Review Article

A Review of Polypharmacy in the Elderly and Its Management Strategies

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Abstract

With the increase in the elderly population and the increase in life expectancy, the possibility of chronic diseases and the use of several drugs at the same time has increased, which can cause harmful drug interactions and reactions. This research is a review study that was conducted by searching the keywords poly-pharmacy, elderly, and prevalence in PubMed, Science Direct, Scopus, Google Scholar, Ovid, Magiran, and Sid databases in the period of 2005-2023. According to the findings, the highest prevalence of polypharmacy was in the age groups of 70-74 and 80-84, and polypharmacy was related to the demographic characteristics and health status of the individual and the characteristics of the health center. Also, studies have shown that there is a relationship between the source of obtaining information about drugs and the polypharmacy consumption pattern. To prevent drug side effects, the necessity of continuous monitoring of elderly drugs has been emphasized in various articles. The results of the studies showed that the use of strategies such as; interaction between doctor and pharmacist, educating the elderly about the dangers of self-inflicted use of medicines, informing the elderly about the limitations of using herbal medicines, using electronic tools to monitor the process of taking medicines and using protocols and guidelines for prescribing medicines can reduce to a great extent the multiplicity of drug regimens in the drug regimen of the elderly and make the use of drugs in this age group much easier.

Keywords: Polypharmacy, Elderly, Management strategies, Databases

Introduction

Due to the advances in medical science and the increase in the elderly population in recent decades, elderly health care has become a global issue. According to the definition of the World Health Organization, when the population over 60 years old in a country reaches more than 7%, that country is elderly [1, 2]. Aging is accompanied by changes in the biological system. Among the important physiological changes in old age are the decrease in body volume, decrease in blood plasma, decrease in total body fluids, decrease in serum albumin and changes in protein binding, decrease in the first phase of liver metabolism, renal glomerular filtration, and renal clearance. Also, studies have shown that aging can specifically change the pharmacokinetic and pharmacodynamic processes of drugs. Pharmacokinetic changes include changes in absorption, metabolism, release, protein binding, and hepatic and renal clearance. Pharmacodynamic changes include changes in drug action on the target tissue, which lead the elderly to unwanted drug side effects [3, 4]. On the other hand, with the increase in life expectancy, the probability of chronic diseases and the need for health care, including drug therapy, increases [1, 5, 6]. These diseases have caused the elderly to be the largest group of drug users in different societies [1, 7].

Since the prevalence of multiple drugs in the elderly is high, a phenomenon called polypharmacy is proposed. The term polypharmacy has different definitions, but most researchers call the use of five or more drugs polypharmacy [1, 8, 9]. In other words, polypharmacy is a condition in which a person

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takes a large number of drugs, some of which may be necessary and some of which may not be necessary [10, 11]. The most common side effects of polypharmacy include drug interactions, drug errors, adverse drug events and reactions (ADR), side effects of re-hospitalization, and increased treatment costs [1, 10]. However, to control and treat some chronic diseases, it is useful to use several drugs at the same time. Several studies indicate that the prevalence of polypharmacy increases with age. This may be due to the increase in the improper prescription of drugs, lack of use of appropriate treatment, medication errors, weak prohibitions for the use of drugs, and the increase in the number of drugs that can be used without a prescription [5, 12, 13].

In their study conducted in 2018, Vetrano and his colleagues acknowledged that polycarmis is directly related to the development of movement disorders in the elderly [14]. In a recent study, it has been determined that the use of more than 10 drugs in 200 elderly people discharged from the geriatric ward had a direct relationship with their re-hospitalization in the next one to three months [15]. It should be noted that the use of medicine is necessary to return to health or to prevent the recurrence and worsening of the disease in the elderly, but the correct principles must be observed so that this process is carried out correctly and the use of the medicine itself does not cause harm to the elderly [16, 17]. Various studies have shown that the use of multiple drugs in the elderly and complex treatment regimens have reduced the level of medication adherence in these people and resulted in various side effects for them, which varied from prolonging the course of treatment to death [18-21]. Studies such as Hosseini *et al*.'s study [22] by examining the prevalence of this phenomenon, related factors, and complications related to the lack of control and management of drug overdose in the elderly, have pointed out an important part of the dimensions of this event in the elderly. However, due to the lack of a coherent study on polypharmacy management strategies in the elderly, this review study was conducted to investigate the polypharmacy management strategies of the elderly.

Materials and Methods

The present study is a review article to investigate polypharmacy and provide solutions for its management in the elderly. Searching for articles electronically using the keywords Elderly, Older Adults, and Polypharmacy Management was carried out in the range of 2005-2023. In this study, various databases such as PubMed, Science Direct, Scopus, Google Scholar, Ovid, Magiran, and Sid were used.

Results and Discussion

Interaction Between Doctor and Pharmacist, Communication to Adjust Drug Regimen

Various studies have mentioned the significant impact of the interaction between the treating physician and the pharmacist to reduce the number of drugs in the medication regimen of people, especially the elderly [23, 24]. Similar effects and side effects are considered in the medication regimen of these people, and in other cases, the elderly person is treated by several doctors at the same time, which creates complex medication regimens for the individual [24]. The elderly can greatly benefit from a clinical pharmacist who specializes in mechanisms and drug interactions and their effects and side effects, and most importantly, in the pharmacokinetic and pharmacodynamic changes of drugs in the elderly more than other people in the treatment team, and this is while it has been observed in many cases that the opinions of the clinical pharmacist and his interaction with the treating physician and the treatment team have reduced the complexity of medication in the elderly and reduced the amount of medication consumed by them [25, 26].

Educating the Elderly About the Necessity of Not Taking Drugs Arbitrarily

Self-prescription or self-treatment is one of the phenomena that is widespread among the elderly today. It is a behavior in which a person tries to fix his illness or health problem without the help and opinion of experts [27]. This phenomenon is associated with many risks, including an increase in the number of drugs consumed, which can lead to polypharmacy by affecting the medication regimen of an elderly person [28]. In addition to the created polypharmacy, avoiding this phenomenon, one of the other important issues that can cause problems for an elderly person who frequently self-prescribes is the use of outdated drugs [29]. The most important reasons for self-inflicted drug use in the elderly are previous use of the drug and recovery and the presence of a similar condition, prescription of the same prescription by the doctor, minor symptoms and no need to go to the doctor, lack of financial ability to visit the doctor again, ensuring that the drug is safe [29]. The most common problems that the elderly use to self-medicate include cold pain and digestive problems, and one of the symptoms that are commonly observed in the elderly is musculoskeletal pain and headache [30]. Different studies show that more than 73% of the elderly use more than three painkillers on average daily [29, 31]. Considering that the prevalence of pain in the elderly is high, the use of non-pharmacological and alternative methods in pain control (such as yoga, water therapy, music therapy, and medicinal scents, etc.) can be replaced [32, 33].

Educating the Elderly About the Limitations of Using Herbal Medicines

Studies have shown that elderly people have used medicinal plants for reasons such as believing in the greater effectiveness of plants, fearing exposure to the possible side effects of chemical drugs, and assuming that medicinal plants are without risks and complications [34]. It is necessary to acknowledge the serious complications caused by the interactions of these plants with each other and with chemical drugs. Also, taking herbal medicines at the same time can cause problems and disrupt their treatment [35]. Although the therapeutic effects of medicinal plants have been confirmed and their use has become widespread in the health system of

many countries, the ignorance of the elderly and the mistaken beliefs that medicinal plants are healthy and harmless may lead to adverse effects them, so it is clear that Medicinal plants, like herbal medicines, should be taken in consultation with a doctor or pharmacist [36].

Using Electronic Tools to Monitor the Process of Taking Drugs

As mentioned, the use of multiple and inappropriate drugs is one of the health problems that the elderly face [30]. What seems to be important is the investigation and monitoring of the drug consumption trend in the elderly at specific intervals by the treatment team and led by the geriatric nurse as the coordinator of this team in these people [37]. Since the health status of the elderly is constantly changing, one of the duties of nurses is to check the coordination of the elderly person's medication regimen with clinical evidence, symptoms of the disease, and drug interactions with each other, medication dosage, and continuing to take the medication for a longer period than prescribed, and should be discussed with the elderly, their family, and specifically with their treating physician [26, 33]. In many cases, the medicine used by the elderly needs to be changed, but this is because the elderly person has not returned for a long time for a re-visit and his medicines have not been evaluated, he has been using an inappropriate medicine for a long time [35]. These conditions impose a large economic burden on the health and treatment system of that society on a large scale and many personal injuries to the elderly person, one of the first cases of which is polypharmacy caused by the use of inappropriate drugs [36]. In this regard, by using electronic tools, it is possible to increase the accuracy in identifying possible interactions and suggest alternative drugs in the medication regimen of an elderly person, and according to the physician's opinion, avoid the consumption of many of these unnecessary medications in their regimen and the number of medications The consumption of these people is low [38].

Use of Drug Administration Protocols and Guidelines

One of the problems related to drug use in the elderly is the use of potentially inappropriate drugs [15]. The names of potentially inappropriate drugs for the elderly are stated in various guidelines and many protocols for drug administration have been designed [39]. Tools are available to prescribe the most suitable medicine in the elderly age group, and the attention of medical staff and drug prescribers to these instructions can greatly reduce the consumption of these drugs [40]. Therefore, it is necessary to use these tools both at the time of drug prescription by the attending physician and at the time of periodic reviews of the drug regimen by the nurse and treatment staff. For example, the Beers criteria are one of these criteria that includes a list of drugs that should not be taken by the elderly and was created by a group of pharmacotherapy experts [41]. Therefore, it is necessary to define the continuous evaluation of the drug list of the elderly as one of the nursing measures by introducing drug screening tools for the elderly in the educational programs of the medical centers and familiarizing the treatment groups with these tools [42].

The study by Bonaga and his colleagues, which was conducted in 2018, shows that more than 70% of the studied elderly need to take five or more medications daily [43]. Such conditions cause many problems for the elderly. The multiplicity of medications caused by the requirement to take different medications due to the diseases that an elderly person is facing can decrease medication adherence in these people in the first step, and in the next steps, it can cause extensive drug interactions and side effects [44]. It seems necessary to investigate the phenomenon of polypharmacy in the elderly and provide solutions to deal with it.

A study by Samanta de Oliveira and colleagues was conducted in 2018 and stated the most important reasons for self-prescription of drugs in the elderly as follows: previous experience and knowledge of the disease, availability of the required drugs at home, and getting them without a doctor's prescription from the pharmacy. Lack of financial ability to return to the doctor and history of recovery from previous diseases due to self-prescription of medicine [29]. In the studies, it was found that there is no significant relationship between age variable and self-prescription of drugs in the elderly, but this is significant in marital status and level of education [29]. It seems that loneliness in elderly people causes a general decrease in the level of health care them and an increase in the amount of physical and mental diseases and possibly the subsequent incorrect and arbitrary use of medicine [31]. Also, it seems that educated elderly think that they have proper drug information, and this false confidence leads to arbitrary drug consumption among them [29, 31]. Also, the study of the relationship between the storage of medicine in the elderly's homes and the amount of self-prescription in them reported a significant relationship that naturally, older people have more exposure to various diseases and the consumption of medicine is also higher in them [28]. This can be due to over-prescription of medicine by the doctor or failure to complete the previous treatment period, which has resulted in a large amount of medicine remaining at home. Therefore, in this field, correct education through the media can play an important role. On the other hand, doctors' colleagues have a valuable role in this regard, because part of the problem of self-administration of drugs is due to the over-prescription of drugs, while the colleagues should strongly advise completing the course of treatment to avoid the problem of drugs remaining at home [45, 46].

Harrison *et al*. conducted a study in Australia titled Cost Review of Inappropriate Medications in the Elderly. In this study, 531 elderly people were investigated and the Beers criterion was used to evaluate the use of inappropriate drugs. In this study, more than 80% of the subjects had used inappropriate drugs. Also, proton pump inhibitors and benzodiazepines were the largest drug groups used inappropriately among the elderly under study [47]. Ganir *et*

al. conducted a study in 2017 to investigate the use of inappropriate drugs in the elderly in Lithuania. In this study, the Beers criteria and the European List of Inappropriate Medicines (EUY-IM List) were used to investigate the prevalence of the use of inappropriate medicines in the elderly in Lithuania, and the findings obtained from these two criteria were compared with each other. In this study, the prevalence of using inappropriate drugs was defined as the percentage of people who used inappropriate drugs at least once a year. In this study, polypharmacy and aging were the most important factors that increased the use of inappropriate drugs. According to the Beers criterion, the risk of taking inappropriate drugs was lower in women than in men. Also, benzodiazepines were the most important inappropriate drug class that was consumed by the elderly under study [41].

Conclusion

Due to their age and physiological conditions, the elderly are required to use medicine to treat and maintain their health. In some cases, due to many problems and diseases, the elderly person is faced with an increase in the consumption of drugs, and this can cause adverse effects for the elderly person. The consequences of this multiplicity of drugs affect the elderly in the first stage and the society and the treatment system in the later stages. Due to the increase in the elderly population and the consequent need for more medication in many years, this issue has become an important priority for health professionals and experts to find the best solutions for the optimal use of drugs and solutions to deal with the multitude of available drugs. Therefore, more communication between the doctor treating the patient and the clinical pharmacist who has more expertise in the field of pharmacology and the nature of drugs, as well as periodic training for doctors to update their information about new drugs, use new protocols and guidelines for prescribing drugs, and Emphasizing that at the time of drug administration, the drug should only be prescribed in the amount during the treatment period, it can greatly reduce the number of drugs in the drug regimen of the elderly. Raising awareness and educating the elderly about not taking medicines arbitrarily and paying attention to the fact that many herbal medicines have complications and can cause disruption in their medication regimen can be very helpful. Also, updating drug prescription and monitoring systems to identify drug interactions and inconsistencies between drugs used by the elderly can reduce the financial burden of the health and treatment system.

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