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Understanding and Managing Polypharmacy in the Aging Population

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ABSTRACT

The likelihood of chronic illnesses and concurrent usage of several pharmaceuticals has grown due to the aging population and longer life expectancy, which might result in negative drug interactions and responses. This review research was conducted to look into the elderly’s polypharmacy management strategies, as there is no comprehensive study on the subject. Polypharmacy, the elderly, and prevalence were searched in the PubMed, Science Direct, Scopus, Google Scholar, Ovid, Magiran, and Sid databases between 2005 and 2023 to perform this review research. The data showed that the age categories of 70–74 years and 80–84 years had the highest frequency of polypharmacy, and that polypharmacy was associated with both the individual’s demographics and health state, as well as the features of the health facility. In addition, research has shown that there is a relationship between the pattern of polypharmacy consumption and the source of knowledge regarding medications. Several studies have emphasized the need for ongoing monitoring of medications taken by the elderly to prevent pharmacological adverse effects. The findings of this study showed that with the application of tactics such as doctor-pharmacist communication, teaching the elderly about the risks of self-harming while taking medications, and educating the elderly about the restrictions of utilizing herbal remedies. It is possible to significantly minimize the variety of drug regimens among the elderly and make drug usage in this age group simpler by utilizing electronic instruments to track medication intake and by following protocols and criteria when administering medications.

Keywords: Polypharmacy, Elderly, Management strategies, Databases

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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 considered elderly [1, 2]. The biological system changes as people age. Decreases in body volume, blood plasma, total bodily fluids, serum albumin, and protein binding, as well as reductions in the first stage of liver metabolism, renal glomerular filtration, and renal clearance, are some of the significant physiological changes associated with aging. Additionally, research has indicated that aging might specifically alter the pharmacokinetic and pharmacodynamic mechanisms of

medications. Changes in absorption, metabolism, release, protein binding, and hepatic and renal clearance are all examples of pharmacokinetic alterations. Unwanted pharmacological side effects in the elderly are caused by pharmacodynamic alterations, which include modifications in the way the drug acts on the target tissue [3, 4]. However, as life expectancy rises, so does the likelihood of developing chronic illnesses and the requirement for medical treatment, including medication therapy [1, 5, 6]. In many societies, the elderly are the biggest population of drug users due to these disorders [1, 7].

A phenomenon known as polypharmacy is suggested because older adults are more likely to take many medications. Although there are several definitions of polypharmacy, most studies refer to the use of five or more medicines as polypharmacy [1, 8, 9]. In other words, polypharmacy is a situation in which a person takes a large variety of medications, some of which may be required and others of which may not [10, 11]. Higher treatment costs, adverse drug events and reactions (ADR), medication interactions, prescription mistakes, and re-hospitalization negative impacts are the most frequent consequences of polypharmacy [1, 10]. Yet, it might be helpful to utilize many medications at once to treat and manage some chronic conditions. Numerous studies suggest that as people age, the frequency of polypharmacy rises. This might be because more medications are being prescribed incorrectly, inappropriate therapy is not being utilized, medication mistakes are occurring, drug use is not being strictly prohibited, and the number of pharmaceuticals that are available without a prescription is growing [5, 12, 13].

Vetrano and his colleagues recognized in their 2018 investigation that polycarmis are directly linked to the emergence of mobility impairments in the elderly [14]. The usage of more than ten medications by 200 senior patients who were released from the geriatric ward was found to be directly associated with their re-hospitalization during the next one to three months in recent research [15]. It should be noted that the elderly must take medication to recover from illness or to stop it from getting worse. However, the right guidelines must be followed to ensure that this process is done correctly and that the elderly are not harmed by the medication itself [16, 17]. Numerous research investigations have demonstrated that the elderly's use of multiple medications and complicated treatment plans has decreased their level of medication adherence and caused a range of adverse effects, from treatment prolongation to mortality [18–21]. A significant portion of the characteristics of this occurrence in the elderly have been highlighted by studies like the one conducted by Hosseini *et al.* [22], which looked at the prevalence of this phenomenon, associated causes, and difficulties connected to the elderly's inability to regulate and manage drug overdose. Nevertheless, the review research was carried out to look into the elderly's polypharmacy management strategies because there isn't a comprehensive study on the subject.

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

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. Several studies have reported that the contact between the treating physician and the pharmacist has a substantial influence on reducing the number of medications in people's prescription regimens, particularly the elderly [23-26]. These people's drug regimens take into account similar effects and adverse effects, and in certain situations, the old person is treated by many doctors at the same time, resulting in complex prescription regimens for the individual [24].

Educating the Elderly About the Necessity of Not Taking Drugs Arbitrarily

Self-prescription or self-treatment is a phenomenon that is common among the elderly nowadays. It is a practice in which a person attempts to treat their ailment or health condition without the assistance and advice of specialists [27]. This condition is connected with several dangers, including a rise in the number of pharmaceuticals ingested, which can result in polypharmacy by interfering with an aged person's medication routine [28]. In addition to creating polypharmacy and preventing these phenomena, one of the other key concerns that might cause problems for an aged person who regularly self-prescribes is the use of obsolete pharmaceuticals [29]. Elderly drug abuse is primarily caused by several factors, including past drug use and recovery, the existence of a similar condition, a doctor's prescription for the same medication, minor symptoms that don't require a visit to the doctor, inability to pay for a follow-up visit, and assurances about the drug's safety [29]. Research indicates that over 73% of older adults take more than three medicines daily [29-31]. Given the high incidence of pain in the elderly, alternative and non-pharmacological approaches to pain management (such as yoga, music therapy, water therapy, and medicinal smells, among others) might take the place of pharmaceutical treatments [32, 33].

Educating the Elderly About the Limitations of Using Herbal Medicines

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. Research has revealed that older adults have utilized medical plants for a variety of reasons, including the belief that plants are more effective than chemicals, the dread of chemical drug side effects, and the belief that medicinal plants are risk-free and trouble-free [34]. The significant issues brought on by these plants' interactions with pharmaceutical medications and one another must be acknowledged. Additionally, concurrent usage of herbal medications may result in issues and interfere with their course of therapy [34-36].

Using Electronic Tools to Monitor the Process of Taking Drugs

As previously stated, one of the health issues encountered by the elderly is the use of many unsuitable medicines [30]. What appears to be vital is that the treatment team investigates and monitors the drug consumption trend in the elderly at regular intervals, with the geriatric nurse serving as the team's coordinator in these individuals [37]. Because the elderly's health status is constantly changing, one of the responsibilities of nurses is to ensure that the elderly person's medication regimen is coordinated with clinical evidence, disease symptoms, and drug interactions with each other, medication dosage, and continuing to take the medication for a longer period than prescribed, and this should be discussed with the elderly, their family, and, specifically, their treating physician [26, 33]. Elderly people frequently need to have their medications changed, but this is usually because they haven't gone back for a long time for a follow-up appointment and their medications haven't been reviewed; instead, they have been taking the wrong medication for a long time [35]. Many senior people suffer personal damage as a result of these illnesses, including polypharmacy, which is one of the earliest instances of improper drug use, and they place a significant financial burden on society's health and treatment system [36]. In this sense, by employing electronic tools, it is possible to improve the precision of detecting potential interactions and recommend substitute medications in an elderly patient's medication regimen. Additionally, the physician thinks that this will help the patient avoid taking many of the unnecessary medications in their regimen and reduce the number of medications. These folks don't consume much [38].

Use of Drug Administration Protocols and Guidelines

One of the issues associated with drug usage in the elderly is the use of potentially harmful substances [15]. The names of possibly unsuitable medications for the elderly are included in many guidelines, and numerous drug administration regimens have been developed [39]. There are tools available to prescribe the most appropriate medicine in the older age group, and medical professionals and drug prescribers who follow these guidelines can significantly lower the consumption of these medications [40]. As a result, these tools must be used both by the attending physician when prescribing drugs and by the nurse and treatment staff during periodic medication regimen reviews. One example is the Beers criteria, which was developed by a committee of pharmacotherapy specialists and comprises a list of pharmaceuticals that should not be taken by the elderly [41]. As a result, it is essential to incorporate drug screening techniques for the elderly into medical institutions' teaching programs and

inform treatment groups about them to establish the ongoing assessment of the elderly's medication list as one of the nursing measures [42].

According to a 2018 research by Bonaga and his colleagues, almost 70% of the elderly people in the investigation use five or more drugs each day [43]. For the aged, such situations lead to several issues. The multiplicity of drugs created by the need to take multiple medications owing to the diseases that an aged person is suffering from can reduce medication adherence in the first stage, and in the subsequent phases, it can cause significant drug interactions and adverse effects [44]. Examining the phenomenon of polypharmacy in the elderly and offering remedies to address it appears vital.

According to a 2018 study by Samanta de Oliveira and colleagues, the three main factors that lead to older adults self-prescribing medications are prior experience and knowledge of the condition, the availability of the necessary medications at home, and obtaining them from the pharmacy without a prescription from a doctor. A history of recovery from prior illnesses as a result of self-prescription medication, as well as the inability to pay to see a doctor again [29]. Elderly medication self-prescription is not significantly correlated with age, according to the research, but it is correlated with marital status and educational attainment [29]. Lonely elderly persons appear to receive less health care overall, have more physical and mental illnesses, and may utilize medication more carelessly and incorrectly as a result [31]. Elderly people with higher levels of education also appear to believe they know enough about drugs, which makes them use drugs arbitrarily [29, 31]. Additionally, research examining the correlation between the amounts of medication stored in the homes of the elderly and their self-prescription usage found a strong correlation between the two. It was shown that older adults are more likely to be exposed to a variety of ailments, and they also consume more medication [28]. This may be the consequence of the doctor prescribing too much medication or of not finishing the prior course of treatment, which left a significant amount of medication at home. Correct education through the media might thus be crucial in this subject. Conversely, physicians' colleagues play a crucial role in this regard because overprescription of medications contributes to the issue of drug self-administration, and they should strongly advise patients to finish their treatment to prevent the issue of drugs remaining at home [45, 46].

In Australia, Harrison *et al.* [47] carried out research called the cost review of inappropriate medications in the elderly. 531 older individuals were examined in the present research, and the usage of inappropriate medicines was assessed using the Beers criteria. Inappropriate drug usage was reported by almost 80% of the participants in the present research. Proton pump inhibitors and benzodiazepines were among the most often misused medication classes among the study's older participants [47]. Grina and Briedis [41] carried out research to look into improper drug usage among Lithuania's senior population. The prevalence of inappropriate medication usage among Lithuania's older population was examined in this study using the Beers criteria and the European List of Inappropriate Medicines (EUY-IM List). The results derived from these two criteria were then compared. The percentage of individuals who used improper substances at least once a year was used to determine the prevalence of inappropriate drug use in this study. According to this study, the two main variables that increased the usage of unsuitable medications were aging and polypharmacy. Women were less likely than men to use medicines inappropriately, based on the Beers criteria. Additionally, the most significant inappropriate medication class used by the elderly participants in the research was benzodiazepines [41].

Conclusion

The elderly must utilize medicine to treat and preserve their health due to their advanced age and physiological issues. In certain circumstances, due to several issues and ailments, the elderly person is forced to consume more medicines, which might have negative consequences for the senior person. The elderly are initially impacted by the effects of this drug proliferation, and later on, society and the treatment system are also impacted. This issue has become an important goal for health professionals and experts in discovering the most effective approaches for proper utilization of drugs and solutions to deal with the multitude of accessible drugs because of the growing number of elderly people and the resulting need for more medication in recent years. As a result, increased communication between the patient's physician and the clinical pharmacist, who is more knowledgeable about pharmacology and the nature of medications, as well as regular training for physicians to stay up to date on new medications, employ new protocols and guidelines for prescribing medications, and stress that the medication should only be prescribed in the dosage during treatment, can significantly lower the number of medications in the elderly patient's medication regimen. It may be extremely beneficial to raise awareness and educate the elderly

about the need to not take medications carelessly and about the fact that many herbal remedies have side effects and can interfere with their prescribed dosage. Additionally, the cost of the health and treatment system can be decreased by modernizing prescription and monitoring systems to detect drug interactions and discrepancies among medications used by the elderly.

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