

Research Article

Polypharmacy in the Elderly

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Citation: Lambrini K (2016) Polypharmacy in the Elderly, J Pharma Pharma Sci 01: 103. DOI: 10.29011/2574-771.100003

Received Date: 9 September, 2016; **Accepted Date:** 10 September, 2016; **Published Date:** 20 September 2016

Abstract

The poly pharmacy (is the use of four or more medications by adult patients aged over 65 years) is a major health risk because during the prolonged administration of drugs, their active substances may impair the body's vital organs function in elderly.

Purpose: The present study aims to examine the phenomenon of polypharmacy and its impact on the elderly's health.

Methodology: The study material was the latest articles on this issue that were found mostly in the online Medline database and the Association of Greek Academic Libraries (HEAL-Link).

Results: The increased drug consumption, the polypharmacy, in the elderly is associated with iatrogenic adverse symptoms. When to these side effects are added to the hypersensitivity reactions and the idiosyncrasy of drugs, deaths from medication errors and hospital admissions from side effects of drugs are reaching frequencies and rates that threaten the public health.

Conclusions: Necessary are the adjustment of medication with the absolutely appropriate preparations and the choice of more flexible quantity schemes of drugs that will ensure the administration, the efficacy and the safety of elderly who receive them.

Keywords: Third Age; Elderly; Drugs and Polypharmacy

Introduction

From antiquity the diseases appeared in the people's life and disrupted their health with symptoms such as pain, fever, and malaise which hindered their daily activities [1].

The drugs' search began from the environment and nature, gradually dominated the observation and the correlation of therapeutic agents with specific diseases. So, special substances that cured the symptoms of various diseases which may not even know their origin began to evolve [2].

Drug is defined as any industrial application product of medical, pharmaceutical and life sciences research which is used for the diagnosis and treatment of human diseases or which generally affects the structure and the function of the human body [3].

The knowledge brought many great drugs that saved man-

kind from famine and epidemics. The diseases were identified and scientist doctors, researchers and health professionals in general, manage to handle them. Slowly, the lifestyle with the changes made and the increase of life expectancy resulted in human newer diseases that required increased medication but not an irrational use of them [3,4].

Therefore, the improvement of the living conditions and especially of the healthcare in developed countries, has led to a significant increase in the percentage of elderly in the general population.

On the other hand, the physiological changes that occur by aging affect the action of drugs. Valuable assistance that helps to understand the differences between drug and age groups is extracted from clinical observations and references [5].

Moreover, the frequency of the various pathological conditions that increases with aging leads to the recruitment of more

drugs. Greater intake involves more risks, mainly because are increasing the problems made by pharmacological interactions. It was found that the incidence of side effects and toxic effects has increased from 3 to 7 times in the elderly compared to young people [6,7].

The elderly is the population that rapidly expands. The identification and the prevention of the drugs side effects in for this group is one of the most critical safety and economy that the health care is facing today [8,9].

In general, it should be said that in elderly these drugs are absorbed with more difficulty, so it should be checked. The activity of each drug is different for each person. Conversely, if the drugs are given at the same doses like given to younger people, the side effects observed in elderly by administration of such drugs itself are more severe [10,11].

Purpose

The purpose of this review is to evidence the phenomenon of polypharmacy and to highlight the effects of polypharmacy in elderly health and their daily lives.

Methodology

The study material used for this study was the latest articles on the topic that were found mainly in the electronic database Medline and the Association of Greek Academic Libraries (HEAL-Link), with the following keywords: third age, elderly, drugs and polypharmacy. Exclusion criterion of articles was the language, other than the Greek and English.

Drugs

The drugs are divided into three categories according to the international scientific criteria: (i) prescription medicine, (ii) Over the Counter Medicine (OTC) and (iii) lifestyle drugs [3].

- i. The prescription drugs are those that are not considered safe because of their toxicity, method of use, interactions with other drugs, the measures that must be taken for their use or even because of the patient's condition. Their use takes place under an expert supervision [5,6].
- ii. The Over the Counter Medicines (OTC) are considered safe for the consumers who use them, only if they follow the direct instructions included in the package that should be read before use. Their instructions must be written in such a way that can be understood by all consumers [3,5].
- iii. The lifestyle drugs do not treat serious conditions that are a directly threat to human life, but problems associated with age or the modern lifestyle, such as obesity, baldness, erectile dys-

function or contraception [12,13].

Each drug exerts its action on one or more sites within the human body. Necessary condition to exert this effect is the drug to arrive at a specific locations and remain there in proper concentration for sufficiently time. The response to drugs changes with age as a result of the changes in their movement from the body and of the tissue sensitivity due to influences exerted by various pathological conditions [14].

The absorption of the drug is reduced and its distribution apparently is influenced by the well-known changes in the composition of the body. Particularly, the rhythm and the effectiveness of their elimination are reduced significantly in old age. The drugs that are administered orally are absorbed from the digestive tract. The absorption rate depends on the blood supply and the physico-chemical properties of the drug [15].

The gastric fluid secretion is substantially reduced in the elderly due to atrophy of the gastric mucosa. The reduction of secretion of gastric juice leads to low absorption of food nutrients such as iron or vitamin B12 [16].

The distribution of drugs varies in old age because of the body composition changes. As people get older, the total body water decreases, the lean mass of the body decreases too and the proportion of body fat increases instead. This increased body fat expands the volume of distribution for lipophilic drugs and also reduces the volume of distribution for hydrophilic drugs. As result the water soluble drugs have an increased serum concentration and the lip soluble have a reduced serum concentration and thus prolonged activity duration [5,14].

Another important change is the reduction of plasma albumin (up to 20% in healthy elderly), probably due to limitation of their synthesis in the liver. As a result, binding capacity decreases for many drugs that bind with albumins (eg, anti-inflammatory) and therefore the free drug levels in plasma increases. Consequently, there is an increase either in their effect or their toxicity [6,7].

Regarding to drug metabolism, the liver is the main organ of metabolism of the most drugs. In elderly, the size of the liver and its blood supply is significantly reduced. At the same time the activity of liver enzymes reduces and therefore a large number of drugs are metabolized slowly. This deceleration becomes worse when a number of drugs simultaneously are introduced into the body- as often occurs in the elderly due to polypharmacy - which compete with one another for their metabolism [14,16].

Furthermore, renal excretion of the drugs is affected by aging, although there are significant differences between individuals for any age decade. The excretion of the drug appears to be related to creatinine clearance, which is reduced to 50% by the age of 75.

However, the lean body mass decreases with aging, serum creatinine tends to overestimate creatinine clearance in elderly [5,17].

Polypharmacy Impact

Polypharmacy is the simultaneous use of several drugs in the treatment of a disease, indicating careless, unscientific or excessive prescribing. It refers to the problems that could arise in a patient who takes more drugs than he really needs. Lately, what seemed like an occasional mishap has now become epidemic [6,18].

The phenomenon is defined by the global drug agency as a process of continuous and often unnecessary consumption of drugs by a country's citizens. The guidance of health institutions for continuous consumption of pharmaceuticals developed the polypharmacy phenomenon. The triggering factors of the phenomenon are the unhealthy lifestyle, lack of prevention, and the unorganized health system, especially in Greece [19].

The polypharmacy is a major health risk because during the prolonged drug administration, their active substances may change the function of vital organs of the body. In older people, who often take combinations of drugs and suffer from more than one disease, the interaction of the active substances in the body raises problems too [20].

The elderly are the top drug users. 40% of aged people take five or more medications per day. Patients at highest risk for polypharmacy related to medical complications are those receiving five or more drugs simultaneously [5].

The etiology of polypharmacy focuses mainly on ignorance of the patients on the composition, properties and interactions of drugs, resulting in their abuse [21,22].

Elderly patients are particularly sensitive to the adverse pharmacological reactions. In the management of side effects, the rescue mechanisms are less efficient because the homeostasis functions in the elderly are weakened [23].

Moreover, the extended use of a composition in an already overburdened pharmaceutically individual may lead to deregulation of a disease which until then was controlled due to treatment or to increased toxic effect of a substance in the kidneys or the liver [6,17].

A lot of elderly people are hospitalized because of the side effects of drugs. The most common side effects of drugs in elderly are constipation, falls, immobility, confusion, hip fractures, and reduction of the functional status due to prolonged bed rest [5,15].

In addition, the side effects of drugs mimic geriatric syndromes, urging doctors to prescribe additional medications. While many drugs may be necessary to prevent progression of the dis-

ease in older people, the abuse and the misuse of drugs has been linked to serious health problems, including hospitalization and death [17,20].

A large number of ambulatory elderly are using drugs which might be procured elsewhere, than in pharmacies without a prescription. Such drugs are aspirin, vitamins, laxatives etc. Sometimes they might change drugs among themselves which is mostly observed in those who live in institutions - or make self-diagnosis taking self-medication [5,24].

The improper maintenance of the drugs can inhibit effective action. Many drugs are destroyed by humidity, high temperature and light. Drugs are usually protected by special packaging, because their movement from one box to another can lead to the deterioration and destruction and also to confusion and to misuse of drugs. This can often occur in people with reduced vision [7,25].

The most common places in the house for placing the drugs are usually the bathroom and the kitchen. Both places expose the drugs to humidity and inappropriate temperature, resulting in some of them, such as nitroglycerin tablets, to lose their effective action very quickly [3,26].

Dealing with Polypharmacy

The pharmacological therapy of elderly needs special attention because of the increased risks they show.

The educational goal of elderly aims at informing about the purpose, action, side effects of the drug and the consistency which they should distinguish on the dose, timing and manner of receiving them. Updating the elderly about the purpose, effect and side effects of the drug will contribute in limiting the misuse and abuse of it [6,7].

It should be clear that the pharmacological treatment is not necessary for all pathological conditions of the elderly. To determine the type and dose of the drugs the age and the general condition of the elderly should be considered [5, 15].

When changes are made in medication, whether added a new or stopped the administration of some drugs used by elderly, explain the detailed information, if necessary withdraw the drug in order to avoid any error [16].

Simple treatment plans avoid errors in elderly patients. Older people need a lower dose than the younger ones. The drugs must be administered when there is a real need, because errors, side effects and interactions increase with their excessive use age [23].

When the elderly take drugs by themselves, the chance of taking a double dose is high. Especially people who do not have a good memory may take a double dose or not take any drug at all.

Specifying in advance the daily dose of drugs will help to avoid taking double dose [7].

The help that might be provided by family members, neighbors or friends must be accepted by the elderly patients, because it contributes to a better adaptability of the elderly to treatment plan [6].

Finally, health care professionals, in their efforts to protect the health of the elderly from using unnecessary drugs, it is advisable to inform and recommend the elderly the following: [7,27].

- Preventing drug consumption without medical prescription
- Avoid changes of drug dose without the permission of the doctor
- Avoid buying medicines recommended by a known person, or friend.
- Avoid buying medicines in large quantities
- Drugs that were purchased and won't be used, it is advisable to return them to the drug store if packaging is unpacked and is within the expiration date.

Conclusion

According to those already mentioned there are many reasons that cause different reactions of elderly to a large number of drugs. Because it is not always easy to predict how each drug will behave in a particular body and especially how it will be affected by other drugs that are administered simultaneously. Hence great care should be paid by both doctors and elderly themselves [6,28].

The promotion costs (advertising) for pharmaceutical products are a considerable amount of total distribution costs. Their distribution is mainly directed in prescribing effort and in providing "free samples" and much less on advertising through the Media [29,30]. The management of promotional costs and taxation of the profits of pharmaceutical companies follow general rules but differs from country to country. The doctor is fully responsible for checking the correct information provided to him through the promotion of pharmaceutical products [31].

Therefore, doctors and health care professionals, in general, should be very careful when administering drugs to the elderly and this should be restricted to the bare essentials. Older people should not take any medicine without the advice from the doctor who knows in detail the condition of the body and the other medications that may already take.

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