

## Perception of Patients with Diabetes Comorbidities on Polypharmacy and Deprescribing in a Public Healthcare Setting

Sandrea Alby<sup>1</sup>, Reshma George<sup>1</sup>, Aksa Roy<sup>1</sup>, Y Joel Isaac<sup>1</sup>, Roja B<sup>1</sup>, Someshwaran S<sup>1</sup>,  
Mohsina Hyder<sup>1\*</sup>, V. Arun Kumar<sup>2</sup>, V. Jothibasu<sup>3</sup>,

<sup>1</sup>Department of Pharmacy Practice, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty-643001, The Nilgiris, India

<sup>2</sup>Department of Pharmacology, Govt Medical College & Hospital, Ooty, The Nilgiris, Tamil Nadu, India

<sup>3</sup>Department of General Medicine, Govt Medical College & Hospital, Ooty, The Nilgiris, Tamil Nadu, India

**Corresponding Author:** Dr. Mohsina Hyder<sup>1</sup>, E-mail: mohsinahyder@gmail.com

### KEYWORDS

Polypharmacy,  
rPATD,  
Treatment Chart  
Review,  
Deprescribing,  
Shared Decision  
Making

### ABSTRACT:

The primary objective is to determine patients' and caregivers' attitude towards polypharmacy and deprescribing by administering a revised Patients' Attitudes Towards Deprescribing questionnaire. Secondary objective is to identify and compare individual characteristics associated with these attitudes and beliefs, and to perform Treatment Chart Review. A prospective cross-sectional questionnaire based-study was carried out on 250 type 2 diabetes patients with comorbidities visiting public health care setting within the Nilgiris for a period of 6 months. Patient's comorbid conditions and concurrent medication were analysed, and a Treatment Chart Review was conducted to identify any drug-related issues. The rPATD questionnaire was administered to both patients and their caregivers, particularly for those aged 60 and over to determine their attitude towards polypharmacy and deprescribing. The study involved 250 participants, consisting of 156 patients and 94 caregivers. Among the patients, 81 (51.9%) exhibited a negative attitude toward deprescribing, while 53 (56.4%) of the caretakers expressed a positive attitude. The Chi square test had shown significant association between participant characteristics (age and education) and their involvement in medication use. Treatment Chart Review was done in 108 inpatients and 53(49%) medication errors were found. These errors were communicated to the physicians. This study underscores that improving patient education and engagement can enhance treatment outcomes and reduce the medication burden. It also illustrates patients' and caregivers' readiness to participate in deprescribing practices with proper guidance from healthcare providers. However, the insufficiency of medical facilities in public hospitals has notably hindered the delivery of healthcare services.

### 1. Introduction

Diabetes mellitus is an escalating global health concern, with its prevalence increasing at an alarming rate worldwide. Type 2 diabetes, in particular, poses substantial risks when left unmanaged over long period. Individuals with Type 2 diabetes mellitus are prone to comorbid conditions like cardiovascular issues, end-stage renal disease, vision problems, and nerve damage due to risk factors including obesity, endothelial dysfunction, vascular inflammation, and dyslipidaemia. <sup>[1]</sup> The existence of additional comorbid conditions greatly influences the approach to treating and managing type 2 diabetes. These complications not only impact the individual's health and quality of life but also place a considerable burden on healthcare systems globally.

According to Vivek Podder et al., a study done among diabetic patients in Northwest India, the overall prevalence of comorbid conditions among 1215 participants were found to be peripheral vascular disease (21.2%), ocular diseases (18.08%), hypertension (13.4%), dyslipidemia (5.7%), kidney disease (2.3%) and stroke (1.2%). <sup>[2]</sup>

Older adults with poorly controlled diabetes often face significant difficulties in managing their condition, which may lead them to try various medications to improve their health. This approach increases the risk of polypharmacy and related drug complications, creating

complex challenges.<sup>[3]-[5]</sup> Thus, treatment goals for older people with diabetes are required to be individualized and precise.<sup>[6]</sup> Polypharmacy, defined as the use of five or more medications simultaneously, is rising globally, with about 50% of people aged 65 and older taking multiple medications.<sup>[7]</sup> This can be divided into ‘appropriate polypharmacy’ and ‘potentially inappropriate medications (PIMs).’ PIMs are drugs where the risks outweigh the benefits, especially when safer options are available.<sup>[8]</sup> Studies indicate that 20% to 65% of older adults use at least one PIM, raising their risk of adverse drug reactions and higher mortality.<sup>[9][10]</sup> The overall prevalence of polypharmacy in India from 2002 to 2020, was found to be 49% which was most prevalent in the north Indian states (65%).<sup>[11]</sup>

Deprescribing is a supervised strategy where healthcare professionals discontinue inappropriate medications to manage polypharmacy and improve patient outcomes.<sup>[12]</sup> This method helps reduce out-of-pocket expenses, drug interactions, medication non-adherence, and side effects, ultimately enhancing overall well-being.<sup>[13]</sup> As people age, the risks and benefits of their medications can change, so long-term treatments may need to be adjusted or stopped.<sup>[14][15]</sup> The deprescribing process necessitates communication between patients and healthcare providers (HCPs), hence the patient's participation is seen as crucial element contributing to deprescribing's success.<sup>[16]</sup> Swetha et al. found that approximately 71.8% of doctors in India believe that deprescribing offers benefits to patients.<sup>[17]</sup>

Generally, Patient's Attitude Towards Deprescribing (PATD) questionnaire is used to capture patients' attitudes and beliefs regarding deprescribing and cessation of medications. In this study, we use the Revised Patients' Attitudes Towards Deprescribing (rPATD) questionnaire because it provides insight into caregivers' views on the medications their care recipients are taking and includes a scoring system.<sup>[18]</sup>

Additionally, the rPATD questionnaire has not been previously studied in Tamil Nadu. The innovative approach of reviewing treatment charts alongside evaluating attitudes represents a new and unique method of investigation. The purpose of this study is to enable the patient to gain a better understanding of their medications and communicate effectively with their healthcare providers regarding their usage of medications. This study also aims in understanding people's perception on deprescribing and to create awareness on avoiding polypharmacy.

## 2. Objectives

- To assess the perception of diabetic patients with comorbidities towards polypharmacy and deprescribing.
- To analyze the comorbid conditions and concurrent medications associated with type 2 Diabetes Mellitus.
- To determine patient's and caregiver's attitude towards polypharmacy and deprescribing using rPATD Questionnaire.

## 3. Methods

A Prospective, cross-sectional questionnaire-based study was conducted at Government Medical college and Hospital, Nilgiris district, Tamil Nadu for a duration of 6 months during October 2023–March 2024. Permission was obtained from Institutional Review Board, Government Medical College and Hospital, Ooty, The Nilgiris (Ref.No.12/IEC/ICMR; Approval No. IRBGMC0031) to carry out the study. Informed consent was acquired from the patient in writing before they were enrolled in the study.

### Study criteria:

#### *Patients' inclusion criteria*

- Male and female subjects age between 30-70 years.
- Type 2 diabetes mellitus patients with comorbid conditions.
- Subjects taking 5 or more long term prescription medications.

#### *Patients' exclusion criteria*

- Subjects who are not willing to give written informed consent.
- Incomplete questionnaires
- Subject with known cognitive, speech, and hearing impairments.

#### *Caregivers' inclusion criteria*

- Individuals who play any role as a family member or individuals receiving financial support for caregiving activities
- Care recipient must be  $\geq 60$  years of age

#### *Caregivers' exclusion criteria*

- Caregiver age  $< 18$  years

#### **Design of study and sample:**

The research utilized a cross-sectional survey approach, consisting of five separate stages to collect the required data.

##### Phase One: Literature Review and Study Protocol

- A review of existing literature was conducted to identify research gaps.
- A study protocol was developed and submitted for approval to the Institutional Ethics Committee, following Good Clinical Practice (GCP) guidelines.

##### Phase Two: Participant Recruitment and Data Collection

- Participants meeting inclusion criteria were recruited through a survey at Government Medical College and Hospital, Nilgiris District, Tamil Nadu.
- This was a prospective cross-sectional study using the revised Patient's Attitudes Towards Deprescribing (rPATD) questionnaire to assess attitudes and beliefs towards deprescribing among diabetic patients and their caregivers.
- The rPATD questionnaire was adapted with approval from the original authors.

##### Phase Three: Informed Consent and Data Collection

- Participants were briefed on the study's aims, objectives, and methodology, and their consent was documented using an Informed Consent Form.
- Data collected included participants' details, existing comorbidities, and current medications.
- A Treatment Chart Review was performed to identify issues such as drug duplication, unnecessary medications, drug interactions, inappropriate drug use, and dosing errors.
- The rPATD questionnaire was administered confidentially to both patients and their caregivers.
- An educational session on polypharmacy was conducted using a pamphlet to raise awareness.

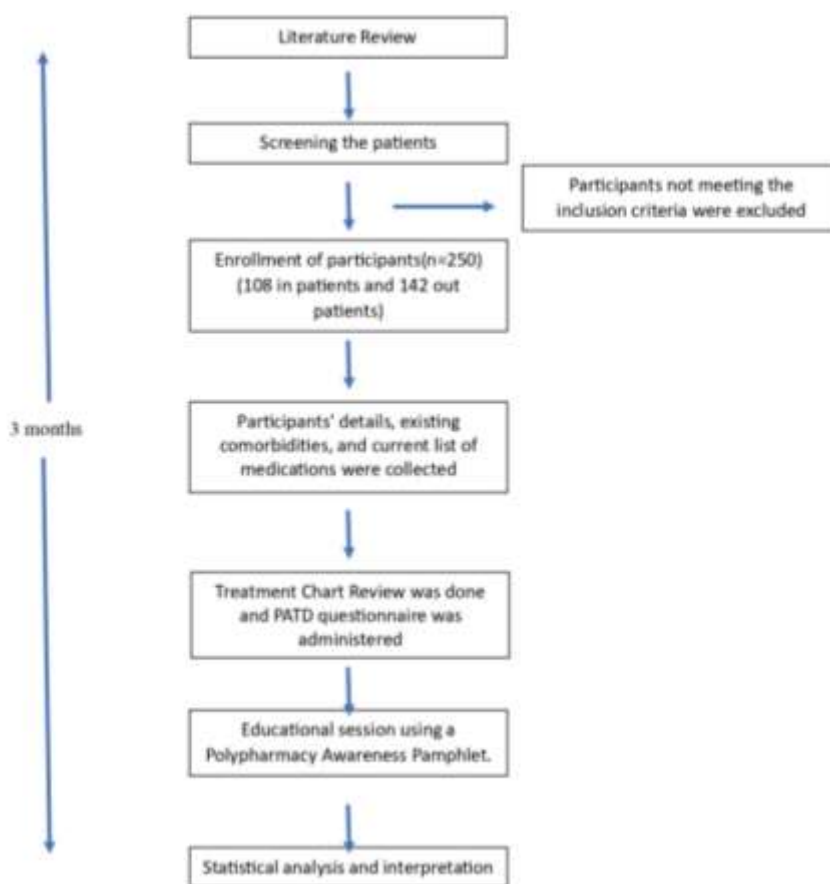
##### Phase Four: Data collection

- Data was collected over a period of three months.

##### Phase Five: Statistical Analysis

- The statistical Analysis was performed with the help of IBM SPSS version 21.
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- **Binomial logistic regression** model was used to determine the effects of the independent variables on the outcome variables
- **Chi Square Analysis** was used to measure the level of association between the patient related factors and willingness to deprescribe.
- All of the rPATD items were then correlated with three separate questions using **Spearman's rank Correlation Analysis**.

**Fig 1: Procedure of the study**



### Questionnaire design:

The revised Patients' Attitudes towards deprescribing (rPATD) questionnaire which was developed and validated by Emily reeve was being used in our study.

The questionnaire has been divided into individual factors such as belief and inappropriateness of medication withdrawal (Appropriateness factor), the perceived burden of their medications (Burden factor), concerns about stopping (Concerns about stopping factor), and the level of involvement/knowledge in medication management (Involvement factor). The rPATD questionnaire also captures the caregiver's perspective on how they feel about the care recipient's medication.<sup>[19]</sup>

The questionnaire used in this study was validated by a panel of experts which includes academicians, doctors and statisticians. Using a Likert scale for analysis, we combined "strongly agree" and "agree" into a score of 3 points, and "disagree" and "strongly disagree" into a score of 1 point, with "neutral" receiving 2 points.<sup>[20]</sup> We evaluated each factor separately and, based on the scores, determined whether patients had a positive or negative attitude toward deprescribing.

### Statistical analysis:

Response frequencies were illustrated by calculating and presenting percentages. The data was coded and entered into MS Excel for descriptive analysis. Qualitative data were summarized in terms of absolute and relative frequencies. Statistical analysis was performed using IBM SPSS version 21. To evaluate the impact of independent variables on the outcome variables, a

binary logistic regression model was applied. Additionally, chi-square analysis was utilized to assess the association between patient-related factors and the willingness to deprescribe. Statistical significance was assessed at P value < 0.05. The associations between all rPATD items and three individual questions—patients' perceptions of medication side effects, patients' willingness to stop taking their medications if their doctor said so, and patients' overall satisfaction with their medications were examined using with Spearman's r correlation analysis.

#### 4. Results

##### Patient Characteristics:

A total of 250 Type 2 diabetes patients with comorbidities (156 patients and 94 caregivers) were recruited from public hospital based on the study criteria. Most of patients were aged 61-70 (48.4%), females (59.6%), and illiterate (33.6%). A significant proportion of hospital patients, specifically 65.2%, reported an income less than 5K. Participant characteristics are

**Table 1 : Participants demographics**

described in Table 1.

| Demographics information      | Number of participants | Percentage (%) |
|-------------------------------|------------------------|----------------|
| <b>GENDER</b>                 |                        |                |
| Male                          | 101                    | 40.4           |
| female                        | 149                    | 59.6           |
| <b>AGE</b>                    |                        |                |
| 30-40                         | 9                      | 3.6            |
| 41-50                         | 28                     | 11.2           |
| 51-60                         | 92                     | 36.8           |
| 61-70                         | 121                    | 48.4           |
| <b>EDUCATION (patients)</b>   |                        |                |
| Illiterate                    | 53                     | 33.9           |
| Primary                       | 62                     | 39.7           |
| Secondary                     | 20                     | 12.8           |
| Higher Secondary              | 11                     | 7              |
| Undergraduate                 | 7                      | 4.4            |
| Postgraduate                  | 3                      | 1.9            |
| <b>EDUCATION (caregivers)</b> |                        |                |
| Illiterate                    | 5                      | 5.3            |
| Primary                       | 11                     | 11.7           |
| Secondary                     | 15                     | 15.9           |
| Higher Secondary              | 34                     | 36.1           |
| Undergraduate                 | 21                     | 22.3           |
| Postgraduate                  | 8                      | 8.5            |
| <b>PROFESSION</b>             |                        |                |
| Unskilled                     | 51                     | 20.4           |
| Unemployed                    | 107                    | 42.8           |
| Semi-skilled                  | 60                     | 24             |
| Skilled                       | 32                     | 12.8           |

### Associated comorbidities and polypharmacy:

The comorbid condition majorly associated with Type 2 Diabetes was found to be 90% (n=224) hypertension, followed by 48% (n=121) dyslipidaemia, 35% (n= 88) cardiovascular diseases and 23% (n= 58) either asthma/COPD. Table 3 presents the current status of polypharmacy among the patients. The medications taken by the majority of participants were antihypertensives 90% (n=224), anti-lipidemic medications 66% (n=164), acid suppressants 58%(n=146), CVD medication 40% (n= 100) and vitamin supplements 72% (n=180). Majority were on a regimen of 5 medications. Various side effects experienced by the participants as a result of their medications were noted. Table 2 and 3 provides more details about associated comorbidities and polypharmacy.

**Table 2: Associated Comorbidities and Side Effects**

| COMORBID CONDITIONS | Number of participants | Percentage (%) |
|---------------------|------------------------|----------------|
| Hypertension        | 224                    | 89.6           |
| Dyslipidaemia       | 121                    | 48.4           |
| CVD                 | 88                     | 35.2           |
| Asthma/COPD         | 58                     | 23.2           |
| Thyroid Disorder    | 35                     | 14             |
| CKD                 | 9                      | 3.6            |
| Others              | 53                     | 21.2           |
| <b>SIDE EFFECTS</b> |                        |                |
| Gastric irritation  | 86                     | 34             |
| Fatigue             | 56                     | 22             |
| Constipation        | 45                     | 18             |
| Joint pain          | 44                     | 18             |
| Insomnia            | 37                     | 15             |

**Table 3: Polypharmacy Status**

| DIABETIC MEDICATIONS     | Number of Participants | Percentage |
|--------------------------|------------------------|------------|
| Biguanides               | 230                    | 92         |
| Sulfonylureas            | 163                    | 65.2       |
| Insulin                  | 39                     | 15.6       |
| DPP-4 inhibitors         | 21                     | 8.4        |
| SGLT 2 inhibitors        | 3                      | 1.2        |
| <b>OTHER MEDICATIONS</b> |                        |            |
| Anti hypertensives       | 224                    | 89.6       |
| Antilipidemic agents     | 164                    | 65.6       |
| Acid suppressants        | 135                    | 54         |
| CVD medications          | 100                    | 40         |
| Vitamin supplements      | 180                    | 72.1       |
| Asthma/COPD medications  | 58                     | 23.2       |
| Thyroid medications      | 35                     | 14         |



|                              |    |      |
|------------------------------|----|------|
| Others                       | 33 | 13.4 |
| <b>NUMBER OF MEDICATIONS</b> |    |      |
| 5 medications                | 80 | 32   |
| 6 medications                | 66 | 26.4 |
| 7 medications                | 50 | 20   |
| 8 medications                | 34 | 13.6 |
| 9 medications                | 13 | 5.2  |
| 10 medications               | 3  | 1.2  |
| more than 10 medications     | 4  | 1.6  |

#### Attitude of patients towards deprescribing:

The majority of patients did not view their medications as burdensome. About 54%(n=85) felt they were not taking an excessive number of medicines, and 72%(n=112) did not see their medications as financially stressful. 63%(n=99) participants believed their medications were beneficial and posed no harm. However, 47%(n=73) of the participants acknowledged experiencing side effects from their treatments. The responses regarding medication discontinuation were evenly divided. Approximately 46% (n=71) expressed hesitation about stopping medications they had been on for a long period, while 42% (n=66) were entirely comfortable with the idea. Additionally, 52%(n=81) of participants felt that stopping their medications would mean losing out on valuable benefits.

Moreover, a significant number of patients, 49% (n=76), reported feeling stressed by alterations to their medication regimen. Although patients were generally engaged with their treatments, 67%(n=105) were unaware of the specific reasons for each medication or the complete list of their prescriptions, though they expressed a desire to learn more. Nearly half of the patients showed interest in participating in decision-making about their treatments but felt they lacked the literacy to fully understand. Overall, 61%(n=95) were satisfied with their current medications, yet 82% (n=128) were open to discontinuing one or more if advised by their physician.

Our findings, were that most patients were on five medications, revealed no perceived burden. Most patients felt their treatments were appropriate and effective. Nevertheless, there was considerable hesitation about stopping medications, reflecting an overall negative attitude towards deprescribing.

**Table 4: Patients' Attitude Towards Deprescribing Using rPATD**

| Item                                                                      | Disagree (1)<br>n (%) | Neutral (2)<br>n (%) | Agree (3)<br>n (%) |
|---------------------------------------------------------------------------|-----------------------|----------------------|--------------------|
| <b>Burden Factor</b>                                                      |                       |                      |                    |
| I spend a lot of money on medicines                                       | 112(71.8)             | 10(6.3)              | 34(21.9)           |
| Taking my medicines every day is very inconvenient                        | 78 (50.1)             | 12 (7.6)             | 66(42.3)           |
| I feel that I am taking a large number of medicines                       | 85(54.4)              | 17(10.8)             | 54(34.6)           |
| I feel that my medicines are a burden to me                               | 82(52.4)              | 10(6.7)              | 64(40.9)           |
| Sometimes I think I take too many medicines                               | 90(57.6)              | 14(9.3)              | 52(33.3)           |
| <b>Appropriateness factor</b>                                             |                       |                      |                    |
| . I feel that I may be taking one or more medicines that I no longer need | 115(73.7)             | 14(8.9)              | 27(17.4)           |

|                                                                                                                                  |           |           |           |
|----------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|
| I would like to try stopping one of my medicines to see how I feel without it                                                    | 75 (48.2) | 18(11.5)  | 63(40.3)  |
| I would like my doctor to reduce the dose of one or more of my medicines                                                         | 68(43.6)  | 27(17.4)  | 61(39)    |
| I think one or more of my medicines may not be working                                                                           | 99(63.2)  | 21(13.6)  | 36(23.2)  |
| I believe one or more of my medicines may currently be giving me side effects                                                    | 80(51.3)  | 3(2.1)    | 73(46.6)  |
| <b>Concerns about stopping factor</b>                                                                                            |           |           |           |
| I would be reluctant to stop a medicine that I had been taking for a long time                                                   | 66(42.3)  | 19(12.1)  | 71(45.5)  |
| If one of my medications was stopped, I would be worried about missing out on future benefits                                    | 56 (35.8) | 19 (12.3) | 81(51.9)  |
| I get stressed whenever changes are made to my medicines                                                                         | 68(43.5)  | 12(7.8)   | 76(48.7)  |
| If my doctor recommended stopping a medicine, I would feel that he/she was giving upon me.                                       | 118(75.6) | 11(7.2)   | 27(17.2)  |
| I have had a bad experience when stopping a medicine before                                                                      | 107(68.6) | 0         | 49(31.4)  |
| <b>Involvement factor</b>                                                                                                        |           |           |           |
| I have a good understanding of the reasons I was prescribed each of my medicines                                                 | 72(46.1)  | 34(21.7)  | 50(32)    |
| I know exactly what medicines I am currently taking, and/or I keep an up-to-date list of my medications.                         | 105(67.3) | 13(8.3)   | 38(24.4)  |
| I like to know as much as possible about my medicines                                                                            | 42 (26.9) | 48(30.7)  | 66(42.4)  |
| I like to be involved in making decisions about my medicines with my doctors                                                     | 59 (37.5) | 33(21.4)  | 64(41.1)  |
| I always ask my doctor, pharmacist, or other healthcare professional if there is something I don't understand about my medicines | 61 (39.1) | 8(5.1)    | 87(55.8)  |
| <b>Global factor</b>                                                                                                             |           |           |           |
| If my doctor said it was possible, I would be willing to stop one or more of my regular medicines                                | 8 (4.7)   | 20(13.1)  | 128(82.2) |
| Overall, I am satisfied with my current medicines.                                                                               | 27(17)    | 34(21.6)  | 95(61.4)  |



### **Attitude of caregivers towards deprescribing:**

A segment of caregivers 59%(n=55) expressed concerns that the number of medications their care recipients were taking was burdensome. Specifically, 42%(n=40) of caregivers indicated a preference for their physician to reduce the dosage of their care recipients' medications, while 47%(n=44) questioned the efficacy of these medications. More than half of the caregivers 51% (n=48) reported feeling stressed and hesitant about discontinuing long-term medications for their care recipients.

The primary concern hindering discontinuation was the fear of losing therapeutic benefits. Despite these concerns, caregivers 46%(n=43) generally demonstrated a positive attitude towards the concept of deprescribing. Caregivers 68% (n=64) showed a keen awareness of their care recipients' medications and expressed a strong interest in understanding these medications thoroughly. They 74%(n=69) also affirmed their willingness to consult healthcare professionals with any questions or uncertainties regarding the medications. Overall, while 57% (n=54) of caregivers were satisfied with their care recipients' current medication regimens and 69% (n=65) remained open to discontinuing these medications if advised by their physician.

| Item                                                                                                                                 | Disagree (1)<br>n (%) | Neutral (2)<br>n (%) | Agree (3)<br>n (%) |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|--------------------|
| <b>Burden Factor</b>                                                                                                                 |                       |                      |                    |
| My Care recipient's medicines are quite expensive                                                                                    | 66 (70.2)             | 5 (5.4)              | 23(24.4)           |
| I feel that the person I care for is taking a large number of medicines                                                              | 36(38.3)              | 8(8.5)               | 50 (53.2)          |
| I feel that my care recipient's medicines are a burden to them                                                                       | 25(26.6)              | 14(14.9)             | 55(58.5)           |
| Sometimes I think the person I care for takes too many medicines                                                                     | 36(38.3)              | 8(8.5)               | 50 (53.2)          |
| <b>Appropriateness factor</b>                                                                                                        |                       |                      |                    |
| I feel that the person that I care for may be taking one or more medicines that they no longer need                                  | 75 (79.7)             | 7(7.5)               | 12(12.8)           |
| I would like the doctor to try stopping one of my care recipient's medicines to see how they feel without it                         | 60(63.8)              | 12 (12.7)            | 22(23.5)           |
| I would like the doctor to reduce the dose of one or more of my care recipient's medicines                                           | 20 (21.3)             | 34(36.2)             | 40(42.5)           |
| I think one or more of my care recipient's medicines may not be working                                                              | 36 (38.2)             | 14(14.8)             | 44(47)             |
| I believe one or more of my care recipient's medicines may be currently giving them side effects                                     | 49 (52.1)             | 4(4.2)               | 41(43.7)           |
| <b>Concerns about stopping factor</b>                                                                                                |                       |                      |                    |
| I would be reluctant to stop one of my care recipient's medicines that they had been taking for a long time                          | 34(36.2)              | 12 (12.8)            | 48(51)             |
| I get stressed whenever changes are made to my care recipient's medicines                                                            | 38(40.4)              | 13(13.8)             | 43(45.8)           |
| I feel that if I agreed to stopping one of my care recipient's medicines then this is giving upon them.                              | 69 (73.4)             | 17 (18)              | 8(8.6)             |
| The person that I care for has had a bad experience when stopping a medicine before.                                                 | 67 (71.2)             | 0                    | 27(28.8)           |
| <b>Involvement factor</b>                                                                                                            |                       |                      |                    |
| I know exactly what medicines the person that I care for is currently taking, and/or I have an up-to-date list of their medications. | 11(11.8)              | 19(20.2)             | 64 (68)            |
| I like to know as much as possible about my care recipient's medicines                                                               | 10 (10.7)             | 14(14.9)             | 70(74.4)           |

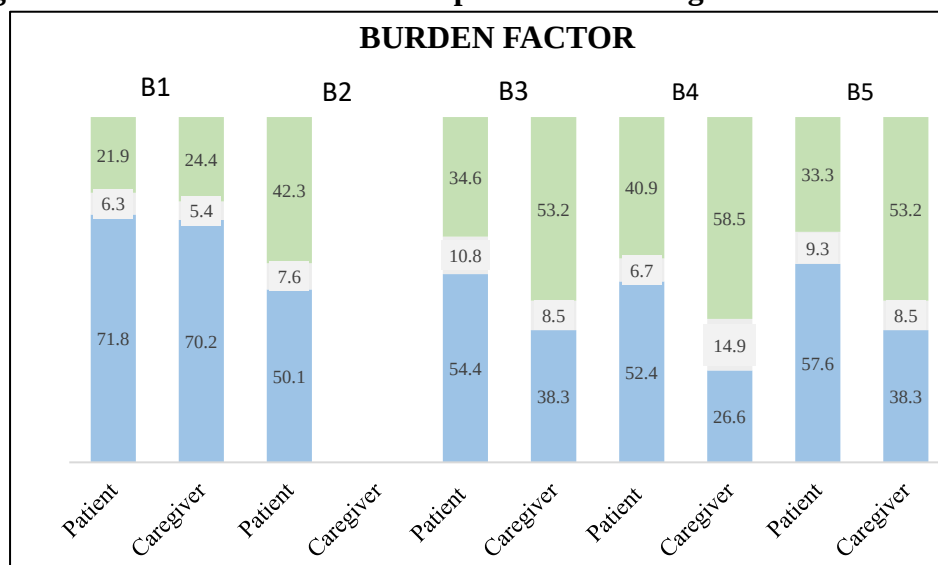
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|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|-----------|
| I like to be involved in making decisions about my care recipients medicines with their doctors                                                   | 20(21.2)  | 22(23.5) | 52 (55.3) |
| I always ask my doctor, pharmacist, or other healthcare professional if there is something I don't understand about my care recipient's medicines | 8(8.5)    | 17 (18)  | 69(73.5)  |
| <b>General factor</b>                                                                                                                             |           |          |           |
| If their doctor said it was possible, I would be willing to stop one or more of my care recipient's medicines                                     | 9(9.7)    | 20(21.3) | 65(69)    |
| Overall, I am satisfied with my care recipient's current medicines.                                                                               | 24 (25.6) | 16 (17)  | 54(57.4)  |

**Table 5: Caregivers' Attitude Towards Deprescribing Using rPATD**

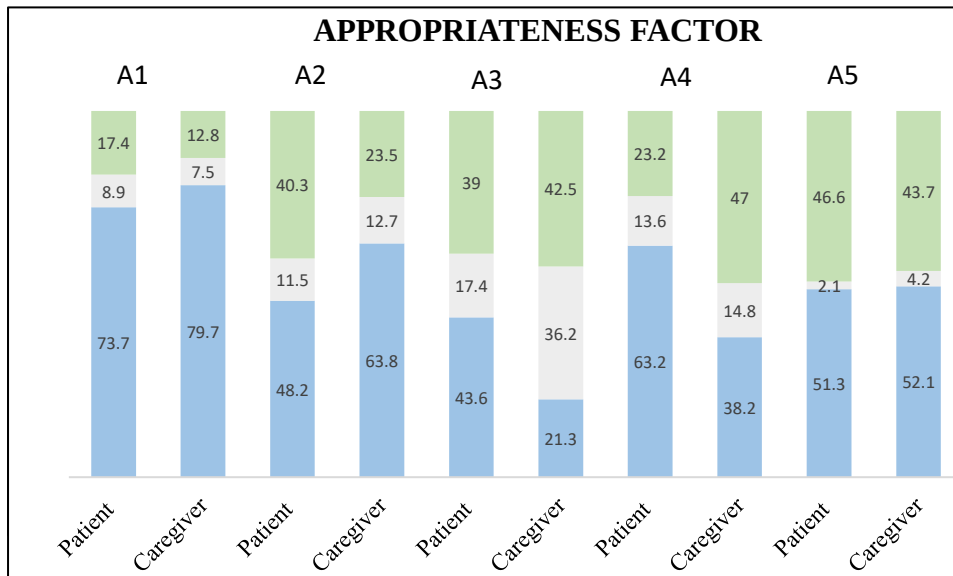
### Treatment Chart Review:

After reviewing the prescription of each participant, Treatment Chart Review was done. Interventions were communicated to respective physicians. Among the 108 in patients, 49%(n=53) medication errors were found. The majority of medications errors were found to be prescription error, 72%(n=38) followed by administration errors 9%(n=5) and other medication errors 19% (n=10).

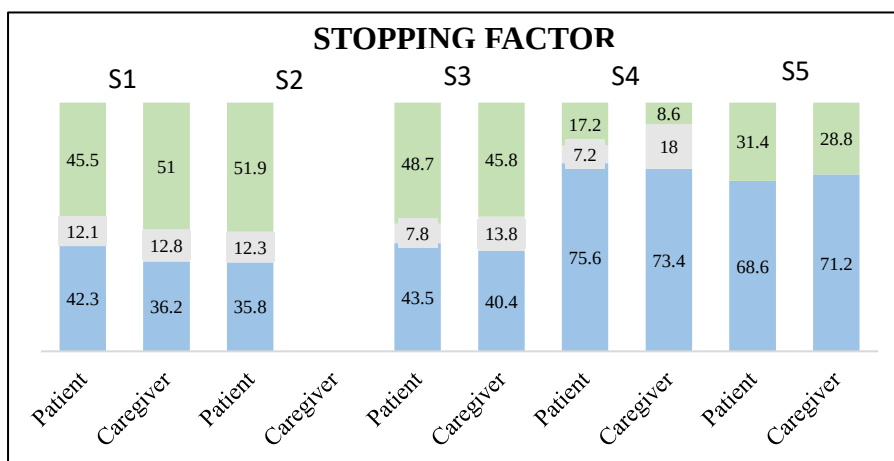
**Fig 2: Burden factor results of both patients and caregivers**



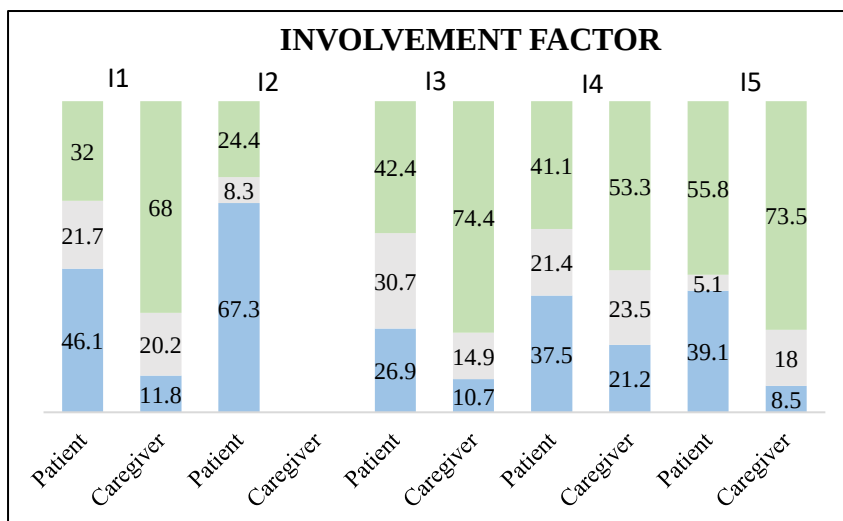
**Fig 3: Appropriateness factor results of both patients and caregivers**



**Fig 4: Stopping factor results of both patients and caregivers**



**Fig 5: Involvement factor results of both patients and caregivers**



**Fig 6: General factor results of both patients and caregivers**

### Participant related factors associated with willingness:

The Chi-square test of independence was used to explore the relationship between categorical variables and found a significant link between patient-related factors and their willingness to stop medications. Notably, patients aged 30-40 were most engaged in managing their medications, showing 100% involvement. The Chi-square

test revealed a strong correlation between age and involvement, with a Pearson Chi-Square value of 43.727 and a p-value of .000. Conversely, patients aged 61-70 were the least involved, and those aged 41-50 had a 33.3% involvement rate.

Further analysis examined how patients' education levels affected their involvement in medication use within a public hospital. The Chi-square test showed a significant correlation ( $\chi^2(2) = 20.951$ ,  $p = 0.001$ ), indicating that patients with higher education were more likely to be involved in their medication management. The Phi and Cramer's V values of .366 suggested a moderate association between education level and involvement

The study also looked at the impact of caregivers' education levels on their involvement in managing a care recipient's medication. Higher education levels among caregivers were linked to greater involvement in medication management. The Pearson Chi-Square test showed a significant correlation ( $\chi^2(5) = 20.344$ ,  $p = 0.001$ ), highlighting the importance of education in both patients and caregivers for active participation in medication use.

A positive correlation was found with 10 items and a negative correlation with 4 items regarding the patients' perception of drug side effects. Patients who felt they were experiencing adverse effects from one or more of their prescriptions had not been satisfied with the drugs they were taking overall.

**Table 6: Correlation Between Patient's Age with Their Involvement Factors**

| Age of Ooty Patients | Ooty Patient's Involvement Factor |    | Asymp. Sig. |
|----------------------|-----------------------------------|----|-------------|
|                      | Yes                               | No |             |
| 30 to 40             | 22                                | 0  | .000        |
| 41 to 50             | 7                                 | 14 | .024        |
| 51 to 60             | 12                                | 34 | .462        |
| 61 to 70             | 50                                | 17 | .001        |

**Table 7:  
Correlation Between Patient's Education with Their Involvement Factors**

| Educational Status of Ooty Patients | Ooty Patient's Involvement Factor |    | Asymp Sig. |
|-------------------------------------|-----------------------------------|----|------------|
|                                     | Yes                               | No |            |
| Illiterate                          | 19                                | 34 | .002       |
| Primary (Class 1-5)                 | 24                                | 38 | .564       |
| Secondary (Class 6-10)              | 17                                | 30 | .613       |
| Higher Secondary (11th & 12th)      | 11                                | 9  | .000       |
| Undergraduate                       | 2                                 | 7  | .09        |
| Postgraduate                        | 2                                 | 1  | .001       |

### Relationships between factor scores and global questions:

There was a correlation between six rPATD categories and patients' willingness to stop taking their drugs if their doctor suggested it was possible in which four of the questions showed positive response. On the other hand, two of the questions showed a negative correlation with patients' willingness to stop taking their medications if the doctor suggested it was possible. These questions included the belief that participants had been taking too many medications, the perception of side effects from one or more medications, unwillingness to stop a long-term medication, and the feeling that their doctors were giving up on them if they suggested stopping a medication. Several factors on the rPATD questionnaire were associated with patients' Overall satisfaction with the drugs they took. This is described in detail in table 8.

**Table 8: Spearman's Correlation of Responses Within the Revised Patients' Attitudes Towards deprescribing**

| rPATD questions Spearman's correlation<br>(P values)                                            | 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. |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Burden factor</b>                                                                            |                                                                                    |                                                                                                       |                                                        |
| 1. I spend a lot of money on my medicines.                                                      | -0.35, 0.091                                                                       | –                                                                                                     | –                                                      |
| 2. Taking my medicines every day is very inconvenient.                                          | 0.28, 0.01                                                                         | –                                                                                                     | –0.22, 0.00                                            |
| 3. I feel that I am taking a large number of medicine.                                          | 0.13, 0.01                                                                         | –                                                                                                     | –0.33, 0.00                                            |
| 4. I feel that my medicines are a burden to me.                                                 | 0.33, 0.02                                                                         | –                                                                                                     | –0.34, 0.00                                            |
| 5. Sometimes I think I take too many medicines.                                                 | –                                                                                  | 0.07, 0.22                                                                                            | –0.28, 0.00                                            |
| <b>Appropriateness factor</b>                                                                   |                                                                                    |                                                                                                       |                                                        |
| 6. I feel that I may be taking one or medicines that I no longer need.                          | –0.33, 0.06                                                                        | –                                                                                                     | –0.38, 0.00                                            |
| 7. I would like to try stopping one of my medicines to see how I feel without it.               | 0.03, 0.12                                                                         | –                                                                                                     | –0.2, 0.53                                             |
| 8. I would like my doctor to reduce the dose of one or more my medicines.                       | 0.22, 0.04                                                                         | 0.07, 0.7                                                                                             | –0.27, 0.001                                           |
| 9. I think one or more of my medicine may not be working                                        | –0.14, 0.07                                                                        | –                                                                                                     | –0.12, 0.007                                           |
| 10. I believe one or more of my medicines may be currently giving me side effects.              | –                                                                                  | 0.14, 0.81                                                                                            | –0.28, 0.00                                            |
| <b>Concerns about stopping factor</b>                                                           |                                                                                    |                                                                                                       |                                                        |
| 11. I would be reluctant to stop a medicine that I had been taking for a long time.             | –0.21, 0.29                                                                        | –0.6, 0.00                                                                                            | 0.29, 0.42                                             |
| 12. If one of my medicines was stopped I would be worried about missing out on future benefits. | –                                                                                  | –0.18, 0.34                                                                                           | 0.55, 0.00                                             |
| 13. I get stressed whenever changes are made to my medicines.                                   | –                                                                                  | –                                                                                                     | –0.15, 0.001                                           |
| 14. If my doctor recommended stopping a medicine I would feel that he/she was giving up on me.  | 0.15, 0.04                                                                         | –                                                                                                     | –0.34, 0.00                                            |



| rPATD questions Spearman's correlation<br>(P values)                                                                                          | 10. I believe one or<br>more of my<br>medicines may be<br>currently giving<br>me side effects. | 21. If my doctor said it was possible I<br>would be willing to stop one or more of<br>my regular medicines. | 22. Overall, I am<br>satisfied with my<br>current medicines. |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>Involvement factor</b>                                                                                                                     |                                                                                                |                                                                                                             |                                                              |
| 16. I have a good understanding of the<br>reasons I was prescribed each of my<br>medicines.                                                   | 0.17, 0.04                                                                                     | —                                                                                                           | 0.02, 0.74                                                   |
| 17. I know exactly what medicines I am<br>currently taking, and/or I keep an up to<br>date list of my medicines.                              | 0.12, 0.03                                                                                     | —                                                                                                           | −0.001, 0.98                                                 |
| 18. I like to know as much as possible<br>about my medicines.                                                                                 | 0.18, 0.001                                                                                    | —                                                                                                           | −0.11, 0.175                                                 |
| 19. I like to be involved in making<br>decisions about my medicines with my<br>doctors.                                                       | —                                                                                              | —                                                                                                           | 0.065, 0.45                                                  |
| 20. I always ask my doctor, pharmacist or<br>other healthcare professional if there is<br>something I don't understand about<br>my medicines. | —                                                                                              | —                                                                                                           | 0.18, 0.032                                                  |
| <b>General Questions</b>                                                                                                                      |                                                                                                |                                                                                                             |                                                              |
| 21. If my doctor said it was possible I<br>would be willing to stop one or more<br>of my regular medicines.                                   | 0.04, 0.012                                                                                    | —                                                                                                           | 0.30, 0.00                                                   |
| 22. Overall, I am satisfied with my current<br>medicines.                                                                                     | —                                                                                              | 0.38, 0.00                                                                                                  | 0.45, 0.98                                                   |

## 5. Discussion and Conclusion

Deprescribing is a strategic process of systematically reducing or discontinuing medications that may no longer be necessary or beneficial for a patient, with the aim of minimizing potential risks and optimizing overall health outcomes.<sup>[21][22]</sup> This approach involves careful evaluation and collaboration

between patients and healthcare providers to ensure that medication management aligns with current health needs and goals. Overall from our study, we were able to find that the patients' willingness to stop medications (82%) was higher than in a similar study in Malaysia (67.7%) but comparable to findings in Ethiopia (81.6%), United Kingdom (75.1%), Singapore (83%), Denmark (85%) and Australia (88%).<sup>[23]-[27]</sup> Notably, our study had a higher proportion of female participants, a trend also observed in a survey of Type 2 Diabetes (T2D) patients in Indonesia, where women were more regular

with their checkups.<sup>[28]</sup> In our research, 69% of caregivers expressed a willingness to stop one or more of their medications if advised by their doctor. This is lower than the 84% reported in Australia but similar to the 65.4% observed in Malaysia.

Hypertension was the most common comorbidity among the patients, followed by dyslipidaemia and cardiovascular disease. Most patients with diabetes and comorbidities were older adults (aged 61-70). This aligns with a study by Sandipana Pati et al., which found that the number of comorbidities increased with age, with those over 60 being more likely to have multiple conditions.<sup>[29]</sup>

Regarding the burden factor, patients and caregivers did not view medications as a burden since they were provided either for free or at a low cost. Most patients were using only 5 to 6 medications, with many being prescribed drugs from the same class. This trend may reflect both the limited range of available medications and the prevailing prescribing practice.

Patient involvement in shared decision-making (SDM) is the key to effective deprescribing. SDM is a collaborative approach where patients and healthcare providers (HCPs) work together to design a personalized treatment plan, with the patient's views being central to the decisions.<sup>[30][31]</sup> Increasing the engagement of older adults and their caregivers in medication choices can greatly aid deprescribing and ensure that treatment plans align with their preferences and values. This collaborative approach not only improves medication adherence but also empowers patients to engage actively in their care, ultimately leading to more rational and effective drug use.<sup>[32][33]</sup> In 2012, Singapore's National Medical Ethics Committee issued new ethical guidelines to promote collaborative decision-making between clinicians and patients, reflecting a significant move towards shared decision-making in healthcare.<sup>[34]</sup>

However, educational background affects engagement levels: older adults with little or no formal education and caregivers with only secondary schooling tend to be less involved than those with higher education. This difference is likely due to varying educational opportunities; older adults often had less schooling, while caregivers usually had more. This study's logistic regression analysis shows that higher education correlates with greater engagement in managing medications, while older patients with lower education are less involved. This was similar to the study done in Malaysia, Singapore and USA. Previous research in the USA also indicates that older adults with less education often have lower health literacy.<sup>[35]</sup>

A review of prescribing practices at the hospital highlighted prescription errors as the main issue, likely due to high patient volume and gaps in medication knowledge. Documentation and administration errors were less common, possibly due to insufficient data management in the public healthcare setting. Overall, patients at the public hospital displayed a reluctance towards deprescribing, primarily because they faced low financial burden and were satisfied with their current medication regimen. However, they were still open to stopping medications if advised by their clinicians, consistent with previous research. Deprescribing seeks to tackle the issue of polypharmacy but encounters several challenges. Research in South India, particularly in Chennai and Bangalore, found that about 76% and 71.6% of physicians, respectively, were keen on adopting deprescribing practices and viewed them as beneficial.<sup>[36][37]</sup> A majority of doctors believed deprescribing provides more benefit than harm to patients. However, this approach faces obstacles such as limited time, insufficient knowledge about potentially inappropriate medications (PIMs), concerns about unforeseen consequences, lack of data on the effects of discontinuation and medication monitoring, and patients' resistance to stopping their medications. To address these barriers, a range of strategies should be employed.<sup>[38]</sup>

Patient education and involvement are crucial for rational drug use. Educating patients about their conditions and medications enhances their understanding and ability to manage their health effectively, leading to better adherence and outcomes.<sup>[39]</sup> As the Indian healthcare system evolves, there is a push towards evidence-based practices, educating patients about unnecessary medications.<sup>[40]</sup>

Polypharmacy, especially in older adults, can lead to adverse effects, making deprescribing a critical aspect of their care. While medications provide significant benefits, their risks necessitate careful evaluation to ensure patients receive only those with a favourable benefit-risk balance.

Studies have shown that many patients and caregivers are open to deprescribing when advised by healthcare providers, with approximately half willing to stop medications based on their doctor's recommendation. This emphasizes the importance of involving patients and caregivers in the deprescribing process and decision-making. Rational prescribing and deprescribing are vital to reducing polypharmacy, particularly in managing chronic conditions like diabetes. However, inadequate medical facilities in public hospitals can hinder effective healthcare delivery.<sup>[41]</sup>

Future research should focus on practical and cost-effective deprescribing strategies for various patient populations, with an emphasis on engaging patients in decision-making. Enhanced patient education and involvement are key to improving treatment outcomes and alleviating medication burdens. Additionally, the study highlighted the need for developing national guidelines tailored to the Indian healthcare context to minimize medication errors and support rational drug use, particularly for chronic conditions such as diabetes.<sup>[42]</sup> Clinical pharmacists play a crucial role in refining medication regimens, identifying potential interactions, and recommending deprescribing strategies to optimize health outcomes.<sup>[43][44]</sup>

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## 7. Conflicts of interest

The authors confirm that they have no conflicts of interest to disclose.

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