Pearson S-A,Matthews S, Gnjidic D. Older peoples' attitudesregarding polypharmacy, statin use and willingnessto have statins deprescribed in Australia. Int J ClinPharmcol. 2015;37:949–957

13. Reeve E, Low LF, Shakib S, Hilmer SN. Development and validation of the revised Patients' Attitudes Towards Deprescribing (rPATD) Questionnaire: Versions for older adults and caregivers. Drugs & aging. 2016;33(12):913-28.

14. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. Psychol Health 1999;14:1–24.

15. World Health Organization. Adherence to long-term therapies: evidence for action [online] (2013) [cited 2017 on Sept 21].

http://www.who.int/chp/knowledge/publications/adherence_report/en/index.html.

16. Hajjar ER, Cafiero AC, Hanlon JT. Polypharmacy in elderly patients. Am J GeriatrPharmacother. 2007; 5(4):345–51.

17. Banning M. Medication management: older people and nursing. Nurs Older People. 2005; 17(7):20–3.

18. Frazier SC. Health outcomes and polypharmacy in elderly individuals. J GerontolNurs. 2005; 31(9):4–11.

19. Guthrie B, McCowan C, Davey P, Simpson CR, Dreischulte T, Barnett K. High risk prescribing in primary care patients particularly vulnerable to adverse drug events: cross sectional population database analysis in Scottish general practice. BMJ. 2011;21(342):d3514.

20. Giustini S, Thiry S. Medicinagenerale, multi morbilita` e politerapianeipazientianziani. RivSocItaliana di Med Gen. 2012;6:11–4.

21. Patterson SM, Hughes C, Kerse N, Cardwell CR, Bradley MC. Interventions to improve the appropriate use of polypharmacy for Older people. Cochrane Database Syst Rev 2012; 5: Art. No.:CD008165

22. Reeve E, Shakib S, Hendrix I, et al. Review of deprescribing processes and development of an evidence-based, patient-centred deprescribing process. Br J ClinPharmacol 2014;78: 738–747.

23. Alessandro Galazzi, Maura Lusignani, Maria Teresa Chiarelli, Pier MannuccioMannucci, Carlotta Franchi, Mauro Tettamanti, Emily Reeve, Alessandro Nobili. Attitudes towards polypharmacy and medication withdrawal among older inpatients in Italy. Int J Clin Pharm (2016) 38:454–461.

24. Garfinkel D, Zur-Gil S, Ben-Israel J. The war against polypharmacy: a new cost-effective geriatric-palliative approach for improving drug therapy in disabled elderly people. Isr Med Assoc J 2007;9:430–434

25. Linsky A, Simon SR, Bokhour B. Patient perceptions of proactive medication discontinuation. Patient Education and Counseling.2015; 98: 220–225.

26. Page AT, Christopher D. Beer E, Rhonda MR, Sally B, Eames M, Potter K. Deprescribing in frail older people – Do doctors and pharmacists agree? Research in Social and Administrative Pharmacy 12 (2016) 438–449

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**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies***

| Section/Topic | Item # | Recommendation | Reported on page # |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | yes |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | yes |
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | yes |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | yes |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | yes |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | yes |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants | yes |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | yes |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | Yes |
| Bias | 9 | Describe any efforts to address potential sources of bias | Yes |
| Study size | 10 | Explain how the study size was arrived at | Yes |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | Yes |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | Yes |
| | | (*b*) Describe any methods used to examine subgroups and interactions | Yes |
| | | (*c*) Explain how missing data were addressed | Yes |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy | Yes |
| | | (*e*) Describe any sensitivity analyses | Yes |
| **Results** | | | |

| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | Yes |
|---|---|---|---|
| | | (b) Give reasons for non-participation at each stage | NA |
| | | (c) Consider use of a flow diagram | NA |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | Yes |
| | | (b) Indicate number of participants with missing data for each variable of interest | Yes |
| Outcome data | 15* | Report numbers of outcome events or summary measures | Yes |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | Yes |
| | | (*b*) Report category boundaries when continuous variables were categorized | Yes |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | Yes |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | NA |
| **Discussion** | | | Yes |
| Key results | 18 | Summarise key results with reference to study objectives | Yes |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | Yes |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | Yes |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | Yes |
| **Other information** | | | Yes |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | NA |

Abb: NA- Not applicable

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

# BMJ Open

## Older patients' perception to Deprescribing in resource limited settings: A cross sectional study in an Ethiopia University Hospital.

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**Older patients' perception to Deprescribing in resource limited settings: A cross sectional study in an Ethiopia University Hospital.**

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## Abstract

**Objectives:** We assessed whether socio-demographic and clinical data were associated with older patients' attitude towards deprescribing of inappropriate medications.

**Design** This was Institutional-based quantitative cross-sectional survey.

**Setting** Data collection was conducted the outpatient clinics of University of Gondar referral and teaching hospital (UoGRTH) in Ethiopia.

**Participants** Older patients aged 65 or greater with at least one medication were enrolled in the study from March 1 to June 30, 2017. Exclusion criteria were patients who had severe physical or psychological problems and those who refused to participate. Of 351 eligible participants, 316 elderly patients completed the survey data.

**Main outcome measures:** Older patients' attitude towards deprescribing was measured using the validated tool of revised Patients' Attitudes towards Deprescribing (rPATD) for older patients. Predictive variables were Sociodemographic and clinical data such as comorbidity and polypharmacy. Older patients' willingness to deprescribing was an interest of outcome.

**Results** Of 316 older patients enrolled in this study, 54.7 % were men; the median number of their daily medications was3 (IQR: 2-4). Most of the participants (81.6%; 95CI: 77%-86%) were willing to stop one or more of their medications if advised by doctor even if a significant number of participants were overall satisfied with medications they were taking (92.1%; 95CI: 89%-95%). This willingness was correlated with seven items of the rPATD including strong correlation with overall satisfaction of patients with their medication taken.

**Conclusion:** Most of the participants (81.6%) were still willing to reduce one or more of their medications if advised by their doctor. Health care providers should be proactive to discuss, evaluate and decision making of potentially in appropriate medications.

**Strengths and limitations of this study**

- Older patients' attitude towards deprescribing and their willingness to stop medicines has been assessed for the first time in resource limited setting like Ethiopia

- This study utilized a validated multidimensional questionnaire in relatively large number of patients.

- The validated tool of rPATD however, has not been tested in a culturally different settings like Ethiopia

- Owing to the interviewer based questionnaire structured for quantitative research, it does not permit in-depth investigation of patient attitude.

- Care givers for older patients have not been included in the current study as they may affect on the preference and willingness to stop medicines.

**Introduction**

Polypharmacy often defined as the practice of prescribing five or more medications to the same person, has been linked with pervasive adverse drug events and ultimately leads to increased morbidity, mortality and healthcare costs [1-3]. Polypharmacy-related adverse drug events (ADEs) are very common and estimated to occur in 25% of ambulatory care patients [3]. Deprescribing, one of the approaches to prevent polypharmacy-related ADEs, is defined as the 'the process of withdrawal of inappropriate medication, supervised by a health care professional with the goal of managing polypharmacy and improving outcomes' [4].Given the holistic and patient-centered nature of deprescribing, it has a number of benefits to the patient. A recent systematic review conducted by Page et al. reported that individualized deprescribing interventions to reduce inappropriate polypharmacy may improve mortality [5]. Deprescribing also has potentially additional benefits to the patient such as increasing patient engagement in

medication therapy management and improving adherence possibly through reducing polypharmacy [6].

The impact of deprescribing is conceivably beneficial for older patients living in resource limited countries such as Ethiopia, where the incidence of chronic non-communicable diseases and multimorbidity is mounting in alarming rate [7]. Moreover, the main source of drug expenditure in Ethiopian patients' out of pocket money and a significant percentage of the population purchase medicines from private drug retail outlets, which are usually not affordable by patients [8].

While concepts such as adherence and medication reconciliation receive considerable attention, and covered by a wide range of literatures worldwide, little attention has been given to the concept of deprescribing and reduction of inappropriate polypharmacy [9]. Despite the prescribers' positive attitude on deprescribing [10], many factors including clinical uncertainty and shared responsibility with other healthcare providers severely impede clinicians' ability to proactivity discontinue medications [11]. Moreover, patient perspectives on deprescribing and their communication with clinicians are equally important in evidence based medication discontinuation process. Several studies conducted in developed countries regarding older people's attitudes toward deprescribing reported a higher rate of willingness to discontinue their medications [12-16]. However, no previous study has explored the attitudes of Ethiopian older patients regarding their medications and deprescribing. It is also uncertain how patients would respond to a suggestion from a clinician to intentionally discontinue a medication. Taking the global evidence into consideration and due to lack of data in Ethiopia, we sought to identify Ethiopian older patients' willingness to have their medications deprescribed.

**Methods**

**Study design and setting**

Institutional-based quantitative cross-sectional survey was conducted from March 1 to June 30, 2017 at University of Gondar referral and teaching hospital (UoGRTH), Ethiopia. The hospital is located in Gondar town, northwest Ethiopia, 738km away from Addis Ababa and it's the only referral and teaching center in the area to which majority of patients with chronic diseases including hypertension, diabetes mellitus, cancer and asthma are referred.

**Participants**

All older patients ($\geq$ 65 years) who has been taking at least one medication regardless of their diagnosis and who visited the outpatient clinic of University of Gondar referral and teaching hospital (UoGRTH) for follow-up and medication refill were our study population. Patients who had severe physical or psychological problems which leads to inability to complete the interview and those who refused to participate were excluded from the survey. Of 351 eligible participants obtained during the study period, 316 elderly patients completed the survey data.

**Main outcome measures:** Older patients' attitude towards deprescribing was measured using the validated tool of revised Patients' Attitudes towards Deprescribing (rPATD) for older patients. Predictive variables were Sociodemographic and clinical data such as comorbidity and polypharmacy. Older patients' willingness to deprescribing was an interest of outcome.

**Survey instrument**

Data was collected by three of the principal investigators through interviewer-administered questionnaire. The investigators were properly trained on the instrument and ways of approaching the patients and securing their permission for interview prior to the data collection process. We used Revised Patients' Attitudes towards Deprescribing (rPATD) questionnaire

[17]. It is a validated multidimensional questionnaire which measure patients' attitudes, knowledge and experiences related to medication discontinuation. The original a 5-point Likert scale in rPATD questionnaire, was changed to a 4-point Likert scale (strongly agree, agree, disagree and strongly disagree) in the current study as it may allow the participants to be more discriminating and avoid misinterpretation of mid points. The rPATD questionnaire has four major factors including Burden factor (5 items); Appropriateness factor (5 items); Concerns about stopping factor (5 items); Involvement factor (5 items) and additional two global questions are also considered. The previously validated tool -Belief in Medicine use Questionnaire (BMQ)- Overuse [18] was utilized for comparison and validation of the rPATD questionnaire. The questionnaire, first prepared in English, was translated to Amharic language and back to English so as to ensure that the translated version gives the proper meaning. It was further pre-tested on 25 elderly patients, who were not included in the final analysis, and slight modifications were instituted before the commencement of the actual survey. Polypharmacy was defined as the use of ≥5 regular medications.

**Statistical analysis**

All the statistical analyses were done using Statistical Package for Social Sciences (SPSS) software version 21.0 for Windows (SPSS Inc., Chicago, IL) [19]. Frequencies and percentages were used to express different variables. Data were screened for normality using both the Shapiro–Wilk and Kolmogorov-Smirnov. Respondents were stratified by polypharmacy status to examine attitudes toward deprescribing in patients with polypharmacy.

Correlation analysis using Spearman's Rho, was used to assess the associations between all rPATD items and three individual questions like Patients' perception of side effect from their medicines, the patients' willingness to discontinue their medications if advised by doctor, and

Overall satisfaction of patients with their medication taken. Binary logistic regression was performed to assess the association between willingness to stop medication if advised by doctors and predictor variables. In Univariate analysis, variables with P<0.2 were selected for final model. But none of the variables fit these criteria. The level of statistical significance was defined as p<0.05 and all tests were two-tailed.

**Operational definitions:**

Deprescribing: is 'the process of withdrawal of inappropriate medication, supervised by a health care professional with the goal of managing polypharmacy and improving outcomes'. It is the planned and supervised process of dose reduction or stopping of medication that might be causing harm or might not be longer providing benefit.

Poly pharmacy: is defined as the practice of prescribing five or more medications to the same person.

**Ethical Consideration**

This study was approved by the Ethical committee of School of Pharmacy, University of Gondar with an approval number of UoG-SoP-131/2017. Written informed consent from the respondents was also obtained before conducting this study. Participants' information obtained was kept confidential.

**Results**

Out of 351 patients approached, 316 of them completed the questionnaire, giving a response rate of 90 %. The median age was 70 years (IQR: 67-75). The mean and median number of their daily medications was 3.43 ± 1.50 and 3 (IQR: 2-4), respectively. From the total number of participants, 62 (19.7%) were on polypharmacy. The most common reason of hospital visit in

polypharmacy groups were diabetes mellitus (DM), hypertension, and Rheumatic heart Disease

(RHD). While in non – polypharmacy study participants, hypertension, DM and heart failure

were more prominent. A detail of socio characteristics of the study participants is tabulated in

Table 1.

**Table 1:** Sociodemographic and clinical characteristics of study participants, (n = 316).

| Variable | Participants, N (%) | Polypharmacy n (%) | |
| --- | --- | --- | --- |
| | | Yes (n=62) | No (n=254) |
| **Gender** | | | |
| Male | 173(54.7) | 35 (56.45 %) | 138 (54.55 %) |
| Female | 143 (45.3) | 27 (43.55%) | 116 (45.45%) |
| **Age(median; Interquartic range(IQR))** | 70(67-75) | 70(67-73 | 70(67-75) |
| **Educational status** | | | |
| Unable to read and to write | 202 (64) | 37 (59.68 %) | 165 (65.2 %) |
| Primary school | 62 (19.6) | 13 (20.97 %) | 49 (19.37 %) |
| Secondary School | 32 (10.1) | 5 (8.06 %) | 26 (10.28 %) |
| Higher education | 20 (6.3) | 7 (11.29 %) | 13 (5.14 %) |
| **Reason of hospital visit (N=315)** | | | |
| Hypertension | 128(40.5) | 20 (32.3%) | 108 (42.5) |
| Heart failure | 23(7.3) | 8 (1.3%) | 15 (5.9) |
| Diabetes Mellitus | 105(33.2) | 22 (35.5%) | 83 (32.7) |
| Chronic kidney disease | 14(4.4) | 1 (1.6%) | 13 (5.1) |
| Asthma | 8 (2.5) | 2 (3.2%) | 6 (2.4) |
| Rheumatoid Heart Disease | 10(3.2) | 4 (6.5%) | 6 (2.4) |
| Others | 27(8.6)[a] | 5 (8.1%) | 22 (9.1)[a] |
| **Charlson Comorbidity index [a] (median;IQR) (N=315)** | 2(1-2) | 2(2-3) | 2(1-2) |
| **Number of Medication (median;IQR)** | 3(2-4) | 5(5-6) | 3(2-3) |

Note: [a] data was missing for one participant

As reported in table 2, a total of 316 participants have responded to 22 rPATD questions. In a

burden factor domain, a total of 214 older patients (67.7%; 95%CI: 63%-73%) taught they spend

a lot of money on their medicines. However, a considerable percentage of participants (61.5%)

didn't feel their medications are a burden to them. Appropriateness factor domain showed that

only 9.4% would like to try stopping one of their medications to see how they feel without it,

even though most of the participants (90.2%) taught one or more of their medicines may not be working.. Concerns about stopping factor; most of the respondents (89.2%; 95CI: 86%-93%) would be worried about missing out on future benefits if one of their medications was stopped.. In the involvement factor, majority of the respondents [257 participants; 81.3%;95CI: (77%-86%)] ask their doctor, pharmacist or other health care professional if there is any miss-understanding about their medications.  If ordered by the doctor, about 258 individuals (81.6%; 95CI: 77%-86%) were willing to stop one or more of their regular medications although a significant number of participants were overall satisfied with medications they were taking (92.1%; 95CI: 89%-95%) (Table 2).

Patients' perception of side effect from their medicines is positively associated the thirteen items but negatively associated with the three factors. Those patients who thought their medications are a burden to them are more likely to perceive side effects from one or more medications. Patients didn't have overall satisfaction with their medications if they perceive side effect from one or more of the medications (table 3).

The patients' willingness to discontinue their medications if advised by doctor was correlated with seven items of the rPATD. Of the three items positively associated with this question, patients are still willing to stop one or more of their medications if advised by doctor even though they may be worried about missing out on future benefits while stopping one of their medications. In contrary, four of the items were negatively correlated with willingness to discontinue their medications if advised by doctor such as belief that participants were taking too many medicines, were perceiving side effects from one or more of their medicines, were reluctant to stop a medication taken for a long time, and perceived their doctor giving up on them If their doctor

recommended stopping a medicine. Overall satisfaction of patients with their medication taken

was correlated with many items of rPATD questionnaire as described in detail in Table 3.

**Table 2:** Patients' attitudes towards deprescribing based on the rPATD questionnaire (n = 316).

| Survey questions | | Strongly disagree | Disagree | Agree | Strongly agree | Strongly agree/ Agree % (95% CI) |
|---|---|---|---|---|---|---|
| **Burden Factor** | | | | | | |
| B1 | I spent a lot of money on my medicines | 87(27) | 15(4.7) | 84(26.6) | 130(41.1) | 67.7% (63-73) |
| B2 | Taking my medicines every day is very inconvenient | 104(32.9) | 92(29.1) | 107(33.9) | 13(4.1) | 38% (32.6-43.4) |
| B3 | I feel that I am taking a large number of medicine | 88(27.8) | 68(21.5) | 135(42.7) | 25(7.9) | 50.6% (45-56) |
| B4 | I feel that my medicines are a burden to me | 114(36.1) | 80(25.4) | 110(34.8) | 12(3.8) | 38.6% (33-44) |
| B5 | Sometimes I think I take too many medicines | 134(42.4) | 69(21.8) | 105(33.2) | 8(2.5) | 35.7% (30-41) |
| **Appropriateness Factor** | | | | | | |
| A1 | I feel that I may be taking one or medicines that I no longer need | 144(45.6) | 65(20.6) | 95(30.1) | 12(3.8) | 33.9% (29-39) |
| A2 | I would like to try stopping one of my medicines to see how I feel without it | 257(81.3) | 29(9.2) | 21(6.6) | 9(2.8) | 9.4% (6-13) |
| A3 | I would like my doctor to reduce the dose of one or more my medicines | 133(42.1) | 49(15.5) | 104(32.9) | 30(9.5) | 42.4% (37-48) |
| A4 | I think one or more of my medicines may not be working | 7(2.2) | 24(7.6) | 281(88.9) | 4(1.3) | 90.2% (87-93) |
| A5 | I believe one or more of my medicines may be currently giving me side effects | 114(36.1) | 70(22.2) | 121(38.3) | 11(3.5) | 41.8% (36-47) |
| **Concerns about stopping factor** | | | | | | |
| C1 | I would be reluctant to stop a medicine that I had been taking for a long time | 109(34.5) | 119(37.7) | 65(20.6) | 23(7.3) | 27.9% (23-33) |
| C2 | If one of my medicines was stopped I would be worried about missing out on future benefits | 9(2.8) | 25(7.9) | 122(38.6) | 160(50.6) | 89.2% (86-93) |
| C3 | I get stressed whenever changes are made to my medicines | 87(27.5) | 81(25.6) | 132(41.8) | 16(5.1) | 46.9% (41-52) |
| C4 | If my doctor recommended stopping a medicine I would feel that he/she was giving up on me | 146(46.2) | 82(25.9) | 63(19.9) | 25(7.9) | 27.8% (23-33) |
| C5 | I have a bad experience when stopping a medicine before | 186(58.9) | 47(14.9) | 45(14.2) | 38(12.0) | 26.5% (21-31) |
| **Involvement Factor** | | | | | | |

| I1 | I have a good understanding of the reasons I was prescribed each of my medicines | 59(18.7) | 44(13.9) | 168(53.2) | 45(14.2) | 67.4% (62-73) |
|----|----|----|----|----|----|----|
| I2 | I know exactly what medicines I am currently taking, and/or I keep an up to date list of my medicines | 114(36.1) | 126(39.9) | 65(20.6) | 11(3.5) | 24.1% (19-29) |
| I3 | I like to know as much as possible about my medicines | 71(22.5) | 54(17.1) | 162(51.3) | 29(9.2) | 60.5% (55-66) |
| I4 | I like to be involved in making decisions about my medicines with my doctors | 32(10.1) | 93(29.4) | 165(52.2) | 26(8.2) | 60.4% (55-66) |
| I5 | I always ask my doctor, pharmacist or other health care professional if there is something I don't understand about my medicines | 19(6.0) | 40(12.7) | 161(50.9) | 96(30.4) | 81.3% (77-86) |
| **General Questions** | | | | | | |
| G1 | If my doctor said it was possible I would be willing to stop one or more of my regular medicines | 22(7.0) | 36(11.4) | 74(23.4) | 184(58.2) | 81.6% (77-86) |
| G2 | Overall, I am satisfied with my current medicines | 9(2.8) | 16(5.1) | 120(38.0) | 171(54.1) | 92.1% (89-95) |

Adopted from Revised Patients' Attitudes Towards Deprescribing (rPATD) Questionnaire (17)

Binary logistic regression was performed after dichotomizing the two outcome variables (willingness to deprescribe one or more of their regular medications if advised by doctor and overall satisfaction with their prescribed medications), but none of the variables fits the final model (P>0.2). And all variables didn't have statistically significant association with both outcome variables.

Table 3. Spearman Correlation of responses within the rPATD questionnaire

| rPATD questions<br>Spearman Correlation<br>(*p*-value) | 10.I believe one or more of my medicines may be currently giving me side effects | 21. If my doctor said it was possible I would be willing to stop one or more of my regular medicines | 22.Overall, I am satisfied with my current medicines |
|---|---|---|---|
| **Burden Factor** | | | |
| 1. I spend a lot of money on my medicines | 0.03,0.63 | 0.14, 0.06 | **0.16, 0.00** |
| 2.Taking my medicines every day is very inconvenient | **0.24,0.00** | -0.07, 0.19 | **-0.28,0.00** |
| 3.I feel that I am taking a large number of medicine | **0.15,0.01** | -0.096,0.09 | **-0.35, 0.00** |
| 4.I feel that my medicines are a burden to me | **0.31,0.00** | -0.08, 0.17 | **-0.35,0.00** |
| 5.Sometimes I think I take too many medicines | **0.25,0.00** | **-0.22, 0.00** | **-0.53,0.00** |
| **Appropriateness Factor** | | | |
| 6.I feel that I may be taking one or medicines that I no longer need | **0.25,0.00** | -0.09, 0.13 | **-0.38,0.00** |
| 7. I would like to try stopping one of my medicines to see how I feel without it | 0.06,0.32 | -0.04, 0.48 | -0.1,0.42 |
| 8.I would like my doctor to reduce the dose of one or more my medicines | **0.14,0.02** | 0.04,0.4 | **-0.25,0.001** |
| 9.I think one or more of my medicines may not be working | **-0.11,0.04** | 0.01,0.8 | **0.14,0.009** |
| 10.I believe one or more of my medicines may be currently giving me side effects | 1 | **-0.14,0.08** | **-0.31,0.00** |
| **Concerns about stopping factor** | | | |
| 11.I would be reluctant to stop a medicine that I had been taking for a long time | **0.19,0.001** | **-0.3,0.00** | **-0.26,0.001** |
| 12.If one of my medicines was stopped I would be worried about missing out on future benefits | **-0.20,0.00** | **0.26,0.00** | **0.55,0.00** |
| 13.I get stressed whenever changes are made to my medicines | **0.27,0.00** | -0.07,0.19 | **-0.17,0.002** |
| 14.If my doctor recommended stopping a medicine I would feel that he/she was giving up on me | **0.12,0.03** | **-0.37, 0.00** | **-0.34,0.00** |
| 15.I have a bad experience when stopping a | **0.19,0.001** | -0.07,0.22 | **-0.18,0.027** |

| | | | |
|---|---|---|---|
| medicine before | | | |
| **Involvement Factor** | | | |
| 16.I have a good understanding of the reasons I was prescribed each of my medicines | **0.14,0.01** | 0.04,0.53 | 0.02,0.74 |
| 17.I know exactly what medicines I am currently taking, and/or I keep an up to date list of my medicines | **0.12,0.03** | -0.02,0.71 | -0.001,0.98 |
| 18.I like to know as much as possible about my medicines | **0.18, 0.001** | -0.08,0.14 | -0.11,0.175 |
| 19.I like to be involved in making decisions about my medicines with my doctors | -0.01,0.79 | -0.01,0.81 | 0.065,0.45 |
| 20.I always ask my doctor, pharmacist or other health care professional if there is something I don't understand about my medicines | 0.05,0.36 | **0.13, 0.02** | **0.18,0.032** |
| **General Questions** | | | |
| 21.If my doctor said it was possible I would be willing to stop one or more of my regular medicines | -0.14,0.08 | 1 | **0.34,0.00** |
| 22. Overall, I am satisfied with my current medicines | **-0.31,0.00** | **0.34, 0.00** | **1** |

**Discussion**

Elderly patients are prone to multi-morbidity with high medication regimens complexity needing stopping of medications, a growing concept so called deprescribing [13]. Elderly patients receiving many medications with their underlined medical illness are vulnerable to re-hospitalization, drug induced complications and morbidity. Moreover, polypharmacy compromises patient adherence and lead to incur additional costs to manage unnecessary adverse outcomes [20-25]. Hence, mutual agreement between patients and clinical practitioners should be sought to optimize the elderly 'patients' medication regimen keeping with few numbers of medications [26]. To our knowledge, this is a first study to have been conducted on this study area in resource limited settings like Ethiopia.

In the current study, the mean and median number of their daily medications was 3.43 and 3 respectively which is very low as compared to other studies such as the mean of Kalogianis et al. study [12] was 14.6, while the median was 6 and 11 in Sirois et al study [16] and Reeve et al [13], respectively.  In spite of having low median number of medications in the current study, majority (81.6%) of the patients still agreed to stop one of the medicines if their doctor advised them to stop. This is also consistent with previous studies conducted by Mona et al [12], Reeve et al [13] and Alessandro et al [27] having 80% , 68%, and 89% of patients' willingness rate to stop their medicines, respectively. This previews the importance of proactive engagement of health care professionals in deprescribing process for elderly patients and should discuss with their patients on how to optimize and simplify the dosage regimens.

Two third of patients believe that they spent a lot of money to medicines. In this regard medications costs are contributing to the patients to have positive attitude to deprescribing as they are willing to reduce one of the medicines. Other study has reported that patients having to

pay less for their medications would influence their willingness to have medications deprescribed and paying more encourage deprescribing [12]. It is always important to consider cost implications in therapeutic decision making and drug selection in elderly patients as those patients are prone to prolonged care, polypharmacy and less productivity to handle their therapeutic expenses [28].

This study has showed the association between each item and the selected three questions of the survey items like perceiving of side effects from one or more of medicines taken, willingness to stop one or more of medicines if advised by doctor, and overall satisfaction with their current medications. In the current study, patient were willing to stop one or more of medications if advised by doctor even if they were taking few medications, didn't perceive side effects from one or more of their medications, were not reluctant to stop a medicine taken for a long time and had overall satisfaction with their medications. Other studies also reported that patient willingness to stop medication was correlated with a desire to take few medicines and the feeling of taking a large number of medications and being less comfortable with current medications [13, 15, 16].

Majority of the elderly patients have curiosity to know about their medicines, ask their healthcare provider and involve in the clinical decision making process. This is very important to patient–provider relationships, encircling on the sub-themes of trust, relying on expertise and shared decision making which are imperative to better patient outcomes.  In spite of these, majority of elderly patients do not have good knowledge of their medicines and merely dependent on the health care providers to initiate decisions about their medications. Moreover, many patients who have a preference to take fewer medicines do not share their beliefs with providers and waiting for provider initiated medication discontinuation [29]. Thus health professionals should use a

patient centered approach to outweigh the risks and benefits of every medicine against the particular goals of the elderly patient, with the aim of minimizing the total number of prescribed medicines [30-32].

**Strengths and Limitations**

This is the first study in Ethiopia to assess elderly patients' perception towards deprescribing and their willingness to stop medicines by using validated multidimensional questionnaire in relatively large number of patients. Yet, the results of the current study should be interpreted with caution due to some limitations. It is interviewer based questionnaire structured for quantitative research, which does not permit in-depth investigation of patient attitude. The rPATD questionnaire has not been yet validated in culturally different settings like Ethiopia. This study may suffer from generalizability as the study was done in a single-center university hospital.

**Conclusion**

Most of older patients (92.1%) were overall satisfied with medications they were taking. However, majority of the participants (81.6%) were still willing to reduce one or more of their medications if advised by their doctor. Therefore, health care providers should be proactive to discuss, evaluate and decision making of potentially in appropriate medications. Further study with potentially large number of study participants and qualitative study is warranted to fully evaluate the deprescribing attitude in different disease categories and prospective significance to Ethiopian elderly patients' health.

**Contributors** HGT has contributed to the conception, study design, prepared the study protocol and drafted the manuscript. YGT and DAE performed literature review, carried out statistical analyses, and interpreted the results. FC and YA acquired and managed the data. KTH, TBA, AAA wrote the manuscript and reviewed the manuscript for critical revisions. All authors approved the final manuscript.

**References**

1. Bushardt RL, Massey EB, Simpson TW, Ariail JC, Simpson KN. Polypharmacy: misleading, but manageable. ClinInterv Aging. 2008;3(2):383-389.

2. Nebeker JR, Barach P, Samore MH. Clarifying adverse drug events: a clinician's guide to terminology, documentation, and reporting. Ann Intern Med. 2004;140(10):795-801

3. Gandhi TK, Weingart SN, Borus J, et al. Adverse drug events in ambulatory care. N Engl J Med. 2003;348(16):1556-1564.

4. Reeve E, Gnjidic D, Long J, Hilmer S. A systematic review of the emerging definition of 'deprescribing' with network analysis: implications for future research and clinical practice. Br J ClinPharmacol 2015; 80: 1254–68

5. Page AT, Clifford RM, Potter K, Schwartz D, Etherton Beer CD. The feasibility and the effect of deprescribing in older adults on mortality and health: A systematic review. British Journal of Clinical Pharmacology. 2016; 82(3):583-623

6. Reeve E, Wiese MD. Benefits of deprescribing on patients' adherence to medications. Int J Clin Pharm 2014;36:26–9

7. Abebe SM, Andargie G, Shimeka S, et al. The prevalence of non-communicable diseases in northwest Ethiopia: survey of Dabat Health and Demographic Surveillance System. BMJ Open. 2017; 7(10): e015496. doi:  10.1136/bmjopen-2016-015496

8. Center for national health development in Ethiopia. http://cnhde.ei.columbia.edu/healthsystem

9. Iyer S, Naganathan V, McLachlan AJ, LeCouteur DG. Medication withdrawal trials in people aged 65 years and older: a systematic review. Drugs Aging 2008;25:1021–31

10. Linsky A, Simon SR, Marcello TB, Bokhour B. Clinical provider perceptions of proactive medication discontinuation. Am J Manag Care. 2015;21(4):277-283

11. Phillips LS, Branch WT, Cook CB, et al. Clinical inertia. Ann Intern Med. 2001;135(9):825-834

12. Kalogianis MJ, Wimmer BC, Turner JP, et al. Are residents of aged care facilities willing to have their medications deprescribed? Research in Social and Administrative Pharmacy 12 (2016) 784–788. http://dx.doi.org/10.1016/j.sapharm.2015.12.004....

13. Reeve E, Wiese M, Hendrix I, et al. People's attitudes, beliefs and experiences regarding polypharmacy and willingness to deprescribe. J Am GeriatrSoc.2013;61:1508–1514…

14. Qi K, Reeve E, Hilmer SN, Pearson S-A, Matthews S, Gnjidic D. Older peoples' attitudes regarding polypharmacy, statin use and willingness to have statins deprescribed in Australia. Int J ClinPharmcol. 2015;37:949–957…

15. Ng WL, Tan MZW, Koh EYL, Tan NC. Deprescribing: What are the views and factors influencing this concept among patients with chronic diseases in a developed Asian community? Proc Singapore Healthc. March 2017:1-8. doi:10.1177/2010105817699633….

16. Sirois C, Ouellet N, Reeve E. Community-dwelling older people's attitudes towards deprescribing in Canada. Res SocAdm Pharm. 2017;13(4):864-870. doi:10.1016/j.sapharm.2016.08.006

17. Reeve E, Low LF, Shakib S, Hilmer SN. Development and validation of the revised Patients' Attitudes Towards Deprescribing (rPATD) Questionnaire: Versions for older adults and caregivers. Drugs & aging. 2016;33(12):913-28.

18. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. Psychol Health 1999;14:1–24

19. IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.

20. World Health Organization. Adherence to long-term therapies: evidence for action [online] (2013) [cited 2017 on Sept 21]. http://www.who.int/chp/knowledge/publications/adherence_report/en/index.html.

21. Hajjar ER, Cafiero AC, Hanlon JT. Polypharmacy in elderly patients. Am J GeriatrPharmacother. 2007; 5(4):345–51.

22. Banning M. Medication management: older people and nursing. Nurs Older People. 2005; 17(7):20–3.

23. Frazier SC. Health outcomes and polypharmacy in elderly individuals. J GerontolNurs. 2005; 31(9):4–11.

24. Guthrie B, McCowan C, Davey P, Simpson CR, Dreischulte T, Barnett K. High risk prescribing in primary care patients particularly vulnerable to adverse drug events: cross sectional population database analysis in Scottish general practice. BMJ. 2011;21(342):d3514.

25. Giustini S, Thiry S. Medicinagenerale, multi morbilita` e politerapianeipazientianziani. RivSocItaliana di Med Gen. 2012;6:11–4.

26. Patterson SM, Hughes C, Kerse N, Cardwell CR, Bradley MC. Interventions to improve the appropriate use of polypharmacy for Older people. Cochrane Database Syst Rev 2012; 5: Art. No.:CD008165

27. Alessandro G, Maura L, Maria TC, et al. Attitudes towards polypharmacy and medication withdrawal among older inpatients in Italy. Int J Clin Pharm (2016) 38:454–461.

28. Garfinkel D, Zur-Gil S, Ben-Israel J. The war against polypharmacy: a new cost-effective geriatric-palliative approach for improving drug therapy in disabled elderly people. Isr Med Assoc J 2007;9:430–434

29. Linsky A, Simon SR, Bokhour B. Patient perceptions of proactive medication discontinuation. Patient Education and Counseling.2015; 98: 220–225.

30. Page AT, Etherton-Beer CD, Clifford RM, Burrows S, Eames M, Potter K. Deprescribing in frail older people–Do doctors and pharmacists agree?. Research in Social and Administrative Pharmacy. 2016 Jun 30;12(3):438-49.

31. Page A, Potter K, Clifford R, Etherton-Beer C. Deprescribing in older people. Maturitas. 2016;91:115-134.

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32. Potter K, Page A, Clifford R, Etherton-Beer C. Deprescribing: A guide for medication reviews. Journal of Pharmacy Practice and Research. 2016;46(4): 358–367

**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies***

| Section/Topic | Item # | Recommendation | Reported on page # |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | P1,L2 and P2, L4 |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | Page 2, L1-23 |
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | P3,L13-24 and P4,L1-20 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | P4, L18-20 |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | P5,L1 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | P5,P2-5 |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants | P5, L7-12 |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | P5,L13-16 |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | P5,L18-23 and P6,1-11 |
| Bias | 9 | Describe any efforts to address potential sources of bias | P6,L11-14 |
| Study size | 10 | Explain how the study size was arrived at | P5, L14 and L15 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | NA |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | P7,L4-6 |
| | | (*b*) Describe any methods used to examine subgroups and interactions | P6,22-23 |
| | | (*c*) Explain how missing data were addressed | NA |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy | NA |
| | | (*e*) Describe any sensitivity analyses | NA |

| Results | | | |
|---|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | P7,L20-22 |
| | | (b) Give reasons for non-participation at each stage | NA |
| | | (c) Consider use of a flow diagram | NA |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | P8,L1-5 |
| | | (b) Indicate number of participants with missing data for each variable of interest | P8,L7 |
| Outcome data | 15* | Report numbers of outcome events or summary measures | P9,L1-10 |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | Page 10, Table 2 |
| | | (*b*) Report category boundaries when continuous variables were categorized | NA |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | NA |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | NA |
| **Discussion** | | | |
| Key results | 18 | Summarise key results with reference to study objectives | P14-16 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | P16, L7-11 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | P16, L7-8 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | P16, L10-11 |
| **Other information** | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | NA |

Abb: NA- Not applicable

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

# BMJ Open

## Older patients' perception to deprescribing in resource limited settings: A cross sectional study in an Ethiopia University Hospital.

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**Older patients' perception to deprescribing in resource limited settings: A cross sectional study in an Ethiopia University Hospital.**

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**Abstract**

**Objectives:** To assess older patients' attitude towards deprescribing of inappropriate medications.

**Design:** This was an institutional-based quantitative cross-sectional survey.

**Setting:** Outpatient clinics of the University of Gondar referral and teaching hospital (UoGRTH) in Ethiopia.

**Participants:** Patients aged 65 or older with at least one medication were enrolled in the study from March 1 to June 30, 2017. Excluded patients were those who had severe physical or psychological problems and refused to participate.

**Main outcome measures:** Older patients' attitude towards deprescribing was measured using a validated instrument, 'the revised Patients' Attitudes towards Deprescribing' (rPATD) tool for older patients. Data were collected on sociodemographic characteristics and clinical data such as co-morbidity and polypharmacy, and the main outcome was older patients' willingness to deprescribing of inappropriate medications.

**Results:** Of the 351 eligible participants, 316 patients completed the survey. Of the 316 patients, 54.7 % were men and were taking a median of 3 (IQR: 2–4) medications daily. Overall, most of the participants (92.1%; 95% CI: 89%–95%) were satisfied with the medications they were taking; however, still a significant number of participants (81.6%; 95%CI: 77%–86%) were willing to stop one or more of their medications if possible and agreed by their doctor. This willingness was correlated with seven items of the rPATD, including strong correlation with the overall satisfaction of patients with their medication taken.

**Conclusion:** Many older patients have shown their willingness for a reduction in one or more of their medications if their doctor said it was possible. Health care providers should be proactive to discuss and evaluate potentially inappropriate medications for better clinical decision making.

Key words: Attitude; medication discontinuation; deprescribing; polypharmacy; elderly

**Strengths and limitations of this study**

- Older patients' attitude towards deprescribing and their willingness to stop medications has been assessed for the first time in resource limited setting.

- This study utilized a validated multidimensional questionnaire in a relatively large number of patients.

- The validated tool of rPATD, however, has not been tested in a culturally diverse settings, such as Ethiopia

- Owing to the interviewer based questionnaire structured for quantitative research, it does not permit in-depth investigation of patient attitude.

- Care givers for older patients have not been included in the current study as they may affect on the preference and willingness to stop medications.

**Introduction**

Polypharmacy often defined as the practice of prescribing five or more medications to the same person, has been linked with pervasive adverse drug events and ultimately leads to increased morbidity, mortality and healthcare costs [1-3]. Polypharmacy-related adverse drug events (ADEs) are very common and estimated to occur in 25% of ambulatory care patients [3]. Deprescribing, one of the approaches to prevent polypharmacy-related ADEs, is defined as the 'the process of withdrawal of inappropriate medication, supervised by a health care professional with the goal of managing polypharmacy and improving outcomes' [4].Given the holistic and patient-centered nature of deprescribing, it has a number of benefits to the patient. A recent systematic review conducted by Page et al. reported that individualized deprescribing interventions to reduce inappropriate polypharmacy may improve mortality [5]. Deprescribingalso has potentially additional benefits to the patient such as increasing patient

engagement in medication therapy management and improving adherence possibly through reducing polypharmacy [6].

The impact of deprescribing is conceivably beneficial for older patients living in resource limited countries such as Ethiopia, where the incidence of chronic non-communicable diseases and multimorbidity is mounting in alarming rate [7]. The burden of chronic diseases alongside with Ethiopian patients' out of pocket expenses and affordability for drug purchases particularly from private drug retail outlets is challenging for most patients. [8]

While concepts such as adherence and medication reconciliation received considerable attention, and covered by a wide range of literatures worldwide, little attention has been given to the concept of deprescribing and reduction of inappropriate polypharmacy [9]. Despite the prescribers' positive attitude on deprescribing [10], many factors including clinical uncertainty and shared responsibility with other healthcare providers severely impede clinicians' ability to proactively discontinue medications [11]. Moreover, patient perspectives on deprescribing and their communication with clinicians are equally important in evidence based medication discontinuation process. Several studies conducted in developed countries regarding older peoples' attitudes toward deprescribing reported a higher rate of willingness to discontinue their medications [12-16]. However, no previous study has explored the attitudes of Ethiopian older patients regarding their medications and deprescribing. It is also uncertain how patients would respond to a suggestion from a clinician to intentionally discontinue a medication. Taking the global evidence into consideration and due to lack of data in Ethiopia, we sought to identify Ethiopian older patients' willingness to have their medications deprescribed.

## Methods

### Study design and setting

Institutional-based quantitative cross-sectional survey was conducted from March 1 to June 30, 2017 at the University of Gondar referral and teaching hospital (UoGRTH), Ethiopia. The hospital is located in Gondar town, northwest Ethiopia, 738km away from Addis Ababa and it's the only referral and teaching center in the area where majority of patients with chronic diseases including hypertension, diabetes mellitus, cancer and asthma are referred.

### Participants

All older patients ($\geq$ 65 years) who had been taking at least one medication regardless of their diagnosis and who visited the outpatient clinic of the University of Gondar referral and teaching hospital (UoGRTH) for follow-up as well as medication refill were included. Patients who had severe physical or psychological problems and those who refused to participate were excluded from the survey. Of 351 eligible participants obtained during the study period, 316 older adult patients completed the survey data.

**Main outcome measures:** Older patients' attitude towards deprescribing was measured using the validated tool of revised the Patients' Attitudes towards Deprescribing (rPATD) for older patients. Predictive variables were Sociodemographic and clinical data such as comorbidity and polypharmacy. The main outcome of interest was older patients' willingness to deprescribing of their medications. .

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**Survey instrument**

We used the revised patients' attitudes towards deprescribing (rPATD) questionnaire [17]. It is a validated multidimensional questionnaire which measure patients' attitudes, knowledge and experiences related to medication discontinuation. The original a 5-point Likert scale in rPATD questionnaire, was changed to a 4-point Likert scale (strongly agree, agree, disagree and strongly disagree) in the current study as it may allow the participants to be more discriminating and avoid misinterpretation of mid points. The rPATD questionnaire has four major factors including Burden factor (5 items); Appropriateness factor (5 items); Concerns about stopping factor (5 items); Involvement factor (5 items) and additional two global questions are also considered. The previously validated tool -Belief in Medicine use Questionnaire (BMQ)-Overuse [18] was utilized for comparison and validation of the rPATD questionnaire. The questionnaire, first prepared in English, was translated into Amharic language and back to English so as to ensure that the translated version gave the proper meaning. It was further pre-tested on 25 elderly patients, who were not included in the final analysis, and slight modifications were instituted before the commencement of the final survey. Polypharmacy was defined as the use of $\geq 5$ regular medications.

Data were collected by three of the principal investigators through interviewer-administered questionnaire. Due to low literacy level of the participants in our study setting, we were forced to interview most of the patients rather than self administration to clarify the questions. The investigators were properly trained on the instrument and ways of approaching the patients and securing their permission for interview prior to the data collection process. This training was conducted in the actual place of study setting to see if the investigators could manage data

collection efficiently with adequate background knowledge about the study; working independently; and good communication skills.

**Patient and Public Involvement statement**

Research questions have been identified during medication review and provision of counseling to older patients while in efforts to get older patients involved in decision making process. Moreover, the local advocacy group so called Young professionals chronic disease network (YP-CDN) Ethiopia chapter has worked with older patients living with chronic diseases and identified their priorities for advocacy and used as an input for this research project.

Patients were involved in the design of this study by identifying the research question; and identifying the need for preliminary study. However, they were not involved in the recruitment and conduct of the study.

The study results will be disseminated both to the study participants and to the wider public using easy and accessible formats with understandable language by the public during health care provision and health education program. The Authors will communicate the findings through national and international conferences. It will also be posted in an international advocacy websites such as YP-CDN website.

**Statistical analysis**

All the statistical analyses were done using Statistical Package for Social Sciences (SPSS) software version 21.0 for Windows (SPSS Inc., Chicago, IL) [19]. Data were summarized as frequencies and percentages.. Data were screened for normality using both the Shapiro–Wilk and Kolmogorov-Smirnov tests. Respondents were stratified by polypharmacy status to examine patients' attitude towards deprescribing..

Correlation analysis using Spearman's Rho was used to assess the associations between all rPATD items and three individual questions: patients' perception of side effect from their medications, patients' willingness to discontinue their medications if the doctor said possible, and overall satisfaction of patients with their medication taken. Binary logistic regression was performed after dichotomizing the two item questions (willingness to deprescribe one or more of their regular medications if the doctor said it was possible and overall satisfaction with their prescribed medications) by grouping the 4 Likert responses to "strongly agree and agree" versus "strongly disagree and disagree" as shown in supplementary table.

**Ethical Consideration**

This study was approved by the Ethical committee of School of Pharmacy, University of Gondar with an approval number of UoG-SoP-131/2017. Written informed consent from the respondents was also obtained before conducting this study. Participants' information obtained was kept confidential.

**Results**

A total of 351 patients were approached; of whom, 316 completed the questionnaire (response rate, 90%). The median age of the participants was 70 years (IQR: 67-75). The median number of their daily medications was 3 (IQR: 2-4). From the total number of participants, 62 (19.7%) were on polypharmacy. The commonest reason for hospital visits both in the polypharmacy and non-polypharmacy groups were hypertension and diabetes mellitus (DM). A detail of sociodemographic characteristics of the study participants is tabulated in Table 1.

**Table 1:** Sociodemographic and clinical characteristics of study participants, (n = 316).

| Variable | Participants, N (%) | Polypharmacy N (%) | |
|---|---|---|---|
| | | Yes (N=62) | No (N=254) |
| **Gender** | | | |
| Male | 173(54.7) | 35 (56.45 ) | 138 (54.55) |
| Female | 143 (45.3) | 27 (43.55) | 116 (45.45) |
| **Age(median; Interquartile range(IQR))** | 70(67-75) | 70(67-73) | 70(67-75) |
| **Educational status** | | | |
| Unable to read and to write | 202 (64) | 37 (59.68 ) | 165 (65.2 ) |
| Primary school | 62 (19.6) | 13 (20.97 ) | 49 (19.37 ) |
| Secondary School | 32 (10.1) | 5 (8.06 ) | 26 (10.28 ) |
| Higher education | 20 (6.3) | 7 (11.29 ) | 13 (5.14 ) |
| **Reason of hospital visit(N=315)** | | | |
| Hypertension | 128(40.5) | 20(32.3) | 108 (42.5) |
| Heart failure | 23(7.3) | 8(1.3) | 15 (5.9) |
| Diabetes Mellitus | 105(33.2) | 22(35.5) | 83 (32.7) |
| Chronic kidney disease | 14(4.4) | 1(1.6) | 13 (5.1) |
| Asthma | 8  (2.5) | 2(3.2) | 6 (2.4) |
| Rheumatoid Heart Disease | 10(3.2) | 4(6.5) | 6 (2.4) |
| Others | 27(8.6)[a] | 5(8.1) | 22 (9.1) [a] |
| **Charlson Comorbidity index [a](median;IQR) (N=315)** | 2(1-2) | 2(2-3) | 2(1-2) |
| **Number of Medication (median;IQR)** | 3(2-4) | 5(5-6) | 3(2-3) |

Note:[a]data was missing for one participant

As reported in table 2, a total of 316 participants responded to 22 rPATD questions. In a burden

factor domain, a total of 214 older patients (67.7%; 95%CI: 63%–73%) taught that they spent a

lot of money for purchasing their medications, yet, there had been  a considerable percentage of

participants (61.5%) that did not  feel their medications were  a burden to them. Appropriateness

factor domain showed that close to 90% of the participants thought that one or more of their

medications may not be working if stopped taking, and this was further confirmed from their

intention to stop their medications; only 9.4% had tried stopping medications in order to see how

they felt  without taking medications. ..Concerns about stopping factor; most of the respondents

(89.2%; 95% CI: 86%-93%) were worried about missing out the future benefits if one of their

medications had been stopped. In the involvement factor, majority of the respondents [257

participants; 81.3%;95% CI: (77%-86%)] asked their doctor, pharmacist or other health care professional if there was any miss-understanding about their medications. If the doctor said it was possible, about 258 individuals (81.6%; 95%CI: 77%-86%) were willing to stop one or more of their regular medications although a significant number of participants were overall satisfied with medications they were taking (92.1%; 95% CI: 89%-95%) (Table 2).

Patients' perception of side effect from their medications was positively associated with the thirteen items but negatively with the three items. Those patients who thought their medications are a burden to them were more likely perceived side effects from one or more medications. There had been a lack of an overall satisfaction with the medications patients were taking if they perceived side effects from one or more of their medications (Table 3).

The patients' willingness to discontinue their medications if their doctor said it was possible was correlated with seven items of the rPATD. Of the three items positively associated with this question, patients are willing to stop one or more of their medications if they were told to do by their doctor even though they may be worried about missing out the future benefits while stopping one of their medications. In the contrary, four of the items were negatively correlated with willingness to discontinue their medications if the doctor said it was possible such as belief that participants were taking too many medications, were perceiving side effects from one or more of their medications, were reluctant to stop a medication taken for a long time, and perceived their doctor giving up on them if their doctor recommended stopping a medicine. The overall satisfaction of patients with their medication taken was correlated with many items of the rPATD questionnaire as described in detail in Table 3.

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**Table 2:** Patients' attitudes towards deprescribing based on the rPATD questionnaire (n = 316).

| Survey questions | | Strongly disagree | Disagree | Agree | Strongly agree | Strongly agree/ Agree % (95% CI) |
|---|---|---|---|---|---|---|
| **Burden Factor** | | | | | | |
| B1 | I spent a lot of money on my medicines | 87(27) | 15(4.7) | 84(26.6) | 130(41.1) | 67.7% (63-73) |
| B2 | Taking my medicines every day is very inconvenient | 104(32.9) | 92(29.1) | 107(33.9) | 13(4.1) | 38% (32.6-43.4) |
| B3 | I feel that I am taking a large number of medicine | 88(27.8) | 68(21.5) | 135(42.7) | 25(7.9) | 50.6% (45-56) |
| B4 | I feel that my medicines are a burden to me | 114(36.1) | 80(25.4) | 110(34.8) | 12(3.8) | 38.6% (33-44) |
| B5 | Sometimes I think I take too many medicines | 134(42.4) | 69(21.8) | 105(33.2) | 8(2.5) | 35.7% (30-41) |
| **Appropriateness Factor** | | | | | | |
| A1 | I feel that I may be taking one or medicines that I no longer need | 144(45.6) | 65(20.6) | 95(30.1) | 12(3.8) | 33.9% (29-39) |
| A2 | I would like to try stoppingone of my medicines to see how I feel without it | 257(81.3) | 29(9.2) | 21(6.6) | 9(2.8) | 9.4% (6-13) |
| A3 | I would like my doctor to reduce the dose of one or more my medicines | 133(42.1) | 49(15.5) | 104(32.9) | 30(9.5) | 42.4% (37-48) |
| A4 | I think one or more of my medicines may not be working | 7(2.2) | 24(7.6) | 281(88.9) | 4(1.3) | 90.2% (87-93) |
| A5 | I believe one or more of my medicines may be currently giving me side effects | 114(36.1) | 70(22.2) | 121(38.3) | 11(3.5) | 41.8% (36-47) |
| **Concerns about stopping factor** | | | | | | |
| C1 | I would be reluctant to stop a medicine that I had been taking for a long time | 109(34.5) | 119(37.7) | 65(20.6) | 23(7.3) | 27.9% (23-33) |
| C2 | If one of my medicines was stopped I would be worried about missing out on future benefits | 9(2.8) | 25(7.9) | 122(38.6) | 160(50.6) | 89.2% (86-93) |
| C3 | I get stressed whenever changes are made to my medicines | 87(27.5) | 81(25.6) | 132(41.8) | 16(5.1) | 46.9% (41-52) |
| C4 | If my doctor recommended stopping a medicine I would feel that he/she was giving up on me | 146(46.2) | 82(25.9) | 63(19.9) | 25(7.9) | 27.8% (23-33) |
| C5 | I have a bad experience when stopping a medicine before | 186(58.9) | 47(14.9) | 45(14.2) | 38(12.0) | 26.5% (21-31) |
| **Involvement Factor** | | | | | | |
| I1 | I have a good understanding of the reasons I was prescribed each of my medicines | 59(18.7) | 44(13.9) | 168(53.2) | 45(14.2) | 67.4% (62-73) |
| I2 | I know exactly what medicines I am currently taking, and/or I keep an up to date list of my medicines | 114(36.1) | 126(39.9) | 65(20.6) | 11(3.5) | 24.1% (19-29) |

| I3 | I like to know as much as possible about my medicines | 71(22.5) | 54(17.1) | 162(51.3) | 29(9.2) | 60.5% (55-66) |
|---|---|---|---|---|---|---|
| I4 | I like to be involved in making decisions about my medicines with my doctors | 32(10.1) | 93(29.4) | 165(52.2) | 26(8.2) | 60.4% (55-66) |
| I5 | I always ask my doctor, pharmacist or other health care professional if there is something I don't understand about my medicines | 19(6.0) | 40(12.7) | 161(50.9) | 96(30.4) | 81.3% (77-86) |
| **General Questions** | | | | | | |
| G1 | If my doctor said it was possible I would be willing to stop one or more of my regular medicines | 22(7.0) | 36(11.4) | 74(23.4) | 184(58.2) | 81.6% (77-86) |
| G2 | Overall, I am satisfied with my current medicines | 9(2.8) | 16(5.1) | 120(38.0) | 171(54.1) | 92.1% (89-95) |

Adopted from the revised Patients' Attitudes Towards Deprescribing (rPATD) Questionnaire (17)

Table 3. Spearman Correlation of responses within the rPATD questionnaire

| rPATD questions Spearman Correlation (*p*-value) | 10.I believe one or more of my medicines may be currently giving me side effects | 21. If my doctor said it was possible I would be willing to stop one or more of my regular medicines | 22.Overall, I am satisfied with my current medicines |
|---|---|---|---|
| **Burden Factor** | | | |
| 1. I spend a lot of money on my medicines | 0.03,0.63 | 0.14, 0.06 | **0.16, 0.00** |
| 2.Taking my medicines every day is very inconvenient | **0.24,0.00** | -0.07, 0.19 | **-0.28,0.00** |
| 3.I feel that I am taking a large number of medicine | **0.15,0.01** | -0.096,0.09 | **-0.35, 0.00** |
| 4.I feel that my medicines are a burden to me | **0.31,0.00** | -0.08, 0.17 | **-0.35,0.00** |
| 5.Sometimes I think I take too many medicines | **0.25,0.00** | **-0.22, 0.00** | **-0.53,0.00** |
| **Appropriateness Factor** | | | |
| 6.I feel that I may be taking one or medicines that I no longer need | **0.25,0.00** | -0.09, 0.13 | **-0.38,0.00** |
| 7. I would like to try stoppingone of my medicines to see how I feel without it | 0.06,0.32 | -0.04, 0.48 | -0.1,0.42 |
| 8.I would like my doctor to reduce the dose of one or more my medicines | **0.14,0.02** | 0.04,0.4 | **-0.25,0.001** |
| 9.I think one or more of my medicines may not be working | **-0.11,0.04** | 0.01,0.8 | **0.14,0.009** |
| 10.I believe one or more of my medicines may be currently giving me side effects | 1 | **-0.14,0.08** | **-0.31,0.00** |
| **Concerns about stopping factor** | | | |
| 11.I would be reluctant to stop a medicine that I had been taking for a long time | **0.19,0.001** | **-0.3,0.00** | **-0.26,0.001** |
| 12.If one of my medicines was stopped I would be worried about missing out on future benefits | **-0.20,0.00** | **0.26,0.00** | **0.55,0.00** |
| 13.I get stressed whenever changes are made to my medicines | **0.27,0.00** | -0.07,0.19 | **-0.17,0.002** |
| 14.If my doctor recommended stopping a medicine I would feel that he/she was giving up on me | **0.12,0.03** | **-0.37, 0.00** | **-0.34,0.00** |
| 15.I have a bad experience when stopping a | **0.19,0.001** | -0.07,0.22 | **-0.18,0.027** |

| medicine before | | | |
|---|---|---|---|
| **Involvement Factor** | | | |
| 16.I have a good understanding of the reasons I was prescribed each of my medicines | **0.14,0.01** | 0.04,0.53 | 0.02,0.74 |
| 17.I know exactly what medicines I am currently taking, and/or I keep an up to date list of my medicines | **0.12,0.03** | -0.02,0.71 | -0.001,0.98 |
| 18.I like to know as much as possible about my medicines | **0.18, 0.001** | -0.08,0.14 | -0.11,0.175 |
| 19.I like to be involved in making decisions about my medicines with my doctors | -0.01,0.79 | -0.01,0.81 | 0.065,0.45 |
| 20.I always ask my doctor, pharmacist or other health care professional if there is something I don't understand about my medicines | 0.05,0.36 | **0.13, 0.02** | **0.18,0.032** |
| **General Questions** | | | |
| 21.If my doctor said it was possible I would be willing to stop one or more of my regular medicines | -0.14,0.08 | 1 | **0.34,0.00** |
| 22. Overall, I am satisfied with my current medicines | **-0.31,0.00** | **0.34, 0.00** | **1** |

**Discussion**

Older adult patients are prone to multi-morbidity with high medication regimens complexity needing stopping of medications, a growing concept so called deprescribing [13]. Elderly patients receiving many medications with their underlined medical illness are vulnerable to re-hospitalization, drug induced complications and morbidity. Moreover, polypharmacy compromises patient adherence and lead to incur additional costs to manage unnecessary adverse outcomes [20-25]. Hence, mutual agreement between patients and clinical practitioners should be sought to optimize the elderly 'patients' medication regimen keeping with few numbers of medications [26]. To our knowledge, this is a first study to have been conducted on this study area in resource limited settings like Ethiopia.

In the current study, the median number of their daily medications (3) was very low as compared to other studies such as the mean of Kalogianis et al. study [12] was 14.6, while the median was 6 and 11 in Sirois et al [16] and Reeve et al study [13], respectively. In spite of having low median number of medications in the current study, majority (81.6%) of the patients agreed to stop one of the medicines if their doctor said it was possible. This is also consistent with previous studies conducted by Mona et al [12], Alessandro et al [27] and Reeve et al having 80% ,, 89% and 92% of patients' willingness rate to stop their medicines if informed to do by their doctor, respectively. This previews the importance of proactive engagement of health care professionals in deprescribing process for older adult patients and should discuss with their patients on how to optimize and simplify the dosage regimens. A small percentage (9.4%) of older patients would like to try stopping one of their medications to see how they feel without it and most of the respondents (89.2%) would be worried about missing out on future benefits if one of their medications was stopped. In this regard, older patients' hesitation to stop one of their

medications might be    reasonable, but it might also a potential barrier to discontinuation of inappropriate medication. The suitability of deprescribing process of a particular medicine in variety of populations should be decided by the integrated approach of patients, caregivers, other health care providers based on the benefits and potential harms [28, 29].

Two third of patients believe that they spent a lot of money to medicines. Even though in current study this variable was not correlated with the patients' willingness to stop one or more of the medicines if the doctor said it was possible, medications costs might contribute to the patients' positive attitude to deprescribing in resource limited setting.  Other study has reported that patients having to pay less for their medications would influence their  willingness to have medications deprescribed and paying more encourage deprescribing [12]. It is always important to consider cost implications in therapeutic decision making and drug selection in elderly patients as those patients are prone to prolonged care, polypharmacy and less productivity to handle their therapeutic expenses [30].

This study has showed the association between each item and the selected three questions of the survey items like perceiving of side effects from one or more of medicines taken, willingness to stop one or more of medicines if the doctor said it was possible, and overall satisfaction with their current medications. Patients didn't have overall satisfaction with their medications if they perceive side effect from one or more of the medications. In the current study, ''Patients' willingness to stop one or more of medications if advised by doctor'' were negatively correlated with others item questions such as "Sometimes I think I take too many medicines", "perceiving of side effects from one or more of their medications" and "being reluctant to stop a medicine taken for a long time . However, it was positively associated with "overall satisfaction with their medications" which in other words, patients were willing to stop one or more of medications if

the doctor said, it was possible, even if they had overall satisfaction with their medications. Other studies also reported that patient willingness to stop medication was correlated with a desire to take few medicines and the feeling of taking a large number of medications and being less comfortable with current medications [13, 15, 16].

Majority of the respondents ask their doctor, pharmacist or other health care professional if there is any miss-understanding about their medications. This imply older adults curiosity to know about their medicines, ask their healthcare provider and involve in the clinical decision making process. This is very important to patient–provider relationships, encircling on the sub-themes of trust, relying on expertise and shared decision making which are imperative to better patient outcomes.  In spite of these, majority of  older adult participants do not have good knowledge of their medicines and merely dependent on the health care providers to initiate decisions about their medications. Moreover, many patients who have a preference to take fewer medicines do not share their beliefs with providers and waiting for provider initiated medication discontinuation [31]. Thus health professionals should use a patient centered approach to outweigh the risks and benefits of every medicine against the particular goals of the elderly patient, with the aim of minimizing the total number of prescribed medicines [32-34].

**Strengths and Limitations**

This is the first study in Ethiopia to assess older adults ' perception towards deprescribing and their willingness to stop medicines by using validated multidimensional questionnaire in relatively large number of patients. Yet, the results of the current study should be interpreted with caution due to some limitations. It is interviewer based questionnaire structured for quantitative research, which does not permit in-depth investigation of patient attitude.  The rPATD questionnaire has not been yet validated in culturally different settings like

Ethiopia. This study may suffer from generalizability as the study was done in a single-center university hospital.

**Conclusion**

Most of older patients (92.1%) were overall satisfied with medications they were taking. However, majority of the participants (81.6%) were willing to reduce one or more of their medications if their doctor said it was possible. Therefore, health care providers should be proactive to discuss, evaluate and decision making of potentially in appropriate medications. Further study with potentially large number of study participants and qualitative study is warranted to fully evaluate the deprescribing attitude in different disease categories and prospective significance to Ethiopian older adults' health.

**Contributors** HGT has contributed to the conception, study design, prepared the study protocol and drafted the manuscript. YGT and DAE performed literature review, carried out statistical analyses, and interpreted the results. FC and YA acquired and managed the data. KTH, TBA, AAA wrote the manuscript and reviewed the manuscript for critical revisions. All authors approved the final manuscript.

**Competing interests:** No competing interest among Authors.

**Patient consent:** Obtained.

**Ethics approval:** Ethical committee of School of Pharmacy, University of Gondar

**Provenance and peer review:** not commissioned; externally peer reviewed.

**Data sharing statement:** No additional data are available

**References**

1. Bushardt RL, Massey EB, Simpson TW, Ariail JC, Simpson KN. Polypharmacy: misleading, but manageable. ClinInterv Aging. 2008;3(2):383-389.

2. Nebeker JR, Barach P, Samore MH. Clarifying adverse drug events: a clinician's guide to terminology, documentation, and reporting. Ann Intern Med. 2004;140(10):795-801

3. Gandhi TK, Weingart SN, Borus J, et al. Adverse drug events in ambulatory care. N Engl J Med. 2003;348(16):1556-1564.

4. Reeve E, Gnjidic D, Long J, Hilmer S. A systematic review of the emerging definition of 'deprescribing' with network analysis: implications for future research and clinical practice. Br J ClinPharmacol 2015; 80: 1254–68

5. Page AT, Clifford RM, Potter K, Schwartz D, EthertonBeer CD. The feasibility and the effect of deprescribing in older adults on mortality and health: A systematic review. British Journal of Clinical Pharmacology. 2016; 82(3):583-623

6. Reeve E, Wiese MD. Benefits of deprescribing on patients' adherence to medications. Int J Clin Pharm 2014;36:26–9

7. AbebeSM, Andargie G, Shimeka S, et al. The prevalence of non-communicable diseases in northwest Ethiopia: survey of Dabat Health and Demographic Surveillance System. BMJ Open. 2017; 7(10): e015496. doi:  10.1136/bmjopen-2016-015496

8. Center for national health development in Ethiopia. http://cnhde.ei.columbia.edu/healthsystem

9. Iyer S, Naganathan V, McLachlan AJ, LeCouteur DG. Medication withdrawal trials in people aged 65 years and older: a systematic review. Drugs Aging 2008;25:1021–31

10. Linsky A, Simon SR, Marcello TB, Bokhour B. Clinical provider perceptions of proactive medication discontinuation. Am J Manag Care. 2015;21(4):277-283

11. Phillips LS, Branch WT, Cook CB, et al. Clinical inertia. Ann Intern Med. 2001;135(9):825-834

12. Kalogianis MJ, Wimmer BC, Turner JP, et al. Are residents of aged care facilities willing to have their medications deprescribed? Research in Social and Administrative Pharmacy 12 (2016) 784–788. http://dx.doi.org/10.1016/j.sapharm.2015.12.004....

13. Reeve E, Wiese M, Hendrix I, Roberts MS, Shakib S . People's attitudes, beliefs and experiences regarding polypharmacy and willingness to deprescribe. J Am GeriatrSoc.2013;61:1508–1514…

14. Qi K, Reeve E, Hilmer SN, Pearson S-A,Matthews S, Gnjidic D. Older peoples' attitudesregarding polypharmacy, statin use and willingnessto have statins deprescribed in Australia. Int J ClinPharmcol. 2015;37:949–957…

15. Ng WL, Tan MZW, Koh EYL, Tan NC. Deprescribing: What are the views and factors influencing this concept among patients with chronic diseases in a developed Asian community? Proc Singapore Healthc. March 2017:1-8. doi:10.1177/2010105817699633….

16. Sirois C, Ouellet N, Reeve E. Community-dwelling older people's attitudes towards deprescribing in Canada. Res SocAdm Pharm. 2017;13(4):864-870. doi:10.1016/j.sapharm.2016.08.006

17. Reeve E, Low LF, Shakib S, Hilmer SN. Development and validation of the revised Patients' Attitudes Towards Deprescribing (rPATD) Questionnaire: Versions for older adults and caregivers. Drugs & aging. 2016;33(12):913-28.

18. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. Psychol Health 1999;14:1–24

19. IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.

20. World Health Organization. Adherence to long-term therapies: evidence for action [online] (2013) [cited 2017 on Sept 21]. http://www.who.int/chp/knowledge/publications/adherence_report/en/index.html.

21. Hajjar ER, Cafiero AC, Hanlon JT. Polypharmacy in elderly patients. Am J GeriatrPharmacother. 2007; 5(4):345–51.

22. Banning M. Medication management: older people and nursing. Nurs Older People. 2005; 17(7):20–3.

23. Frazier SC. Health outcomes and polypharmacy in elderly individuals. J GerontolNurs. 2005; 31(9):4–11.

24. Guthrie B, McCowan C, Davey P, Simpson CR, Dreischulte T, Barnett K. High risk prescribing in primary care patients particularly vulnerable to adverse drug events: cross sectional population database analysis in Scottish general practice. BMJ. 2011;21(342):d3514.

25. Giustini S, Thiry S. Medicinagenerale, multi morbilita` e politerapianeipazientianziani. RivSocItaliana di Med Gen. 2012;6:11–4.

26. Patterson SM, Hughes C, Kerse N, Cardwell CR, Bradley MC. Interventions to improve the appropriate use of polypharmacy for Older people. Cochrane Database Syst Rev 2012; 5: Art. No.:CD008165

27. Alessandro G, Maura L, Maria TC, et al. Attitudes towards polypharmacy and medication withdrawal among older inpatients in Italy. Int J Clin Pharm (2016) 38:454–461.

28. Reeve E, Moriarty F, NahasR, Turner JP, O'Donnell LK,Hilmer SN. A narrative review of the safety concerns of deprescribing in older adults and strategies to mitigate potential harms. Expert Opinion on Drug Safety. 2018;17(1); 39-49, DOI: 10.1080/14740338.2018.1397625).

29. Reeve E, Thompson W, Farrell B. Deprescribing: A narrative review of the evidence and practical recommendations for recognizing opportunities and taking action. European Journal of Internal Medicine. 2017:38; 3-11)

30. Garfinkel D, Zur-Gil S, Ben-Israel J. The war against polypharmacy: a new cost-effective geriatric-palliative approach for improving drug therapy in disabled elderly people. Isr Med Assoc J 2007;9:430–434

31. Linsky A, Simon SR, Bokhour B. Patient perceptions of proactive medication discontinuation. Patient Education and Counseling.2015; 98: 220–225.

32. Page AT, Etherton-Beer CD, Clifford RM, Burrows S, Eames M, Potter K. Deprescribing in frail older people–Do doctors and pharmacists agree?. Research in Social and Administrative Pharmacy. 2016 Jun 30;12(3):438-49.

33. Page A, Potter K, Clifford R, Etherton-Beer C. Deprescribing in older people. Maturitas. 2016;91:115-134.

34. Potter K, Page A, Clifford R, Etherton-Beer C. Deprescribing: A guide for medication reviews. Journal of Pharmacy Practice and Research. 2016;46(4): 358–367

## **Supplementary material**

Binary logistic regression was performed after dichotomizing the two item questions (willingness to deprescribe one or more of their regular medications if the doctor said it was possible and overall satisfaction with their prescribed medications) by grouping the 4 Likert responses to "strongly agree and agree" versus "strongly disagree and disagree".

However, in Univariate analysis, Sociodemographic and clinical variables like Age, sex, Education, charlson comorbidity index (CCI) and reason of hospital visit (chief complaint) didn't fit final model according to the Hosmer-Lemeshow assumption owing to having p >0.2. The level of statistical significance was defined as p<0.05 and all tests were two-tailed as shown in the table below.

**Supplementary Table:** Univariate analysis of Sociodemographic and clinical variables with the two item questions

| Variables | 21.Willingness to stop one or more of regular medicines if the doctor said it was possible (agreed/strongly agreed) | | 22. Overall satisfaction with the current medications (agreed/strongly agreed) | |
|---|---|---|---|---|
| | COR (95% CI) | P-Value | COR (95% CI) | P-Value |
| Age | 1.02(0.98-1.06) | 0.37 | 0.89(0.93-1.04) | 0.60 |
| Sex (male) | 0.94(0.53-1.66) | 0.83 | 1.26(0.55-2.9) | 0.58 |
| Education | - | 0.59 | - | 0.35 |
|   Unable to read and write | 1.39(0.48-4.06) | 0.54 | 1.76(0.36-8.5) | 0.48 |
|   Primary school | 2.25(0.64-7.89) | 0.20 | 0.75(0.15-3.86) | 0.73 |
|   Secondary school | 1.44(0.37-5.5) | 0.59 | 1.07(0.16-7.06) | 0.94 |
|   Higher education | 1 | - | 1 | - |
| Reason of admission | - | 0.96 | - | 0.92 |
| CCI | 0.85(0.63-1.15) | 0.37 | 0.82(0.54-1.25) | 0.35 |

Abbreviation: CCI: Charlson Comorbidity Index, CI: Confidence Interval, COR: Crude Odds Ratio

Note: None of the variables fits the final model (P>0.2)

**STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies***

| Section/Topic | Item # | Recommendation | Reported on page # |
|---|---|---|---|
| **Title and abstract** | 1 | (*a*) Indicate the study's design with a commonly used term in the title or the abstract | P1,L2 and P2, L4 |
| | | (*b*) Provide in the abstract an informative and balanced summary of what was done and what was found | Page 2, L1-23 |
| **Introduction** | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | P3,L13-24 and P4,L1-20 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | P4, L18-20 |
| **Methods** | | | |
| Study design | 4 | Present key elements of study design early in the paper | P5,L1 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | P5,P2-5 |
| Participants | 6 | (*a*) Give the eligibility criteria, and the sources and methods of selection of participants | P5, L7-12 |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | P5,L13-16 |
| Data sources/ measurement | 8* | For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group | P5,L18-23 and P6,1-11 |
| Bias | 9 | Describe any efforts to address potential sources of bias | P6,L11-14 |
| Study size | 10 | Explain how the study size was arrived at | P5, L14 and L15 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | NA |
| Statistical methods | 12 | (*a*) Describe all statistical methods, including those used to control for confounding | P7,L4-6 |
| | | (*b*) Describe any methods used to examine subgroups and interactions | P6,22-23 |
| | | (*c*) Explain how missing data were addressed | NA |
| | | (*d*) If applicable, describe analytical methods taking account of sampling strategy | NA |
| | | (*e*) Describe any sensitivity analyses | NA |

| Results | | | | |
|---|---|---|---|---|
| Participants | 13* | (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed | | P7,L20-22 |
| | | (b) Give reasons for non-participation at each stage | | NA |
| | | (c) Consider use of a flow diagram | | NA |
| Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | | P8,L1-5 |
| | | (b) Indicate number of participants with missing data for each variable of interest | | P8,L7 |
| Outcome data | 15* | Report numbers of outcome events or summary measures | | P9,L1-10 |
| Main results | 16 | (*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included | | Page 10, Table 2 |
| | | (*b*) Report category boundaries when continuous variables were categorized | | NA |
| | | (*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | | NA |
| Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | | NA |
| **Discussion** | | | | |
| Key results | 18 | Summarise key results with reference to study objectives | | P14-16 |
| Limitations | 19 | Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias | | P16, L7-11 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | | P16, L7-8 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | | P16, L10-11 |
| **Other information** | | | | |
| Funding | 22 | Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based | | NA |

Abb: NA- Not applicable

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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