HAYDARPAŞA NUMUNE MEDICAL JOURNAL

DOI: 10.14744/hnhj.2025.24445
Haydarpasa Numune Med J 2025;65(1):82–90

hnhtipdergisi.com

ORIGINAL ARTICLE

Knowledge, Attitudes, and Behaviors of Family Medicine Residents About Polypharmacy

Büşra Özsaray[1], Tuncay Müge Alvur[2]

[1]Department of Family Medicine, Kocaeli City Hospital, Kocaeli, Türkiye
[2]Department of Family Medicine, Kocaeli University, Faculty of Medicine, Kocaeli, Türkiye

Abstract

Introduction: In this study, we aimed to determine the level of knowledge and attitudes of family medicine residents in Türkiye regarding polypharmacy and to inform them about the methods and guidelines they can use to reduce polypharmacy.

Methods: This is a cross-sectional study. A total of 308 physicians participated in our study. A questionnaire was administered to physicians via the internet. The questionnaire consisted of 25 questions, including sociodemographic information, medicine and residency-related details, evaluation of polypharmacy, deprescribing, and clinical evaluation questions about polypharmacy.

Results: Among the participants, 76.3% were female, and 68.5% were receiving family medicine specialty training at a university hospital. A total of 21.8% of physicians had received training on polypharmacy, with a higher rate observed among those working at university hospitals. Additionally, 27.3% of physicians reported that they did not prescribe medications without examining the patients. Before prescribing a new medication, 62.9% of physicians considered that the patient's complaints might be caused by the side effects of another medication they were currently taking. The level of self-sufficiency in deprescribing practice was calculated as an average of 2.03±0.93 out of 5. Physicians who had previously received training on polypharmacy had a significantly higher level of self-sufficiency (2.34±0.88) compared to those who had not (1.95±0.93) (p=0.002).

Discussion and Conclusion: Our study found that physicians generally did not have sufficient knowledge about polypharmacy. To reduce polypharmacy, medical school students, family medicine residents, and family physicians should be provided with appropriate training.

Keywords: Deprescribing; family medicine residents; polypharmacy.

In parallel with factors such as the development of socio-economic conditions, a decrease in the birth rate, and easy access to modern medicine, the global population has aged more rapidly compared to the last 50 years[1]. Like the rest of the world, Türkiye's elderly population is also growing. According to the census results of the Turkish Statistical Institute, the proportion of the population aged 65 and over in the total population increased from 8.8% in 2018 to 10.2% in 2023[2].

The increase in the prevalence of multimorbidity (the co-occurrence of two or more chronic medical conditions in one person) in aging populations is currently one of the

Correspondence: Büşra Özsaray, M.D. Department of Family Medicine, Kocaeli City Hospital, Kocaeli, Türkiye
Phone: +90 535 876 87 56 **E-mail:** busrainans@gmail.com
Submitted Date: 07.05.2024 **Revised Date:** 30.01.2025 **Accepted Date:** 30.01.2025
Haydarpaşa Numune Medical Journal

greatest challenges facing international health services[3]. It is reported that 90% of individuals aged 65 years and older have one chronic disease, 35% have two, 23% have three, and 15% have four or more chronic diseases. Despite this, most medical research and guidelines focus on the management of single diseases. Treating each disease separately inevitably leads to polypharmacy, the risks and benefits of which are unproven and often unpredictable[1,4].

Although polypharmacy has been extensively covered in the literature, there is no universally accepted definition. Polypharmacy is most commonly defined as the concurrent use of five or more medications, including prescribed, over-the-counter, traditional, and complementary medicines[5]. Although the prevalence of polypharmacy varies across studies, it is particularly common in the elderly population. According to The Survey of Health, Ageing and Retirement in Europe (SHARE), the prevalence of simultaneous use of five or more medications in individuals aged 65 years and older was reported to be between 26.3% and 39.9%[6]. Additionally, the prevalence of polypharmacy in primary care has been reported in various countries. In a 2019 study, 58.3% of patients aged 65 and over who visited primary care in Türkiye were found to be using four or more medications[7]. In a primary care study conducted in Germany with patients aged 70 years and older, the participants used an average of 3.7 prescription drugs, and 26.7% of patients were continuously using five or more prescription medications[8]. In a study investigating the prevalence of polypharmacy in primary health care in Scotland, 16.9% of participants were reported to use 4-9 medications[9].

Considering polypharmacy risk factors at multiple levels, including the patient, the health system, and the caregiver, they include: being over 65 years of age, cognitive impairment, having multiple health problems followed by multiple specialists, chronic mental disorders, a young population with chronic diseases, low educational level, prolonged hospitalizations, chronic painful conditions such as fibromyalgia, use of over-the-counter medications, use of herbal products without informing the physician, poor and outdated medical records, prescription cascade (initiation of another medication to treat the side effect of an existing medication), symptom-specific rather than patient-specific prescriptions, the perception that prescribing a large number of medications demonstrates greater concern for the patient's health, the tendency to use medications based on recommendations from neighbors or relatives, requests by patients or their relatives to have previously prescribed medications re-prescribed, and having a large number of medications stored at home and used without a physician's recommendation[10,11].

Polypharmacy has been associated with several negative outcomes. Problems linked to polypharmacy include drug side effects, drug-drug interactions, increased treatment costs, medication incompatibility, increased hospitalizations, and medication errors[12]. Inappropriate polypharmacy is responsible for 11% of hospital admissions, with 50% of these cases considered preventable. In a 2008 study, the risk of developing side effects was found to be 15% with the use of two medications, increasing to 58% with five medications and 82% with seven or more medications[13]. Furthermore, polypharmacy has been associated with falls and related fractures, defining it as a significant cause of morbidity and mortality[14,15]. Additionally, polypharmacy has been linked to worsening functional and cognitive decline, sedation, urinary incontinence, nutritional disorders, and increased mortality[16,17].

Many countries have established drug use criteria and guidelines to prevent inappropriate medication use in the elderly. These include the Beers Criteria, STOPP-START Criteria (Screening Tool of Older Persons' Prescriptions and Screening Tool to Alert to Right Treatment), and The Medication Appropriateness Index (MAI) (which assesses the appropriateness of prescribing for elderly patients using ten criteria for each medication prescribed). In Türkiye, the Turkish Inappropriate Medication Use in the Elderly (TIME) Criteria were established by the Academic Geriatrics Society Rational Medicine and Polypharmacy Group[11,18-19].

Several recommendations have been described in the literature to reduce polypharmacy and its possible complications: reviewing all medications (including over-the-counter medications) at each patient visit, evaluating non-pharmacologic treatment alternatives before prescribing, ensuring a clear clinical indication for any new medication, considering potential side effects and drug interactions, initiating new medications as a trial rather than for continuous use, closely monitoring drug side effects, starting with the lowest possible dose, discontinuing medications gradually if feasible, avoiding prescription cascades, refraining from prescribing new medications to patients currently taking five or more drugs, and not re-prescribing without thoroughly reviewing existing medications, including over-the-counter drugs and dietary supplements[1,11].

To mitigate the risks associated with polypharmacy, family physicians play a crucial role in implementing

effective medication reduction management, including a strategy known as "deprescribing." Deprescribing involves evaluating inappropriate or unnecessary medications and discontinuing them when necessary[20]. Reducing medication use is a therapeutic intervention similar to initiating clinically appropriate treatment[11]. In a study involving elderly patients, 50% of participants expressed willingness to reduce their medication burden[21]. Another study conducted in nursing home residents concluded that 78.9% of individuals who received guidance from their physicians regarding medication reduction were receptive to deprescribing[22].

As primary care physicians frequently encounter the geriatric population and have the opportunity to monitor patients regularly, it is essential for them to enhance their knowledge and experience regarding polypharmacy and to utilize deprescribing strategies when appropriate. Although numerous studies in Türkiye have examined polypharmacy at the patient level, we did not find any studies assessing the level of polypharmacy knowledge among family medicine residents.

In this study, we aimed to determine the level of knowledge and attitudes of family medicine residents in Türkiye regarding polypharmacy and to inform them about the methods and guidelines they can use to reduce polypharmacy.

Materials and Methods

This study is an analytical cross-sectional study conducted between 01.02.2021 and 01.04.2021 with full-time family medicine residents in Türkiye. The study population consisted of approximately 1,200 physicians working as full-time family medicine residents in Türkiye at the time of the study. An effort was made to reach all of them. However, due to factors such as work intensity and pandemic conditions, 308 physicians who agreed to participate in the study and completed the questionnaire were included. All participants were required to confirm the informed consent form before completing the questionnaire. The study was conducted in accordance with the Declaration of Helsinki.

For this study, a questionnaire was developed by reviewing the relevant literature. The questionnaire was created using Google Forms and distributed to physicians via the internet. The questionnaire remained open for two months, and physicians were reminded at ten-day intervals. No identification information was requested from the participants.

The questionnaire consisted of five sections with a total of 25 questions:

- The first section included general sociodemographic information.
- The second section contained questions related to medicine and residency.
- The third section included questions about the evaluation of polypharmacy.
- The fourth section focused on deprescribing.
- The fifth section contained clinical evaluation questions about polypharmacy.

Some of the questions had true and false answer options. Participants were provided with the correct answers after completing the questionnaire to inform them about polypharmacy. The study was conducted after obtaining ethics committee approval and hospital management permissions.

Statistics Analysis

IBM SPSS 20.0 software was used for statistical analysis. Results were reported as mean±standard deviation and frequency (percentages). The normal distribution of the data was assessed using visual methods (histograms) and statistical tests, including the Kolmogorov-Smirnov and Shapiro-Wilk tests.

For categorical variables, Pearson's chi-square tests were used to evaluate differences between groups. For numerical variables, differences between groups were analyzed using the Mann-Whitney U test. The Type 1 error level was set at 5% in two-way tests.

Results

Among the participants, 76.3% were female, and 68.5% were receiving family medicine specialty training at a university hospital, whereas 31.5% were at a training and research hospital. The overall mean age was 28.7±4.00, and the median age was 28. The median year of professional experience of the physicians was 3 years. A total of 56.5% had 3 years or less experience, while 43.5% had more than 3 years of experience. When the physicians were asked whether they had received any training on polypharmacy, 78.2% of them stated that they had not (Table 1). The rate of training was higher among physicians working at university hospitals (24.6%) compared to those working at training and research hospitals (15.5%). However, this difference was not statistically significant (p=0.070) (Table 2).

When physicians were asked the question, "Do you prescribe medication without examining your patients?", the responses were as follows: "I only prescribe registered

Table 1. Sociodemographic data

	n	%
Gender		
Female	235	76.3
Male	73	23.7
Workplace		
University Hospital	211	68.5
Training and Research Hospital	97	31.5
Professional experience		
≤3 year	174	56.5
>3 year	134	43.5
Age		
≤28 year	192	62.3
>28 year	116	37.7
Education status		
Yes	241	78.2
No	67	21.8

medicine" (61.4%), "No" (27.3%), and "Yes" (11.4%). When compared according to the workplace of the physicians, those working in training and research hospitals were less likely to prescribe without examination than those working in university hospitals (p=0.027) (Table 3). No statistically significant difference was found regarding gender, age, number of patients, and professional experience.

Table 2. The distribution physicians' polypharmacy training according to workplace

Polypharmacy training	University Hospital		Training and Research Hospital		p
	n	%	n	%	
Yes	52	24.6	15	15.5	0.070*
No	159	75.4	82	84.5	

*: Pearson chi-square.

Table 3. The distribution of prescribing medication without examination according to workplace

Prescribing medication without examination	University Hospital		Training and Research Hospital		p
	n	%	n	%	
I only prescribe registered medicine	139	73.5	50	26.5	0.027*
Yes	24	68.6	11	31.4	
No	48	57.1	36	42.9	

*: Pearson chi-square.

To the question, "Before prescribing a new medicine, do you think that the patient's complaints may be caused by the side effect of another medicine that the patient is currently taking?", 62.9% of the physicians answered "Yes," while 36.6% answered "Sometimes." Being female and having more professional experience increased the rate of "Yes" responses, but these differences did not reach statistical significance (p=0.25, p=0.09, respectively).

To the question, "What do you do if you think that a medicine prescribed to the patient by another physician is no longer needed (if you find it useless)?", 33.1% of the physicians answered, "I stop the medicine," 64.9% answered, "I inform the patient to contact the physician who prescribed the medicine," and 1.9% answered, "I re-prescribe the medicine if the patient wants to use it."

In the questionnaire, all three different propositions about the definition of polypharmacy, which were asked as true/false questions, were correct. Additionally, among the five true/false questions asked to assess the level of knowledge about polypharmacy, all definitions were correct except for one. A total of 65.2% of the participants answered "True" to the statement, "It is useful to add PPI to the prescription of a patient with polypharmacy," which should have been marked as "False." A total of 25.0% of the physicians answered all the questions correctly. The answers to the questions measuring the level of knowledge about polypharmacy are presented in Table 4.

When participants were asked about the most important patient-related cause of polypharmacy, the most common answer was "Having more than one chronic disease followed by multiple physicians" (74.0%). When physicians were asked about the most important physician- or system-related cause of polypharmacy, 42.9% responded "Prescription cascade," and 26.0% responded "Reluctance to stop medication prescribed by another physician" (Table 5).

The findings regarding the use of guidelines by physicians to guide medication prescribing in elderly patients are presented in Table 6. It was found that the "Medication Appropriateness Index" was the most frequently heard and used guideline. Physicians who had received training on polypharmacy were significantly more likely to have heard of and used the STOPP/START criteria (p=0.001) and TIME criteria (p=0.017). No statistically significant difference was found regarding gender, age, professional experience, or workplace.

The physicians participating in the study were asked to rate their perceived competence in deprescribing on a scale from

Table 4. Distribution of responses regarding the definition of polypharmacy and level of knowledge

	Those who selected 'True' n (%)	Those who selected 'False' n (%)	Correct answers n (%)
Taking two or more medications for at least 240 days fits the definition of polypharmacy	192 (62.3)	116 (37.7)	192 (62.3)
Use of >4 medications fits the definition of polypharmacy	247 (80.2)	61 (19.8)	247 (80.2)
In general, taking more medication than necessary fits the definition of polypharmacy	194 (63)	114 (37)	194 (63)
The risk of side effects increases as the number of medicines used increases	304 (98.7)	4 (1.3)	304 (98.7)
Polypharmacy increases the risk of falls	263 (85.3)	45 (14.7)	263 (85.3)
Polypharmacy increases the risk of depression	263 (85.3)	45 (14.7)	263 (85.3)
Polypharmacy is associated with dry mouth	283 (91.8)	25 (8.2)	283 (91.8)
It is useful to add a PPI* to the prescription of a patient with polypharmacy	201 (65.2)	107 (34.8)	107 (34.8)

*: Proton pump inhibitör.

Table 5. Distribution of responses regarding the reasons for polypharmacy

Patient-related causes of polypharmacy	n	%
Over 62 years of age	20	6.5
Having multiple chronic diseases followed by multiple physicians	228	74.0
Low sociocultural level	11	3.6
Inadequate information of patients on medication use	19	6.2
Use of medication without medical supervision	29	9.4
History of prolonged hospitalization	1	0.3
Physician- or system-related causes of polypharmacy		
Reluctance to stop the medication prescribed by another physician	52	16.9
Outdated medical records	44	14.3
Time constraints	132	42.9
Prescription cascade	80	26.0

Table 6. Distribution of responses regarding physicians' use of medicine prescribing guidelines

	n	%
STOPP-START criteria		
Not heard	169	54.9
Heard about it but haven't used it	49	15.9
I used it	90	29.2
TIME criteria		
Not heard	181	58.8
Heard about it but haven't used it	27	8.8
I used it	100	32.5
Beers criteria		
Not heard	186	60.4
Heard about it but haven't used it	46	14.9
I used it	76	24.7
Medication Appropriateness Index		
Not heard	134	43.5
Heard about it but haven't used it	67	21.8
I used it	107	34.7

1 to 5. This scoring was based on personal perception rather than any calculated measure. The level of self-sufficiency in deprescribing practice was calculated as median: 2.0, IQR: 2.0. The level of self-sufficiency of those who had received training on polypharmacy before (median: 2.0, IQR: 1.0) was significantly higher than those who had not (median: 2.0, IQR: 2.0) (p=0.002, Mann-Whitney U test). No statistically significant difference was found regarding gender, age, professional experience, or workplace.

A significant relationship was observed between those who had considered practicing deprescribing in the outpatient clinic and those who had actually implemented it. Physicians who had thought about deprescribing were more likely to practice it (p<0.001).

In the questionnaire section, "Which of the following situations about the patient would encourage you to stop medication?", the most preferred option was "The possibility that his/her complaint is related to the medication he/she is taking" (66.9%).

To evaluate the medication management strategies of the physicians participating in our study, three clinical cases involving multiple medication use were presented, and the details of the questions are shown in Table 7. When the answers were analyzed, it was concluded that the frequency of choosing the correct option was quite low in Question 1 (18.8%) and Question 2 (21.1%). The majority of physicians did not want to take responsibility for changing or stopping medications in the prescription.

Table 7. Clinical cases

Clinical case 1: A 72-year-old patient with Type 2 DM, HT and stable angina had recurrent episodes of hypoglycemia. He uses insulin, metoprolol, ASA, lizinopril. He has no other disease. How would you proceed in this case?

	n	%
I would prescribe the same medicines	2	0.6
I would remove insulin from the prescription or change it with a suitable medicine	91	29.5
I would remove ASA from the prescription or change it with a suitable medicine	2	0.6
I would remove lisinopril from the prescription or change it with a suitable medicine	6	1.9
I would remove metoprolol from the prescription or change it with a suitable medicine	58	18.8
I would have referred for a change of medication	149	48.3

Clinical case 2: A 40-year-old male patient has been taking ASA, metoprolol, clopidogrel, captopril regularly since his MI 15 months ago. He asked you to prescribe his registered medicines, mentioned above. How would you proceed in this situation?

	n	%
I would prescribe the same medicines	81	26.2
I would stop metoprolol	4	1.2
I would stop clopidogrel	65	21.1
I would stop captopril	11	3.5
I would stop ASA	14	4.5
I would have referred for a change of medication	133	43.1

Clinical case 3: A 67-year-old female patient has HT is taking hydrochlorothiazide, bisoprolol, lisinopril and doxazosin. She wants to prescribe her medications and tells you that she fell in the bath a few days ago. Her blood pressure is well controlled, and she has no other medical problems. How would you proceed in this situation?

	n	%
I would prescribe the same medicines	10	3.2
I would remove hydrochlorothiazide from the prescription or change it with a suitable medicine	17	5.5
I would remove doxazosin from the prescription or change it with a suitable medicine	143	46.4
I would remove lisinopril from the prescription or change it with a suitable medicine	9	2.9
I would have referred for a change of medication	129	41.8

Discussion

Although the primary health care setting is an ideal environment to examine the problem of polypharmacy and inappropriate prescribing, a review of the literature revealed a limited number of studies on this issue.

More than half of the physicians in our study reported seeing 20 or fewer patients per day on average, while very few saw 61 or more patients. In a study conducted on general practitioners in Erzurum, it was reported that 15.1% of physicians saw 30 or fewer patients on average, 37.5% saw 30-59, 26.3% saw 60-89, and 21.1% saw 90 or more patients per day[23]. The mean number of patients per day in that study was found to be higher than in our study. It is expected that family medicine residents see fewer patients than general practitioners working in the field.

Among the physicians who participated in our study, those working at university hospitals were found to prescribe medication more frequently without examining patients. However, their patient load was lower compared to physicians working in training and research hospitals. This result was unexpected. Additionally, in a study conducted with primary care physicians, it was reported that 40.2% of participants did not prescribe medications without examining patients, while 42.5% prescribed only registered medicines[24]. These rates are higher than those found in our study. Further investigation is needed to understand why family medicine residents tend to prescribe medications without examination more frequently than physicians working in the field. This is crucial for preventing and reducing polypharmacy.

It was observed that the rate of utilization of guidelines designed to guide prescribing among physicians in our study was very low. In the literature, it has been emphasized that these guidelines are not widely used in routine practice because they are time-consuming and complex[25].

According to the findings of our study, physicians had a low level of knowledge about deprescribing. This is expected,

as the concept of deprescribing has emerged only in recent years. Indeed, the results of a 2018 study on polypharmacy and off-label medication use among dentists in California also showed that dentists had very limited knowledge on the subject[26]. Furthermore, a clinical trial conducted with primary care physicians suggested that preventing polypharmacy and updating medication initiation criteria would be more effective than deprescribing[27].

The uncertainty regarding who is responsible for deprescribing has been identified as a major issue, and it has been emphasized that clinicians are reluctant and anxious about assuming the risks associated with this process. These concerns include worsening symptoms, disease recurrence, withdrawal effects, adverse outcomes, shortened lifespan, criticism from patients, damage to patient-physician relationships, and creating interdisciplinary conflicts[5]. Addressing the medico-legal concerns related to these potential risks and encouraging physicians to engage in deprescribing is extremely important for reducing polypharmacy.

In a study, general practitioners stated the causes of polypharmacy as follows: new medications were prescribed to treat side effects, patients took medications without a doctor's advice, medications such as painkillers were used continuously to feel better, different physicians prescribed medications for the same patient, and there was no communication between these physicians working in different locations[28]. Similar results were obtained in our study.

"Prescribing cascade" was the most frequently chosen physician- or system-related reason for polypharmacy. Among other options, "time constraints" was more frequently selected by physicians working in training and research hospitals. This may be related to the fact that their daily patient numbers are higher than those of physicians working in university hospitals. This finding is consistent with results from other studies conducted with the participation of family physicians[29,30].

Most of the physicians in our study answered, "I would inform the patient to contact the physician who prescribed the medicine" when asked what they would do if a medication prescribed by another physician was no longer needed. In a 2006 study conducted in the Netherlands among general practitioners, it was observed that physicians hesitated to change or discontinue a medication prescribed by a specialist, which aligns with the results of our study.[31] Another study also demonstrated the reluctance of general practitioners to intervene in a treatment prescribed by their colleagues[32].

In our study, the most common incentive for deprescribing was "the possibility that the patient's complaint was related to the medication they were using." A 2017 study also identified this factor as a prominent reason for deprescribing[33]. Additionally, a 2023 study found that facilitators for deprescribing included the patient's willingness to stop medication, collaboration with case managers and pharmacists, and up-to-date medication lists[34].

In our study, 65.2% of participants incorrectly answered "true" to the statement, "It is beneficial to add PPI to the prescription of a patient with polypharmacy," making it the least correctly answered question. In clinical practice, many patients are observed to use PPI treatment without an adequate indication[35]. Data on inappropriate PPI use in family physicians' prescriptions are also available in the literature[36]. One possible explanation for this issue is a lack of physician knowledge regarding the indications for PPI use. Considering that the other statements assessed in our study were correctly answered at a high rate, it can be inferred that the physicians who participated in our study were generally aware of the harmful effects of polypharmacy on patients.

Our study has some limitations. One limitation is that the data collection process coincided with the COVID-19 pandemic. Participation in the study may not have reached the desired level due to the workload and rotational schedules of physicians. Another limitation is that data collection was conducted via an internet-based self-rating method, which may introduce bias. Lastly, due to the limited number of studies on polypharmacy among physicians in the literature, we were unable to discuss our findings in depth.

Conclusion

In this study, it was found that physicians generally did not have sufficient knowledge about polypharmacy.

It was determined that most of the physicians participating in the study had not received prior training on polypharmacy. This suggests that topics related to polypharmacy are neglected during family medicine residency training. To reduce polypharmacy, which is commonly encountered in primary care, this issue should be emphasized in medical school curricula and family medicine residency training programs, and family physicians should be provided with relevant training.

The rate of physicians' use of guidelines designed to guide

prescribing was found to be quite low. These guidelines should be more widely disseminated, and their use should be facilitated in clinical practice.

Before prescribing a new medication, the majority of physicians considered the possibility that the patient's complaints might be caused by the side effects of another medication they were currently taking. This awareness is crucial in preventing polypharmacy.

It is of great importance that family physicians, who frequently encounter the elderly population and have the opportunity to monitor them at regular intervals, enhance their knowledge and experience regarding polypharmacy and deprescribing. Therefore, we believe that guidelines for identifying unnecessary medications and preventing polypharmacy and drug-drug interactions should be more actively incorporated into daily practice. Increasing physician awareness, expanding the use of guidelines, and organizing educational programs are essential steps in addressing polypharmacy.

There are few studies on polypharmacy among family physicians and in primary care settings in Türkiye. In this regard, our study contributes to the existing data in this field and highlights the need for further research.

This study was based on the my medical specialization thesis of the corresponding author.

Ethics Committee Approval: The study was approved by Kocaeli University Non-Interventional Clinical Research Ethics Committee (No:E.598497, Date: 27.05.2024).

Use of AI for Writing Assistance: Not declared.

Peer-review: Externally referees.

Authorship Contributions: Concept – B.Ö.; Design – B.Ö.; Supervision – T.M.A.; Fundings – B.Ö.; Materials – B.Ö.; Data collection &/or processing – B.Ö.; Analysis and/or interpretation – T.M.A.; Literature search – B.Ö.; Writing – B.Ö., T.M.A.; Critical review – T.M.A.

Conflict of Interest: The authors declare that there is no conflict of interest.

Financial Disclosure: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Yeşil Y, Cankurtaran M, Kuyumcu ME. Polifarmasi. Klinik Gelişim [Article in Turkish] 2012;25:18–23.
2. Türkiye İstatistik Kurumu. İstatistiklerle yaşlılar, 2023 Available at: https://data.tuik.gov.tr/Bulten/Index?p=Istatistiklerle-Yaslilar-2023-53710 Accessed Feb 18, 2025.
3. World Health Organization. Primary health care–now more than ever. Available at: https://www.who.int/director-general/speeches/detail/primary-health-care---now-more-than-ever Accessed Feb 18, 2025.
4. Mair A, Wilson M, Dreischulte T. Addressing the challenge of polypharmacy. Annu Rev Pharmacol Toxicol 2020;60:661–81.
5. Robinson M, Mokrzecki S, Mallett AJ. Attitudes and barriers towards deprescribing in older patients experiencing polypharmacy: A narrative review. NPJ Aging 2024;10:1–6.
6. Midão L, Giardini A, Menditto E, Kardas P, Costa E. Polypharmacy prevalence among older adults based on the survey of health, ageing and retirement in Europe. Arch Gerontol Geriatr 2018;78:213–20.[CrossRef]
7. Gümüştakım RŞ, Başer DA. Multiple drug use in elderly in primary care: An example of rural field. Turk J Fam Pract [Article in Turkish] 2019;23:2–8. [CrossRef]
8. Junius-Walker U, Theile G, Hummers-Pradier E. Prevalence and predictors of polypharmacy among older primary care patients in Germany. Fam Pract 2007;24:14–9. [CrossRef]
9. Payne RA, Avery AJ, Duerden M, Saunders CL, Simpson CR, Abel GA. Prevalence of polypharmacy in a Scottish primary care population. Eur J Clin Pharmacol 2014;70:575–81. [CrossRef]
10. Rochon PA. Drug prescribing for older adults. Available at: https://www.uptodate.com/contents/drug-prescribing-for-older-adults. Accessed Feb 18, 2025.
11. Halli-Tierney AD, Scarbrough C, Carroll D. Polypharmacy: Evaluating risks and deprescribing. Am Fam Physician 2019;100:32–8.
12. Hanlon JT, Lindblad CI, Hajjar ER, McCarthy TC. Update on drug-related problems in the elderly. Am J Geriatr Pharmacother 2003;1:38–43. [CrossRef]
13. Masodi NA. Polypharmacy: To err is human, to correct divine. BJMP 2008;1:6– 9.
14. Fried TR, O'Leary J, Towle V, Goldstein MK, Trentalange M, Martin DK. Health outcomes associated with polypharmacy in community-dwelling older adults: A systematic review. J Am Geriatr Soc 2014;62:2261–72. [CrossRef]
15. Hajjar ER, Hanlon JT, Sloane RJ, Lindblad CI, Pieper CF, Ruby CM, et al. Unnecessary drug use in frail older people at hospital discharge. J Am Geriatr Soc 2005;53:1518–23. [CrossRef]
16. Damián J, Pastor-Barriuso R, Valderrama-Gama E, de Pedro-Cuesta J. Factors associated with falls among older adults living in institutions. BMC Geriatr 2013;13:6. [CrossRef]
17. Doan J, Zakrzewski-Jakubiak H, Roy J, Turgeon J, Tannenbaum C. Prevalence and risk of potential cytochrome P450-mediated drug-drug interactions in older hospitalized patients with polypharmacy. Ann Pharmacother 2013;47:324–32. [CrossRef]
18. Akademik Geriatri Derneği. Türkiye yaşlıda uygunsuz ilaç kullanım kriterleri. Available at: https://www.akademikgeriatri.org/index.php?func=new_content&id=67 Accessed Feb 18, 2025.
19. By the American Geriatrics Society 2015 Beers Criteria Update Expert Panel. American Geriatrics Society 2015 updated beers criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc 2015;63:2227–46. [CrossRef]

20. Doğrul RT, Kızılarslanoğlu MC, Yavuz BB, Cankurtaran M. Polypharmacy and rational drug use in the elderly. Turkiye Klinikleri Geriatr Spec Top [Article in Turkish] 2016;2:1–6.
21. Kalogianis MJ, Wimmer BC, Turner JP, Tan EC, Emery T, Robson L, et al. Are residents of aged care facilities willing to have their medications deprescribed? Res Social Adm Pharm 2016;12:784–8. [CrossRef]
22. Trenaman S, Willison M, Robinson B, Andrew M. A collaborative intervention for deprescribing: The role of stakeholder and patient engagement. Res Social Adm Pharm 2020;16:595–8.
23. Vançelik S, Çalıkoğlu O, Güraksın A, Beyhun E. The basic factors that impact prescribing and the status of consideration of the rational drug usage criteria of general practitioners. Eurasian J Med 2006;38:7–12.
24. Doğukan MN. Ankara ili Keçiören Sağlık Grup Başkanlığı'na bağlı birinci basamak sağlık kuruluşlarında çalışan hekimlerin akılcı ilaç kullanımı konusunda bilgi ve tutumlarının değerlendirilmesi. Yüksek Lisans tezi. Ankara: Gazi Üniversitesi; 2008. [In Turkish]
25. Ryan C, O'Mahony D, Kennedy J, Weedle P, Barry P, Gallagher P, et al. Appropriate prescribing in the elderly: An investigation of two screening tools, beers criteria considering diagnosis and independent of diagnosis and improved prescribing in the elderly tool to identify inappropriate use of medicines in the elderly in primary care in Ireland. J Clin Pharm Ther 2009;34:369–76. [CrossRef]
26. Stephens KM, Johnson T, Gurenlian JR. Polypharmacy and off-label drug use in dentistry: Knowledge, attitudes and practices of California dental hygienists. J Dent Hyg 2018;92:31–9.
27. Mahlknecht A, Wiedermann CJ, Sandri M, Engl A, Valentini M, Vögele A, et al. Expert-based medication reviews to reduce polypharmacy in older patients in primary care: A northern-Italian cluster-randomised controlled trial. BMC Geriatr 2021;21:659. [CrossRef]
28. Anthierens S, Tansens A, Petrovic M, Christiaens T. Qualitative insights into general practitioners views on polypharmacy. BMC Fam Pract 2010;11:65. [CrossRef]
29. AlRasheed MM, Alhawassi TM, Alanazi A, Aloudah N, Khurshid F, Alsultan M. Knowledge and willingness of physicians about deprescribing among older patients: A qualitative study. Clin Interv Aging 2018;13:1401–8. [CrossRef]
30. Palagyi A, Keay L, Harper J, Potter J, Lindley RI. Barricades and brickwalls--A qualitative study exploring perceptions of medication use and deprescribing in long-term care. BMC Geriatr 2016;16:15. [CrossRef]
31. Sinnige J, Korevaar JC, van Lieshout J, Westert GP, Schellevis FG, Braspenning JC. Medication management strategy for older people with polypharmacy in general practice: A qualitative study on prescribing behaviour in primary care. Br J Gen Pract 2016;66:e540–51. [CrossRef]
32. Larson EB. General internal medicine at the crossroads of prosperity and despair: Caring for patients with chronic diseases in an aging society. Ann Intern Med 2001;134:997–1000. [CrossRef]
33. Ie K, Felton M, Springer S, Wilson SA, Albert SM. Physician factors associated with polypharmacy and potentially inappropriate medication use. J Am Board Fam Med 2017;30:528–36. [CrossRef]
34. Zreik J, Kato M, Bailey B, Biggs WS, Hamadeh G. Polypharmacy prevalence and perceptions of deprescribing in elderly patients among community primary care providers in mid-Michigan practices. Cureus 2023;15:e39399. [CrossRef]
35. Benli AR. Rational drug use in geriatric population in primary health care services. Ankara Med J 2015;15:258–9. [CrossRef]
36. Lai A, Odom A, Roskos SE, Phillips JP. Deprescribing inappropriate proton pump inhibitors in a family medicine residency practice office. PRiMER 2021;5:43. [CrossRef]