

Prevalence of Overtreatment, Polypharmacy, and Potential Candidates for Deprescribing Among Elderly Patients with Type 2 Diabetes Mellitus: A Cross-Sectional Study

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Abstract

Background: Elderly patients with Type 2 diabetes mellitus (T2DM) have special risk of overtreatment and polypharmacy due to polycomorbidities and complex medication therapy. The use of too many medications can lead to hypoglycaemia, side effects of medications, functional decline and poor quality of life, making it important to recognise the right candidates for deprescribing.

Objectives: To investigate the prevalence of overtreatment, polypharmacy and possible candidates for deprescription in elderly patients with Type 2 Diabetes Mellitus (T2DM) and to assess their clinical features.

Materials and Methods: A cross-sectional study using hospital setting was done on 200 elderly patients (≥ 65 years) who were attending the outpatient department for T2DM. The data were gathered with regard to demography, clinical, laboratory and medication details using a structured case record form. The analyses of data were carried out using IBM SPSS statistics version 26.0. The descriptive statistics, chi square and logistic regression analyses were conducted, and the significance level was set at p-value < 0.05 .

Results: the mean (SD) age at which the participant was diagnosed with diabetes was 78.12 ± 7.79 years, and the mean (SD) duration of diabetes was 12.67 ± 7.09 years. Polypharmacy was found in 78.0% of participants and overtreatment was found in 16.0% of participants. Insulin and sulfonylureas were used by 40.5% and 30.0% of the patients, respectively. 19.0% reported hypoglycemia and 28.0% had frailty. In total, 74.5% of elderly patients were deemed to be potential candidates for deprescribing.

Conclusion: Polypharmacy and overtreatment are prevalent in elderly T2DM patients, and many could benefit from deprescription. Medication review, individualized glycemic targets and evidence-based deprescribing approaches can help to minimize medication-related harm and optimize the safety and quality of diabetes care for older adults.

Keywords: Type 2 diabetes mellitus (T2DM); Elderly patients; Overtreatment; Polypharmacy; Deprescribing; Hypoglycemia; Frailty; Medication review; Individualized glycemic targets

Introduction

Type 2 diabetes mellitus (T2DM) is one of the most common chronic conditions worldwide, and a significant public health problem, especially in older adults. With population aging, increased life expectancy, sedentary lifestyle and changes in dietary habits, the number of elderly people living with diabetes has significantly increased (Arokiasamy et al., 2021). According to the International Diabetes Federation, the worldwide diabetes burden keeps rising and a large number of people suffering with diabetes are over the age of 65. The elderly T2DM patients have specific physiological, functional, and psychosocial features that are different from younger patients (Lin et al., 2025). Multiple chronic conditions, cognitive decline, frailty, and decreased functional reserve make age-related glycemic management more challenging and make older adults more vulnerable to adverse events related to medication use (Izzo et al., 2021). As a result, care of diabetes in this population should be personalized to achieve the best possible glycemic control while maintaining safety and a high quality of life and functional independence.

T2DM treatment has come a long way over the last 20 years, having seen the development of many new antihyperglycemic drugs and the establishment of treatment guidelines based on evidence. Intensive glycemic control has been shown to have benefits for reducing the risk of microvascular complications in selected patient groups but not necessarily in elderly people (Taylor et al., 2021). Older people are often sicker, have different life expectancies, and different priorities for treatment. Intensive glucose control may be suitable in younger patients but not necessarily in older patients, especially those with frailty, polypharmacy, and/or a shortened life expectancy (Galindo et al., 2023). Individualized glycemic targets are becoming the recommendation of clinical practice guidelines from a variety of health professional organizations, as opposed to a blanket treatment approach for all patients.

Despite recommendations, overtreatment is still a problem in the treatment of elderly T2DM patients. Overtreatment is usually defined as the use of more or stronger glucose-lowering medication than is recommended for a given person's health state or when the anticipated benefits of glucose-lowering therapy are not considered to justify the potential harms (Strain et al., 2021). Hyperglycemia in older people may put them at a much greater risk for hypoglycemia, falls, cardiovascular events, hospitalization, cognitive impairment, fractures, and death (Sonmez et al., 2020). Medications like insulin and sulfonylureas are especially linked to hypoglycemia, and elderly patients may be more susceptible to severe effects caused by their inability to recognize the signs and symptoms of hypoglycemia and physiological response to hypoglycemia (Rodriguez et al., 2024). Therefore, a moderate glycemic control is generally considered safer than the near normal glycemic range in vulnerable elderly people.

Polypharmacy, which is the simultaneous use of five or more drugs, is also a significant issue in the care of geriatric diabetes. However, elderly patients often have multiple chronic diseases such as hypertension, dyslipidaemia, cardiovascular disease, chronic kidney disease, osteoarthritis, depression and osteoporosis, making the occurrence of polypharmacy more common (Remelli et al., 2022; Atak Tel et al., 2023). Combined treatment of the conditions may require multiple pharmaceutical products to treat the conditions, resulting in an increased complexity of medication. The use of excessive medications can cause drug-drug interactions, medication errors, poor medication adherence, higher costs of healthcare, functional decline and adverse drug reactions (AL-Musawe et al., 2020). Polypharmacy can impact older adults' health and may negatively affect treatment outcomes (Oktora et al., 2021).

Polypharmacy is especially important in older people with T2DM, as diabetes is usually associated with many metabolic and cardiovascular diseases—and long-term pharmacotherapy is often needed for both of these. Patients are also frequently prescribed antihypertensive drugs, lipid-lowering drugs, antiplatelet agents and anticoagulants, gastrointestinal drugs, analgesics, vitamin supplements, and drugs for other chronic conditions (Remelli et al., 2022). These therapeutic regimens can be complicated which can make it easier for the wrong medication to be prescribed and for patients to not take medications as prescribed. Furthermore, the drug absorption, distribution, metabolism and elimination processes are modified by age and lead to drug toxicity in elderly people, even when used at the normal therapeutic level (Dobrică et al., 2019).

The concept of deprescribing has become more popular due to the increasing awareness of the risks of medication-related harm and its importance in managing older adults in general. Deprescribing is systematic and evidence-based approach to determining the need to either reduce or eliminate medications that are no longer necessary, may be potentially inappropriate (MPU) or unlikely to be of benefit to the patient and then carefully reducing or stopping under medical supervision (Quek et al., 2024). The goal of deprescribing is not just to decrease the number of medicines, but to maximize the effectiveness of pharmacotherapy by minimizing the treatment burden (Crisafulli et al., 2022). Deprescribing in older adults with T2DM can include insulin dose reduction, stopping sulfonylureas, making treatment regimens simple or modifying glycemic goals based on functional and clinical status (Linsky et al., 2024). The benefits of successful deprescribing have been linked to lower rates of hypoglycemia, fewer adverse drug events, improved adherence, increased patient satisfaction and better health outcomes (Zidan & Awaisu, 2024).

Multiple clinical factors need to be carefully considered before identifying patients who are appropriate candidates for deprescribing. Some of the factors that could suggest increased potential for benefit from medication simplification include advanced age, a history of hypoglycemia, low glycated hemoglobin (HbA1c) levels, frailty, cognitive impairment, multiple comorbidities, reduced renal function, limited life expectancy, and extensive polypharmacy (Haider et al., 2025; Schleiden et al., 2024). A personalized risk benefit assessment, patient wishes, and a multidisciplinary approach that integrates the perspectives of multiple healthcare professionals and patients should be a component of clinical decision making (Dinarvand et al., 2024; Samajdar & Joshi, 2025). This will encourage joint decision making and safer use of medicines, without any unnecessary therapeutic intensity.

There is growing focus on person-centred diabetes management and deprescribing of diabetes medications in older people, but evidence of the prevalence of overtreatment, polypharmacy and people who may benefit from deprescribing is scarce in the majority of healthcare systems, including those in low and middle-income countries (LMICs) (Munshi et al., 2025). Current research has been largely undertaken on glycemic control or on drug use separately, and few have investigated overtreatment, complexity of drug use and deprescribing opportunities in the same elderly diabetic population (Haider et al., 2025). Additionally, variations in care, drug prescribing, availability of newer antihyperglycemic medications, and patient characteristics necessitate the development of context-specific evidence to inform clinical practice and healthcare policy (Das et al., 2026; Changaris, 2025).

The aim of this cross-sectional study is therefore, to identify prevalence of overtreatment, polypharmacy and possible candidates for deprescribing among elderly patients of Type 2 diabetes mellitus (Type 2 DM) (Sonmez et al., 2020). In addition, the study aims to determine the demographic and clinical parameters that are linked to these conditions, and evidence that could support tailored, safer, and patient-centred diabetes management (Oktora et al., 2023; Thomas, 2020). Results will help clinicians make more effective choices about medications, minimize preventable adverse drug events, and help improve the quality of care provided to the large and growing number of elderly diabetics.

Objectives

Research Objectives

Primary Objective

- To find out the rate of overtreatment, polypharmacy and possible candidates for deprescribing in elderly patients with Type 2 diabetes mellitus.

Secondary Objectives

1. To assess the prevalence of polypharmacy among older people with Type 2 diabetes mellitus.
2. To evaluate the rate of overtreatment using personalized glycemic control goals as well as antidiabetic medication.
3. Identify elderly patients as potential candidates for deprescribing based on clinical features and drug use.
4. To assess the relationship between demographic and clinical factors and the presence of overtreatment, polypharmacy and eligibility for deprescribing.

Research Methodology

A cross-sectional observational study was conducted in hospital setting to assess the prevalence of overtreatment, polypharmacy and potential candidates for deprescribing among elderly Type 2 diabetes mellitus patients. The data was obtained from 200 elderly patients who visited the OPDs of a Tertiary care teaching hospital and analyzed through IBM SPSS Statistics version 26.0. The methodology used in the study is explained in the next sections.

Study Design

The hospital-based cross sectional observational study was used to identify the prevalence of overtreatment, polypharmacy and potential for deprescribing in elderly patients with Type 2 diabetes mellitus (T2DM). A cross-sectional study design was deemed suitable because it allows for the measurement of patient characteristics, medication use, glycemic control and deprescribing opportunities at one specific time. The study was observational, so no changes or interventions were made to the participants' current treatment plans. The design allowed to estimate the prevalence and to identify factors associated with overtreatment and polypharmacy in routine clinical practice.

Study

The study was carried out in the outpatient department of General Medicine and Endocrinology of a tertiary care teaching hospital. Patients were screened for eligibility during the study period during their regular follow-up visits for diabetes management. The hospital setting offers a good opportunity to assess the prescribing practices and medication outcomes for older people, as it covers a wide spectrum of diabetes care, including clinical consultation, laboratory investigations, use of medications, and diabetes education.

Study Population

The subjects of the study were elderly people with Type 2 diabetes mellitus who were under pharmaceutical intervention and visited the selected health care facility during the data collection period. These patients were a diverse sample of individuals, varying in duration of diabetes, number of co-morbid conditions, medications and glycemic control. The inclusion of patients from routine outpatient care contributed to the representativeness of the findings and was reflective of actual prescribing in the real world.

Inclusion Criteria

Patients were included if they were 65 years or above and had been diagnosed with Type 2 diabetes mellitus for one year or more and were taking 1 or more antidiabetic medications. In addition, eligible participants had to have full medical records, which included medication history and recent laboratory testing including glycated hemoglobin (HbA1c). Informed consent was obtained in writing from the patients or their legally authorized representative, and these patients were included in the study.

Exclusion Criteria

Patients with Type 1 diabetes mellitus, gestational diabetes and secondary diabetes were excluded. People who were admitted for emergency or critical care, where the expected survival was less than six months, or patients who had incomplete clinical records were also excluded. Also, individuals who refused to participate or were not able to give any reliable information even with the help of caregivers were not included in the study.

Sample Size

Three hundred Type 2 diabetes mellitus elderly patients were enrolled in the study. A sample size was deemed adequate for the estimation of the prevalence of overtreatment, polypharmacy, and deprescribing eligibility with statistical precision. It also included sufficient observations for conducting subgroup analyses and determining the clinical and demographic characteristics related to medication outcomes in elderly diabetic patients.

Sampling Technique

Convenience sampling was used for the recruitment of participants. Patients who were consecutive and met the inclusion criteria and attended the outpatient clinics during the study period were invited to participate in the study until the desired sample size was reached. This method of sampling was

effective with no disruption of standard clinical care and enabled the recruitment of patients with a wide spectrum of clinical features.

Study Variables

To be able to assess medication use in elderly patients with Type 2 diabetes mellitus (T2DM) comprehensively, the study contained both dependent and independent variables. The outcome measures were overtreatment, polypharmacy and deprescribing eligibility. Independent variables consisted of demographic data (age, gender, and BMI), clinical data (duration of diabetes, glycated hemoglobin [HbA1c] level, fasting blood glucose [FBG] level, estimated glomerular filtration rate [eGFR] level, number of comorbidities, number of medications prescribed, type of antidiabetic therapy, insulin use, history of hypoglycemia, and frailty status). This selection of variables was chosen as a result of previous studies that have shown a relationship between these factors and medication safety and diabetes management in older adults.

Operational Definitions

The definition of overtreatment that was used for this study was intensive glucose-lowering therapy in patients with sub-ITT (individualized treatment targets) HbA1c, especially if insulin or sulfonylureas were used in patients at high risk of hypoglycemia. Multiple chronic disease management medications (defined as five or more) were considered to be polypharmacy. Patients with advanced age, low HbA1c levels, frequent hypoglycemia, frailty, renal insufficiency, multiple chronic conditions, or polypharmacy were considered potential candidates for deprescribing, and were deemed benefiting from reduced or withdrawn treatment to improve treatment safety without impacting clinical outcomes.

Data Collection Tool

Structured and pre-tested case record form was used to gather the data, which was prepared for the study. The questionnaire contained the following domains: demographic, medical history, duration of diabetes, lifestyle characteristics, comorbid conditions, medication profile, laboratory investigations, history of hypoglycemia, frailty assessment and medication appropriateness. The data was collected from the patients' interviews and the examination of their Electronic Medical Records to guarantee the accuracy and completeness of the information.

Data Collection Procedure

All patients who attended the outpatient clinics were identified and screened based on the pre-defined inclusion and exclusion criteria. Demographic and clinical information was collected by face-to-face interviews with the structured data collection form after obtaining the informed consent in writing. Medication prescriptions, laboratory results and clinical diagnoses were verified from the medical records. The level of polypharmacy, overtreatment and potential for deprescription were assessed for each participant's medication list. The data collected were checked for completeness prior to analysis using a study database.

Statistical Analysis

The data collected were entered, coded and analyzed using IBM SPSS Statistics version 26.0. Demographic and clinical data were summarized using descriptive statistics, continuous data presented as mean $\pm$ SD and categorical as frequency and percentage. Chi Square test was used to determine associations for categorical variables and independent samples t-test and Mann Whitney U test was used for comparisons of continuous variables between groups, depending on data distributions. Independent predictors of overtreatment and eligibility for deprescription were determined using binary logistic regression analysis. Odds ratios with 95% confidence intervals were computed and p value < 0.05 was regarded as statistically significant.

Results

In the final analysis 200 elderly patients with Type 2 diabetes mellitus were included. The data collected were analyzed in IBM SPSS Statistics version 26.0 to assess prevalence of overtreatment, polypharmacy and potential candidates for deprescribing. Demographic, clinical and medication-related features of the study population were summarized using descriptive statistics; categorical variables were reported as frequencies and percentages and continuous variables as mean $\pm$ standard

deviation. The results are reported in the six tables, which include the demographic and clinical characteristics of participants, the medication profile, polypharmacy and overtreatment prevalence, the relationship between polypharmacy and overtreatment, and prevalence of eligibility for deprescription, and the prevalence of medication-related outcomes among elderly Type 2 diabetes mellitus patients.

Table 1. Demographic and Clinical Characteristics of the Study Participants (n = 200)

Variable	Mean $\pm$ SD
Age (years)	78.12 $\pm$ 7.79
Body Mass Index (kg/m ²)	27.51 $\pm$ 4.30
Duration of Diabetes (years)	12.67 $\pm$ 7.09*
HbA1c (%)	7.66 $\pm$ 1.21*
Fasting Blood Glucose (mg/dL)	149.88 $\pm$ 40.32*
Number of Comorbidities	3.38 $\pm$ 1.68
Total Medications	7.41 $\pm$ 2.82

*Values calculated from the study dataset.

The demographic and clinical data of the 200 elderly patients (age 65 years or above) who were included in the study with Type 2 diabetes mellitus are presented in Table 1. The mean age was 78.12 $\pm$ 7.79 years, which suggests that the study population was mostly older adults who are more vulnerable to adverse events related to medications. The average body mass index (BMI) was 27.51 $\pm$ 4.30 kg/m² indicating that most participants were over weight. The mean duration of diabetes was 12.67 $\pm$ 7.09 years, indicating chronic diabetes with long-standing disease that should be chronically managed with pharmacological treatment. Participants had moderately controlled glycemic status with an average HbA1c of 7.66 $\pm$ 1.21%. Likewise, the mean fasting blood glucose (FBG) was 149.88 $\pm$ 40.32 mg/dL, which showed a range of glycemic control in the study population. The average number of comorbid conditions was 3.38 $\pm$ 1.68, reflecting the high complexity of the clinical picture of elderly diabetic patients. Moreover, the mean number of drugs prescribed was 7.41 $\pm$ 2.82, suggesting a significant drug burden and a high risk of polypharmacy in this population.

Table 2. Gender Distribution and Polypharmacy

Gender	Polypharmacy (No)	Polypharmacy (Yes)	Total
Male	19	79	98
Female	25	77	102
Total	44	156	200

Table 2 shows the proportion of polypharmacy by gender. The number of medications the 98 males were taking ranged from one to 12, with 79 (80.6%) of these having polypharmacy, and 19 (19.4%) having a low number of medications prescribed, which was less than five. Among the 102 female participants, 77 (75.5%) had polypharmacy and 25 (24.5%) did not. Overall, 156 participants (78.0%) were polypharmacy patients, while 44 patients (22.0%) were taking less than five medicines. Males had a slightly higher rate of polypharmacy, but high rates of polypharmacy were observed in both genders, highlighting the fact that polypharmacy is a common problem among elderly people with Type 2 diabetes mellitus, regardless of gender.

Table 3. Medication Profile of the Participants

Variable	n	%
Insulin therapy	81	40.5
Sulfonylurea therapy	60	30.0
History of hypoglycemia	38	19.0
Frailty	56	28.0

Demographic data and clinical characteristics selected for the study participants are summarized in Table 3. A significant percentage (81, 40.5%) of the 200 elderly patients were using insulin therapy. Moreover, 60 participants (30.0%) were taking sulfonylureas, which are linked with a higher incidence

of hypoglycemia in elderly people. Nearly one in five participants (38; 19.0%) reported a history of hypoglycemia. In addition, 56 participants (28.0%) were determined to be frail and, therefore, have decreased physiological reserves and heightened susceptibility to negative drug effects. These results highlight the fact that many elderly patients with diabetes have clinical features which should be carefully reviewed for medications and treated in a personalized way.

Table 4. Association Between Polypharmacy and Overtreatment

Polypharmacy	Overtreatment (No)	Overtreatment (Yes)	Total
No	39	5	44
Yes	129	27	156
Total	168	32	200

Polypharmacy was associated with overtreatment in the study participants, as shown in Table 4. Of the 44 patients not taking 'polypharmacy', 39 (88.6%) did not fall into the category of 'overtreated', and 5 (11.4%) did. Among the 156 patients with polypharmacy, 129 (82.7%) were not overtreated, but 27 (17.3%) were found to be receiving overtreatment. Overall, 32 participants (16.0%) were overtreated, and 168 participants (84.0%) were not overtreated. The results suggest that the higher the medication burden, the more often patients were overtreated, which suggests that polypharmacology may lead to intensive glucose-lowering treatment in elderly patients beyond their individual treatment targets.

Table 5. Overtreatment and Deprescribing Eligibility

Overtreatment	Not Eligible	Eligible	Total
No	51	117	168
Yes	0	32	32
Total	51	149	200

Table 5 shows that there is a correlation between the two concepts of overtreatment and eligibility for deprescribing. Of the 168 who were not overtreated, 117 (69.6%) met criteria for depression medication deprescription (e.g. polypharmacy, frailty, recurrent hypoglycaemia or comorbidities) and 51 (30.4%) did not meet criteria. Interestingly, every 32 participants (100%) who were classified as over-treated were also determined as appropriate candidates for deprescribing. Of the total, 149 (74.5%) were eligible for deprescribing and 51 (25.5%) were not. These results demonstrate that medication optimization opportunities are not limited to over-use of medications, but also apply to an enlarged population of older patients who have multiple medications.

Table 6. Overall Prevalence of Medication-Related Outcomes

Outcome	n	%
Polypharmacy	156	78.0
Overtreatment	32	16.0
Deprescribing Candidates	149	74.5
Hypoglycemia	38	19.0
Frailty	56	28.0

Table 6 shows the overall prevalence of the most important medication-related outcomes in the study participants. More than three-quarters of the elderly diabetic patients (156) were found to be under more than 5 medications, which is the major condition observed, known as polypharmacy. A significant number, 32 patients (16.0%), were overtreated, meaning that intensive glucose-lowering therapy was being used, but perhaps not benefiting the patient. In addition, 149 participants (74.5%) were identified as candidates for deprescribing highlighting the high opportunity for medication optimisation in this population. 38 participants (19.0%) reported hypoglycemia and 56 participants (28.0%) were frail. Together, the results show that medication related problems are very common in patients aged over 65 years with Type 2 diabetes mellitus and highlight the need to tailor prescribing at an individual level and to review medication regularly to better ensure treatment safety and clinical outcomes.

Discussion

This cross-sectional study aimed at assessing the rate of overtreatment, polypharmacy and potential candidates for deprescribing in elderly people with Type 2 diabetes mellitus. The results showed that high rates of medication-related problems exist in this population; 78.0% were taking polypharmacy, and 74.5% were considered candidates for deprescribing. These observations indicate that older persons' diabetes care is becoming more complex; they often have more than one chronic condition besides diabetes.

The high prevalence of polypharmacy was one of the most important findings. Average number of medications prescribed to participants: 7.41 medications, which is significantly more than the usual definition of polypharmacy (5 medications). The same has been reported in previous studies, as elderly diabetics with hypertension are likely to take multiple medications for hypertension, dyslipidemia, cardiovascular diseases, and chronic kidney disease. There are many of these therapies clinically indicated but increasing medication burden increases the risk of adverse drug reactions, poor medication adherence, drug-drug interactions and increased utilization of health care services. The present results highlight the need for periodic medication review of elderly diabetics to ensure that each of their medications is clinically appropriate.

This study revealed that a significant number of elderly patients were undergoing overtreatment (16.0%), suggesting that many were still treated with intensive glucose-lowering therapy despite the recommendations for individual glucose targets. For older individuals with frailty, cognitive impairment, recurrent hypoglycemia or short life expectancy, the benefits of strict glycemic control may be less and the risks of treatment complications may be significantly increased. The prevalence observed was in line with findings from international studies that have reported high rates of overtreatment despite the increasing knowledge and need for personalized diabetes management approaches.

Insulin and sulfonylureas were still commonly used medications, in 40.5% and 30.0% of people, respectively. These agents have been noted as potential causes of hypoglycaemia in elderly people. As expected, 19.0% of participants had experienced some hypoglycemia in the past, underscoring the clinical implications of high-intensity glucose-lowering treatment. In older people, hypoglycemia has been linked to falls, fractures, cognitive dysfunction, cardiovascular adverse events, longer hospital stay, and death. The results endorse current recommendations to promote antihyperglycemic drugs with less risk of hypoglycemia when clinically suitable.

One of the most salient findings was that almost three-quarters (74.5%) of respondents were deemed as candidates for deprescribing. In addition, patients who were overtreated also met the criteria for being eligible for deprescription. The results indicate that optimized treatment of individual patients with medication might significantly decrease unnecessary treatment burden without worsening glycemic control. Deprescribing should not be viewed as a withdrawal of beneficial therapy; rather, it is a clinical process that involves structuring the process to balance therapeutic benefits with potential harms. A careful reduction of unnecessary medications can help elderly patients to adhere to their medication, reduce the number of adverse drug reactions, make their treatment regimens easier to follow and improve the quality of their lives.

This study also illustrated that polypharmacy and overtreatment often go hand in hand. There was a higher proportion of overtreatment of those reporting more than one medication than of those reporting fewer medications. This connection could be because patients with multiple chronic diseases tend to be treated more intensively, leading to more complex medication regimens. Therefore, comprehensive medication review, multidisciplinary team work, and tailored glycemic goals are critical to safe diabetes management in older people.

In general, these results confirm modern diabetes treatment recommendations of setting individual treatment targets, regular review of treatment appropriateness, and deprescribing of medications in older adults with Type 2 diabetes mellitus. Outpatient diabetes clinics are suitable for the implementation of systematic medication review programs that can help to prevent overtreatment, reduce hypoglycemia and enhance patient-centered outcomes. Larger, future prospective, and

multicenter studies are suggested to assess the long-term clinical outcomes of deprescribing interventions on glycemic control, quality of life, health utilization and mortality in older patients.

Conclusion

This cross-sectional study shows that overtreatment, polypharmacy and deprescribing are common in elderly patients with Type 2 diabetes mellitus. The results showed that over 75% of the respondents were on polypharmacy and a significant number on intensive glucose-lowering therapy may not have been warranted for their clinical status, comorbidity and their age. In addition, almost three-quarters of the study population were classified as potential candidates for deprescribing, highlighting the significant opportunity to improve medication use in day-to-day clinical practice. Insulin and sulfonylureas were used frequently, and hypoglycemia and frailty were also common, highlighting the need for glycemic control in older adults in a way that is also safe. Intensive glucose control treatment should not be a primary treatment goal unless individualized therapeutic goals are established and patients are at high risk for hypoglycemia, have multiple comorbidities, or have a limited life expectancy. Careful review of medications, holistic geriatric evaluation, and interprofessional working with physicians, pharmacists, nurses, patients, and caregivers are critically important to identify unnecessary medications and to undertake safe, effective medication deprescription. Evidence-based deprescribing in diabetes care could lead to a decrease in the number of medications, lower risk of hypoglycemia, increased treatment adherence, and better quality of life. Multi-center prospective studies in large and diverse elderly populations are warranted to assess the clinical outcomes and cost-effectiveness of deprescribing interventions in elderly patients with Type 2 diabetes mellitus.

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