

Medication use Pattern among the Elderly in Iran: A Review Article

Abstract

Suffering from multiple diseases simultaneously has turned the elderly into the largest group of drug users in society. On the other hand, the situation of the pattern of drug consumption by the elderly vulnerable group has received less attention. The present study was conducted to determine the pattern of drug consumption among the elderly in the country between 2010 and 2023. The present study is a narrative review. Based on the defined keywords, a targeted search has been conducted in available Persian and English databases. 114 articles were found, and by removing duplicates and appraisal of abstracts based on the inclusion criteria and the purpose of the research, finally, 14 articles (8 English and 6 Persian) were analyzed. The most common drugs used by the elderly in Iran were cardiovascular, pain relievers, and digestive drugs, and more than 90% of the drugs were taken orally. Also, according to the findings, polypharmacy is common among the elderly in the country, and with the increase in the number of drugs used, self-administration of drugs, non-adherence to drugs, and the use of potentially inappropriate drugs have also increased. Previous recovery experience and easy access to medicine are also mentioned as the most important factors of self-treatment. The use of drugs by the Iranian elderly does not follow a logical pattern, which can not only lead to serious consequences in the health status of this age group but will also have significant economic and social consequences for the elderly and their families, the health system, and the society.

Keywords: Elderly, Iran, medication, nursing, utilization pattern

Introduction

Iran's population is rapidly moving towards old age. According to the statistical estimates the world, in 2015, Iran in terms of aging speed ranked ninth in the world population, so it is predicted that by 2050, Iran's population will increase by about 30% and the growth of the elderly population will be about 400% (four times).^[1,2] The World Health Organization has called this growth rate a silent tsunami in Iran and has drawn the attention of health officials to the necessity of planning for the elderly.^[3]

Due to physiological changes caused by aging, the elderly are susceptible to many diseases. So more than three-quarters of the elderly are infected with at least one chronic disease and half of the elderly are from two chronic diseases.^[4] These diseases have turned the elderly into the largest group of medication users in society.^[5] So that in the

¹polypharmacy: taking four or more medicines simultaneously

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US, nearly 40% of prescribed medicines are taken by people over 60 years old.^[6]

Studies conducted in different countries show that the elderly, especially elderly women, take medicine more than twice their share in society.^[5] Taking medicine is considered the main part of the disease treatment cycle^[6] and medication therapy also increases with increasing age and prevalence of chronic diseases.^[5] In addition, pharmacokinetic (the effect of the medicine on the body) and pharmacodynamic (the body's response to the medicine) changes in elderly patients with age-related changes. For this reason, the possibility of adverse side effects and drug interactions increases,^[7,8] the possibility of hospitalization of the elderly due to side effects caused by drugs is four times that of younger people (16.6% vs. 4.1%). In addition, the increase in functional problems such as impaired vision, decreased hand strength, and loss of sensory and motor skills can have negative effects on the correct and timely use of medications by the elderly, which ultimately lead to clinical problems^[9] and numerous economic burden.^[8] It is obvious that the

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more the number of medications used, the risk of unwanted side reactions, the possibility of drug interactions and drug intoxication will also be more.^[10]

In the medical profession, medicine is like a double-edged sword;^[11] its proper use reduces the symptoms and pain of the patient and helps a lot in treating the disease, but incorrect use has the opposite result.^[12] How to take medicine by people is called a drug utilization pattern, and it can be rational or irrational.^[13]

The World Health Organization has estimated that more than half of the medicines are prescribed and distributed incorrectly, and about half of the people do not take their medicines correctly.^[14] The most common side effects of not taking medicine correctly can be drug interactions, medication errors, adverse drug events and reactions, side effects of re-hospitalization, and even sudden death.^[15] Irrational drug use has many forms, for example, polypharmacy, excessive use of injectable drugs, self-medication, improper use of drugs, etc.^[13] Polypharmacy is a condition in which a person takes more than four drugs a day, and some of them may not be necessary.^[16] Self-medication is an important part of the self-care behavior of the elderly and one of the vital challenges of the healthcare system.^[11,17] Various forms of self-treatment can also be found in studies that include taking non-prescription drugs, changing the dosage and frequency of prescription drugs, or taking medicine recommended by friends and acquaintances.^[15] Medication adherence is a name that is given to the degree of compliance of the patient's behavior towards taking medication with the recommendations of the doctor or health experts.^[18,19]

Since the incorrect use of medicine is a global problem^[11] and the rational use of medicine has become one of the key principles in providing health care,^[14] the study of medicine use in the elderly population is one of the most important and challenging topics.^[7] Irrational use of medicine can lead to a decrease in the quality of treatment, and an increase in side effects and the number of hospitalizations, resulting in increased health costs.^[6]

Due to the high costs and consequences of incorrect medication use, paying attention to the correct drug utilization pattern is considered one of the important issues of society.^[6] planning for drug therapy management and modifying the pattern of drug utilization, especially in the elderly, is considered one of the essential issues of the health care system.^[18] It is necessary to have comprehensive and complete information about how to use medicines in the elderly due to their mental state, neglect, and social isolation.^[17] So, medication use research is a valuable tool for health politicians in making decisions and improving the rational use of medicine. This research was conducted to review the studies conducted on how to use medicine by the elderly in the country. In this research, the meaning of drug utilization pattern is the number and forms of medicine use, pharmaceutical groups used, medication prescribers, self-inflicted drug use, following medication instructions,

polypharmacy, and investigating the relationships between these factors.

Procedure

This research is a type of documentary study (narrative study) that examines the literature in the field of "Drug utilization patterns among the elderly in Iran". The research community is a collection of studies related to the drug utilization pattern among the elderly and purposeful sampling is based on the degree of relevance to the subjects under study and including the keywords "elderly", "aged", "taking medicine", "self-medication", "polypharmacy", "medicine multiplicity", "function", "adherence" among the available sources in the articles of valid databases such as Scientific Information Database of Academic Jihad (SID), Iran Research Institute of Scientific Information and Documents, National Publications, and PubMed, Magiran, Google Scholar, and also the English keywords "Elderly", "Medication", "Polypharmacy", "Self-Medication", "Adherence", "Consumption", in the Ovid database, Science Direct, Springer, Scopus, Google Scholar, Elsevier and it was completely done in the 10 years from 2010 to 2023. Due to the overlap of some databases and the simultaneous indexing of an article in several databases, net software version 6 was used to identify duplicate titles. The criteria for entering the study in this research is to write an article in English or Farsi and to match the purpose of the research, and the criterion for exiting exclusion from the research is the lack of full access to the full text of the studies, and only be done on elderly people admitted to hospitals or nursing homes Diagram number 1.

Findings

In the recent study, a total of 10 articles (6 studies in Farsi and 4 studies in English) met the inclusion criteria and were analyzed based on the purpose of the study. First, the type and form of medications used, self-inflicted drug use, potentially inappropriate medications, multiplicity or polypharmacy, adherence to the drug regimen, and then the relationship of each of them with demographic characteristics has been investigated [Table 1].

Type and Form of Medications Used

The most common categories of medications used among the elderly in Hosseini *et al.*'s^[5] study (reviewed between 2000 and 2015) respectively are cardiovascular medications, painkillers, and anti-inflammatories. In the study by Nougabi *et al.* are medications affecting the cardiovascular system, digestive medications, and anticoagulants. In the study of Nougabi *et al.*,^[20] the most commonly used drugs are aspirin, atenolol, and ranitidine, and about three-fourths (72.1%) of the elderly under studied were drug users, and 96.6% of the drugs used were in the form of tablets and the rest in the form of capsules, syrups, spray, and other medicinal forms. In the study of Saberi and colleagues

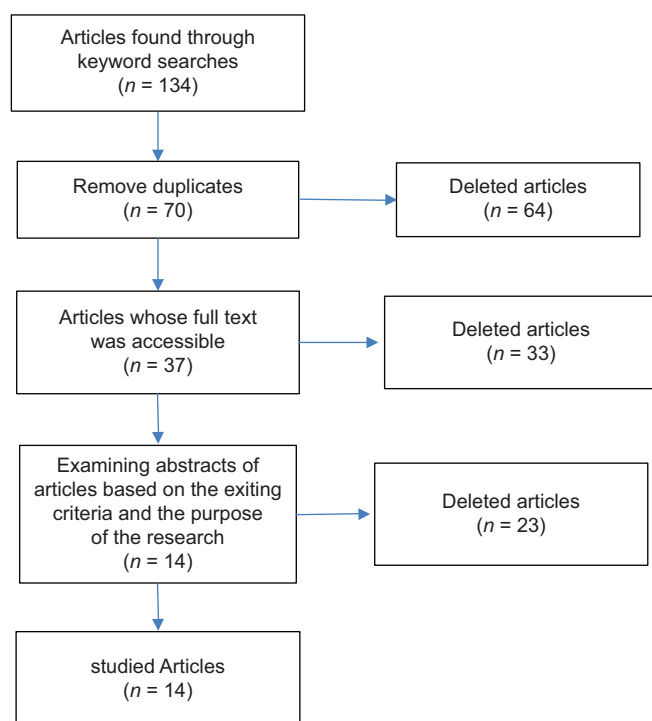


Diagram 1: The process of searching and screening studies.

(2020) in Amol City, cardiovascular drugs are the most common drug category and aspirin, Atenolol, and ranitidine are also the most common drugs used by the elderly. About 85% of the drugs used were in oral form.

Self-Inflicted Drug Use or Self-Medication in the Elderly

Self-medication is a health-related issue that has been addressed in many countries of the world. So far, several definitions have been provided for self-medication, the most common is trying to use non-prescribed medications by a doctor [over-the-counter (OTC) drug use] and the use of medications to treat the signs and symptoms of the disease by the patient.^[21,22] In other words, self-medication is a part of health care in which the patient assumes that has a higher degree of responsibility for the management of his disease by using OTC medicinal products.^[22]

More than a quarter of the elderly over 65 years old (28.5%) who participated in the study by Dehvan *et al.* had self-medicated. The most common drugs used included painkillers 43.1%, cold medicines 26.4%, cardiovascular medicines 20.8%, antibiotics 2.8%, and herbal medicines 1.4%.^[17] In the study of Jafari *et al.*^[23] (2015), 86% of the elderly of Kermanshahi also kept medicine in their home. The most commonly used medicines included painkillers 92%, cold medicines 74% and vitamins 61%. In the study of Sabri and colleagues, about 72% of the elderly kept drugs at home, 54% of them had self-medicated in the last three months, and analgesics were the most common drugs they used.

99. 4% of the elderly in Central Province (Zarandia) who participated in Karimy *et al.*'s study in 2011 also kept medicines at home. About one-third (31%) of them have self-medication. The most common non-prescription drugs used included antihypertensive medications, painkillers, antibiotics, digestive medicines, cold medicines, and vitamins.^[24] In the study of Nougabi *et al.*^[6] in 2014, more than half of the elderly under studied (53.3%) also self-medication and the most common nonprescription drugs used by them were cold medicines, painkillers and hypnotics.

In the study of Soleimani *et al.*,^[28] in 2015, approximately 46% of the elderly have self-medicated in the last three months, and the most commonly used drugs were acetaminophen and acetaminophen codeine. In the study of Dehvan *et al.*, the majority of the elderly (62.5%) had self-medication based on their personal experiences, and about 37.5% of them had self-medication based on the advice of family, friends, and medical staff. Elders who lived with their spouses and children, as well as working elders, had more self-medication than other elderly people. However, there was no significant relationship between other demographic characteristics and self-treatment.^[17] In the study of Jafari *et al.*,^[23] there was a significant relationship between demographic characteristics and self-medication, so elderly women, single elderly, literate elderly and elderly with insurance, and elderly without sufficient information about drug side effects have self-medication more than other elderly people. However, in Dehvan study, the probability of self-medication decreased with increasing education.^[17]

Different studies have mentioned different reasons for self-medication. In the analytical study of Mortazavi *et al.* (2017),^[15] access to local pharmacies and convenient purchase of medication and in other studies (Nougabi, Karimi, and Dahoun), previous use of medication and improvement of symptoms, the assumption of symptoms are minor, financial problems, difficulty in medical appointment was mentioned as one of the most important reasons for tending to self-medication.^[6,17,24] In their review study (from 2016 to 2021), Rafati *et al.* estimated the rate of self-treatment of Iranian elderly between 0/3%–82% in different regions and 36% on average.^[25] They believe that this problem can be controlled by educating the elderly about the side effects of self-treatment through mass media.

Polypharmacy or Multiple Medications

There are many definitions of polypharmacy in different studies, but most researchers call the use of 5 or more medicines polypharmacy. By reviewing 21 articles, Hosseini *et al.* (2020) concluded that the risk factors related to polypharmacy can be divided into three main categories: the demographic characteristics of the elderly, their health status, and the characteristics of the health center referred to by the elderly, and the highest prevalence of polypharmacy is in the age category of 70–74 years old

Table 1: Characteristics and findings of the included studies (n=14)

Authors	Study design	Study environment	Population	Results
1 Karimy et al. ^[24] 2011	Descriptive-Sectional	Zarandieh	180 elders over 60 years old	31% of the elderly have self-medication, the most important reason being the previous experience of the disease and available medication.
2 Nougabi et al. 2012	Descriptive-Sectional	Gonabad	323 elders over 60 years old	53.3 percent of the elderly have self-medication, and there is a significant relationship between age and self-medication.
3 Dehvan et al. 2017	Descriptive-analytical	Sanandaj	275 elderly people of Sanandaj city	The high prevalence of self-medication was related to painkillers and cold pills, and financial problems and difficulty in making appointments were the most common reasons for self-medication in the elderly.
4 Nougabi et al. 2012	Descriptive-Sectional	Gonabad	323 elders over 60 years old	56/6 of the elderly had multiple medications, and there was a significant relationship between multiple medications and adherence to medication orders.
5 Abazari et al. 2020	Descriptive-Sectional	Esfahan	200 elders over 65 years old	52% of the elderly had very weak medication adherence, and there was a significant relationship between medication adherence and education level.
6 Hosseini et al. 2019	Review study	Browsing articles from all over the world	21 selective studies	The highest amount of multiple medications were in the age groups of 74–70 and 74–80 and was related to demographic characteristics, health status, and health center characteristics.
7 Dianati et al. ^[26] 2019	Descriptive-Sectional	Kashan	360 elders over 60 years old	54.5% of the elderly had multiple medications, of which 21.4% were taking at least one inappropriate medication.
8 Mortazavi et al. 2017	Qualitative study: content analysis	Iran	21 people who participated in 25 interviews. 10 people over 60 years old, 3 medical staff, 3 pharmacists, and 5 doctors.	Important factors in the self-medication of the elderly are placed in 5 categories: attitude towards the disease, treatment, and doctor, living with the disease, inappropriate environment, inefficiency of the treatment system, and power and influence of others.
9 Hosseini et al. 2020	Analytical (cohort)	Iran/Babol	1616 elders over 60 years old	23% of the elderly had multiple medications, which was more common among women, and Cardiovascular medicines were the most common category of medicines used by both sexes.
10 Jafari et al. ^[23] 2015	Descriptive-Sectional	Kermanshah	272 elders over 60 years old	83% of the elderly have self-medication and elderly women, unmarried and illiterate, and uninsured elderly have the most self-medication.
11 Bastani et al. ^[27] 2021	Qualitative study	Shiraz	23 people who participated in interviews. 16 people over 60 years old and 2 their children, 3 nurses, 2 pharmacists and 2 doctors	The lack of knowledge, Low level of education, inappropriate lifestyle and social situation are among the factors affecting the reduction of medication adherence in the elderly
12 Rafati et al. ^[25] 2023	Review study	Iran	Selective study	Self-treatment among the elderly in Iran has been estimated from 0/3% to 82%. There is a correlation between the number of research samples and the proportion of self-treatment..
13 Soleimani et al. ^[28] 2015	Descriptive cross-sectional	Tehran	1054 elders over 60 years old.	69% of elderly people regularly used at least one medicine per day and 46% of them had self-medication.
14 Saberi et al. ^[29] 2020	Descriptive- analytic	Amol	100 elders over 60 years old.	About 75% of the elderly had self-medication and 65% of them had polypharmacy. There has been a correlation between marital status and education level with the amount of self-medication

multiple medications increases with age increasing until the age of 84, but after that, the number of daily medication

used decreases. In addition, compared to men, women take more medicines daily until the age of 80, but after that,

there is no significant difference between the two sexes in terms of the number of received medicines. Also, the number of medicines among urban residents is more than rural residents, which is related to their lifestyle and type of activity.^[5] The findings of Soleimani's study showed that the average number of drugs used by the elderly in Tehran was 3.57 drugs per day. And 69% of them regularly used at least one medicine per day. In Sabri's study, 54% of the elderly in Amol City had polypharmacy and used an average of 5.3 medicines per day.

Abazari *et al.*'s^[19] study (2020) has shown that 18.5% of the elderly in Esfahan City had 4 or more diseases and took at least 8 medicines daily.

In Hosseini *et al.*'s^[16] study, the prevalence of polypharmacy in the population over 60 years old in Babol City was 23.1%, having at least three diseases at the same time (in 61.1% of the elderly) was considered the most important cause of polypharmacy. In addition, polypharmacy has been related to demographic factors such as gender and marital status, so married elderly women had polypharmacy more than other elderly.

In the study by Dianti *et al.*^[26] (2013), 88% of the elderly participants in the study received at least one medicine, and the average of medication used items was 6.2 medicines. 54.5% of these people had polypharmacy. There was a statistically significant relationship between gender and the number of medications used, multiple medications in elderly women was more than in men, in addition, multiple medications had a direct relationship with the number of doctors who prescribed the medicines, and the higher the number of doctors, the higher the multiple medication.

Other studies also indicate the use of multiple medications in the elderly. The results of Nougabi *et al.*'s^[20] study (2012) represent a high prevalence of daily medication use (4.06) in people over 60 years old, so that 56.6% of the elderly had multiple medications. Of course, it is worth mentioning that in this study, taking 4 or more medicines is defined as multiple medications. Multiple medications have a significant relationship with gender and profession, so multiple medications in women and elderly housewives were more than other elderly people.

Prescribing Potentially Inappropriate Medication in the Elderly

In 1997, Dr. Mark Beer *et al.* published an article in which a list of drugs whose use in the elderly is associated with high risk. Investigation into the results of this article continued and developed further and led to the establishment of criteria for medicines that are potentially inappropriate and dangerous to use in the elderly. This criterion includes medications that are generally inappropriate to use and medicines that are dangerous in the presence of certain diseases. This criterion has been widely accepted in the

field of elderly care, reducing the side effects of drugs and reducing the cost of medications.^[30]

Dianti *et al.*^[26] in their study, has estimated the prevalence of use of potentially inappropriate (PIM) in the elderly of Shahr Kashan to be 21.4%, so that one out of every five elderly medicine users had at least one inappropriate medicine among their medications. PIM (Potentially Inappropriate Medication) has a direct relationship with the number of medicines used and the number of prescribing doctors, and with the increase in the number of doctors and the number of medicines used, the use of potentially inappropriate medication has also increased.

Medication Adherence

The number of elderly who use several medicines at the same time is increasing. Multiple medication management can be challenging especially in the elderly group due to having multiple diseases and physical and cognitive changes. The degree of compliance of the elderly to medication orders can be divided into three categories: full, moderate, and low compliance.^[31,32]

The results of Saberi's study have shown that 74% of the elderly in Amol had partial to complete adherence to their medication regimen, and the most important reason for non-adherence in the rest of the elderly was forgetfulness. There has been a direct relationship between having a spouse and medication adherence and an indirect relationship between visual impairment and movement disorder and medication adherence. The results of Nougabi and Balochi's study (2013) showed that 71.5% of the elderly over 60 years old in Gonabad had partial to complete adherence to the medication regimen. The most common causes of non-adherence to medication orders are forgetting the time to take medicines and not being able to recognize the type of medicines due to reduced vision and similarity in the shape and color of medications. 90% of people did not follow the diet according to the medicines they were taking. The elderly who usually had a companion by their side when taking medicine and the elderly with fewer medicines had higher medication compliance than other people.^[6]

According to Abazari *et al.*'s^[19] study, more than half of the elderly in Isfahan City (52%) had low medication adherence, 21.5% had moderate medication adherence, and 26.5% had high medication adherence. Among the demographic characteristics, there is a direct relationship between the level of education and the level of medication adherence, so the elderly with university education had the highest medication adherence. In addition, there was no significant relationship between visual and hearing impairment and medication adherence. In the qualitative study of Bastani *et al.* (2021), the most important factors of medication non-adherence among the Iranian elderly were found to be a lack of knowledge, insufficient

education, difficult living conditions, and social pressures. They believe that improving medication adherence in Iran requires principled and scientific management including planning and carrying out interventions at all health levels (from the Ministry of Health to the elderly).

Discussion

Medication is an important and inseparable tool in the prevention, diagnosis, cure, and rehabilitation of patients.^[33] According to studies, 339 medicines are taken by every Iranian annually, which is two to four times more than the international standard.^[17] Lack of attention to the structures of prescribing and receiving medications in Iran has led to a large part of the burden of diseases (65%).^[21]

According to the results of the studies, cardiovascular medications are the most common pharmaceutical category and aspirin and atenolol are the most common drugs used by the elderly in the country, which is the result of the high prevalence of cardiovascular diseases among the elderly in the country.^[26] More than 90% of prescription medicines for the elderly in the country are in the form of tablets. The results of studies represent a decrease in the prescription of injectable medicines because injectable medicines are painful, uncomfortable, more expensive, and associated with less safety, and the price of injectable medicines is almost higher than oral products, therefore the prescription of injectable medicines is limited and the prescription of oral medicines has the priority among doctors.^[34] On the other hand, in the market drugs are mostly produced and available in the form of tablets and capsules.

When it comes to self-medication, the elderly are considered a special group because according to the findings from numerous studies, the elderly are the largest medication user group, and the Iranian elderly are not excluded from this rule. In addition, doctors' visits are expensive and medicines are cheaper in Iran,^[35] and it is easily accessible to people, so in some cases, prescription medicines are also available to people without a prescription.^[15] In studies conducted in the field of self-medication, the condition of vulnerable groups such as the elderly, has been less investigated.^[17] It has been reported that the self-administration of medications in Iran is higher and about three times the global average.^[21,23] The rate of self-medication in Iran has been reported from 12% to 90% with an average of 53%.^[21] The results of the reviewed studies are also consistent with the findings of other studies so self-medication is reported from 28% to 83% in different provinces. And pain killers and cold medicines are also the most common drugs that were used arbitrarily in all regions. Due to the results of the studies, the causes of self-medication can be divided into three categories: factors related to the pharmacy (easy access to pharmacies and OTC sales), personal factors (personal experiences, feeling that the symptoms are minor), and factors related to the doctor (unavailability of a doctor), expensive visits).

In general, the most common cause of self-medication in studies is related to personal factors. Self-medication is very high in East Asian countries, for example, 42.5% in Egypt, 35.4% in Saudi Arabia, and 68.1% in Pakistan. It has been reported that self-medication prevalence in the developing countries of Ethiopia, Nigeria, and Nepal is respectively 43.2%, 73%, and 59%^[23], and in developed countries between 8.3% and 87% (in Spain 12.7% and in Mexico 61%).^[21] In Ethiopia, painkillers, antibiotics, and digestive drugs were the most common drugs that were self-administered, and most of the elderly also took this action for personal reasons.^[36] In Gazi Bara's study (2013),^[37] half of the elderly living in Serbia have taken non-prescribed medicines, which 85.3% have obtained from public and private pharmacies, 3.7% from family members, and 11% from other ways.

The review of various studies represented that medicines that are taken arbitrarily are almost the same all over the world and their prevalence varies depending on various cultural and social factors. Access to OTC medicines and their use patterns depend on the national health system. For example, in the United States, OTC medicines are sold directly to customers by general and specialized pharmacies. These differences can affect the prevalence of self-medication in different countries.^[15]

In most studies, more than 50% of the country's elderly have had polypharmacy due to the presence of several diseases at the same time. The occurrence of polypharmacy in the elderly is significant and can be associated with many risks such as medicine interactions, side effects of medicines, increasing the possibility of the presence of inappropriate medications among medicines, the risk of confusion, and cognitive and hemodynamic problems.^[38] For example, in Noughabi's study, 14.2% of the elderly had side effects of medicines due to multiple medications, and 52.1% of them went to the doctor for complication treatment. Polypharmacy is related to the number of diseases, gender, occupation, marital status, and the number of prescribing doctors, but in all studies, elderly women had the most polypharmacy. The results of the studies are the same as the results of the Orlando review study in 2020, and women generally used more medicines than men, which may be the reason for more women going to the doctor and their participation in research studies.^[5] Insufficient training of the medical department staff about the difference between pharmacotherapy of the elderly and young adults causes the prescription of additional medicines and as a result, polypharmacy increases.^[20] In India, based on Amanda Hargery's study, polypharmacy has been seen in 45% of the researched samples. Polypharmacy in North Korean society varies from 7% to 45%.^[39] Polypharmacy is estimated at 17% of European elderly, for example in Switzerland. In addition, the study of Tatjana Gazi Bara in 2013,^[37] in Belgrade, Serbia showed that 10.4% of the elderly were suffering from polypharmacy. In the

Kingdom state, during the last two decades, the number of elderly people over 65 years old with polypharmacy has increased from 12% to 49%. Therefore, the prevalence of polypharmacy in Asian countries is higher than in European countries.^[31]

With the increase in the number of medicines used in the elderly, the risk of using potentially inappropriate medication also increases.^[8] Few studies have examined the prescription of potentially inappropriate medication (PIM) in the country's elderly, but what can be obtained from the review of the articles is that the use of potentially inappropriate medication is not a rare event, and according to the study by Dianati *et al.*, 21% of the country's elderly use this type of medicines. Therefore, to reduce the possibility of prescribing PIM, drug side effects, frequent hospitalizations, and treatment costs, more attention should be paid to the issue of prescribing drugs, especially in elderly patients with multiple chronic diseases. In Iran, Beers criteria or other specific criteria are not used for prescribing drugs in the elderly, and doctors and nurses are not given special training during and after the study period regarding potentially inappropriate drugs in the elderly. The lack of an educational program in this area will lead to the risk of prescribing potentially inappropriate medications for the elderly.^[40]

Adherence to medication and good medication adherence is necessary to ensure safe and effective medication use.^[31] Adherence to a medication regimen is a complex and voluntary behavioral process that makes a person take his medicines at the right time and in the right amount, and continue to take them during the prescribed period.^[41] Medication adherence can be defined as the degree of compliance of a person's performance in taking medication with the recommendations of health care providers such as doctors and pharmacists. Non-adherence to medication refers to deviations from treatment agreements, such as taking too little or too much medicines.^[31] The elderly are more at risk of non-adherence to the medication regimen than the young due to the use of a large number of medications.^[41] In the city of Isfahan, 52% of the elderly and in the city of Gonabad 28.5%, and in Amol City 26% of the elderly had non-adherence to medication, this difference can be because in Isfahan City, elderly people over 65 years old and in Gonabad city, elderly people over 60 years old have been examined. In other words, medication adherence decreases with age. The results of the studies are consistent with the studies of other countries so in different countries, medication non-adherence has been reported up to 50% among the elderly.^[31] Medication non-adherence has many reasons, which can be attributed to factors such as the individual characteristics of the elderly, medication factors (such as the form and the color of medicines), factors related to health service providers (such as teaching the correct use of medications and expressing the side effects of irrational

use), health care system (such as the system of prescribing and distributing system), economic and social factors.^[21,27] With increasing age, the use of medicine, mobility, and vision problems and disabilities have increased.^[42] In Saberi's study (2020), there was a direct correlation between having a visual impairment, movement disorder, and loneliness with medication nonadherence.

More than a quarter of the elderly have problems such as not being able to open the lid of the box when taking medicine. Also, elderly people with vision problems need help twice as much as elderly people without vision problems when taking medications.^[29,31] According to the studies, there is a relationship between vision loss, the number of medications used, not having a companion and forgetfulness with non-compliance with medication instructions in the elderly.

In the present study, only articles published in Farsi and English and review research conducted at the community level were used, and the articles conducted in the field of drug utilization patterns in hospitals and nursing homes and written in other languages have not been included in the study, so a comprehensive and wider study is suggested.

Research limitation

- 1 - In the present study, only Persian and English studies whose texts were available were included in the study.
- 2 - Review and original studies whose target population was the elderly hospitalized in medical centers and nursing homes were excluded from the research. Therefore, this study does not provide the reader with information about the pattern of drug consumption in a significant part of the Iranian elderly.
- 3 - Studies that were conducted to investigate the pattern of consumption of a specific type of drug or the pattern of drug consumption in a specific group of elderly people (suffering from a specific disease) were excluded from the study. Therefore, the results of this study cannot be generalized to all Iranian elderly.

Conclusion

The conducted studies indicate that the correct use of medicine is not observed among the Iranian elderly. Incorrect and irrational patterns of medicine in different forms of polypharmacy, self-inflicted use of medicine, inappropriate use of medicines, and medication non-adherence can be seen at high levels. The occurrence of possible problems and risks such as the increase in medicine intoxication, medicine interactions, the increase in diseases, the possibility of hospitalization, and finally the increase in healthcare costs show the need to pay attention to the prescription and utilization of medicines by the elderly. Since the elderly are the main medicine users in the country due to chronic diseases, training to improve the drug utilization pattern should start with training doctors and nurses to improve the pattern and the prescription

of medicines. Also, pharmacists and pharmaceutical companies should start to improve the shape and color of medicines, to reduce healthcare costs, prevent drug side effects, and improve the health of the elderly the training caregivers and the elderly during home visits and implementing the program of integrated care for the elderly should be continued. Therefore, special attention to the elderly by those in charge of the matter, including the Ministry of Health, can help to a great extent in correcting the drug utilization pattern through educational planning.

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Conflicts of interest

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