Geriatric Pharmacology: Optimizing Medication Use in Older Adults

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Abstract

Geriatric pharmacology, also known as geropharmacology or geriatric pharmacotherapy, is a specialized field of study that focuses on the use of medications in older adults. As people age, their physiology and pharmacokinetics undergo significant changes, which can affect the way drugs are absorbed, distributed, metabolized, and excreted in their bodies. These changes can lead to altered drug responses and an increased risk of adverse drug reactions in the elderly population. Therefore, understanding the principles of geriatric pharmacology is crucial for healthcare professionals to ensure safe and effective medication use in older adults.

Keywords: Geriatric pharmacology • Geriatric syndromes • Drug-drug interactions

Introduction

Pharmacokinetics refers to the study of how drugs are absorbed, distributed, metabolized, and eliminated in the body. Several age-related changes can impact the pharmacokinetics of drugs in older adults. The absorption of drugs may be delayed or reduced in older adults due to decreased gastric acid secretion, reduced gastrointestinal blood flow, and changes in the gastrointestinal tract. As a result, drug bioavailability and onset of action may be affected. Age-related changes in body composition, such as an increase in body fat and a decrease in lean body mass, can alter the volume of distribution of drugs. Additionally, changes in plasma protein binding and decreased cardiac output may affect the distribution of drugs in the elderly. The liver plays a crucial role in drug metabolism, and hepatic blood flow and liver enzyme activity decline with age. This can result in a decreased drug metabolism capacity, leading to increased drug concentrations and a higher risk of toxicity. Renal function declines with age, leading to a decrease in glomerular filtration rate and renal blood flow. As a result, the elimination of drugs that rely on renal excretion may be impaired, leading to drug accumulation and potential toxicity. Polypharmacy, the use of multiple medications, is common in older adults due to the presence of multiple chronic conditions [1].

However, polypharmacy increases the risk of drug-drug interactions, which can have detrimental effects on the health of elderly individuals. Drug-drug interactions can occur through various mechanisms, such as pharmacokinetic interactions (e.g., altered metabolism or excretion) and pharmacodynamics interactions (e.g., additive or synergistic effects). Healthcare providers must be vigilant in assessing and managing potential drug-drug interactions to minimize adverse outcomes. The Beers Criteria is a widely used tool in geriatric pharmacology that provides guidance on potentially inappropriate medications for older adults. It was developed by a panel of experts to assist healthcare professionals in identifying drugs that may pose a higher risk of adverse effects or lack evidence of efficacy in older patients. The Beers Criteria categorizes medications into different levels of appropriateness based on the available evidence and expert consensus. It serves as a valuable resource to promote safe prescribing practices in geriatric patients. Pharmacodynamics refers to how drugs interact with receptors and produce therapeutic effects or side effects. Age-related changes can influence drug receptor sensitivity and responsiveness in older adults. Moreover, alterations in receptor populations and signal transduction pathways may contribute to altered drug responses in the elderly [2].

Literature Review

Understanding these pharmacodynamics changes is important for optimizing medication therapy in geriatric patients. Due to the heterogeneity of the elderly population, an individualized approach is essential. Factors such as age, comorbidities, functional status, cognitive function, and social support should be considered when making prescribing decisions. Older adults are more susceptible to adverse drug reactions due to age-related changes in pharmacokinetics and pharmacodynamics. Monitoring for adverse effects is crucial, and appropriate dose adjustments may be necessary. Polypharmacy can be overwhelming for older adults, leading to poor adherence and increased risk of medication errors. Simplifying medication regimens by reducing the number of medications and doses can improve medication adherence and patient outcomes. Older adults with cognitive impairment may have difficulty managing their medications independently. In such cases, involving caregivers or utilizing adherence aids can help ensure medication compliance. Certain medications, such as sedatives, hypnotics, and antihypertensive, can increase the risk of falls in older adults. Prescribers should be cautious when prescribing these medications and consider alternative options or lower doses [3].

Due to the unique challenges and considerations in geriatric pharmacology, research specific to this population is essential. Clinical trials often exclude older adults, leading to a lack of evidence-based guidelines for medication use in the elderly. There is a need for more clinical trials and research studies that specifically include older adults to generate robust evidence on the safety and efficacy of medications in this population. As mentioned earlier, there is a scarcity of clinical trials and research specifically focused on geriatric populations. This limited evidence base makes it challenging to establish optimal dosing, efficacy, and safety of medications in older adults. To overcome this challenge, healthcare professionals often rely on extrapolation from studies conducted in younger populations, clinical experience, and expert consensus guidelines. Older adults commonly have multiple chronic conditions, which can complicate medication management. Comorbidities may require a complex medication regimen and increase the risk of drug-drug interactions and adverse effects. An integrated, patient-centred approach that considers all medical conditions is necessary to balance the benefits and risks of pharmacotherapy in this population. Ageism, the stereotyping and discrimination against older adults can influence healthcare professionals' attitudes and decisions regarding medication use [4].

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Discussion

Therapeutic nihilism, a negative bias toward treatment benefits in older

adults, can lead to under-treatment or inadequate management of certain conditions. Healthcare professionals must be aware of these biases and ensure that treatment decisions are based on individual patient characteristics, rather than age alone. Adherence to medication regimens is crucial for successful treatment outcomes. However, older adults may face challenges such as cognitive impairment, polypharmacy, and physical limitations that impact medication adherence. Strategies to improve adherence in this population include simplifying medication regimens, providing clear instructions, utilizing reminder systems, and involving caregivers or support systems. Older adults may have varying levels of health literacy, which can impact their understanding of medication instructions and potential risks. Healthcare professionals should use clear and simple language when communicating with older patients, provide written instructions, and encourage questions to ensure proper understanding and adherence to medication therapy. Hypertension, heart failure, and ischemic heart disease are prevalent in older adults. Medication selection and dosing should account for age-related changes in cardiovascular physiology, renal function, and potential drug interactions. Close monitoring of blood pressure, heart rate, and cardiac function is essential [5].

Older adults with diabetes often have multiple comorbidities and may require a complex medication regimen. Medication selection should consider the risk of hypoglycaemia, renal function, and potential drug interactions. Regular monitoring of glycaemic control, renal function, and medication adherence is necessary. Conditions such as dementia, Parkinson's disease, and neuropathic pain require careful medication management. Medications should be chosen with consideration for cognitive effects, potential drug interactions, and individual tolerability. Regular cognitive and functional assessments are important in monitoring medication response and adverse effects. Geriatric syndromes such as falls, frailty, and delirium often have multifactorial causes and may be influenced by medication use. Healthcare professionals should evaluate medication regimens for potential contributors to these syndromes and consider DE prescribing or dose adjustments when appropriate. DE prescribing refers to the process of reducing or discontinuing medications that may no longer be necessary, are causing harm, or have limited benefits in older adults. Polypharmacy increases the risk of adverse drug reactions and can impact quality of life.

DE prescribing involves a systematic review of medications, considering the patient's goals, preferences, and overall health status. It requires collaboration between healthcare professionals, patients, and caregivers to ensure a safe and effective reduction in medication burden. Geriatric pharmacotherapy often requires a multidisciplinary approach, involving healthcare professionals from different disciplines. Collaboration between physicians, pharmacists, nurses, and other healthcare providers is crucial to address the complex needs of older adults. Each professional brings a unique perspective and expertise to medication management, enabling comprehensive assessments, medication reviews, and monitoring for potential adverse effects or interactions. Technological advancements can play a significant role in supporting geriatric pharmacology. Electronic Health Records (EHRs) and Computerized Physician Order Entry (CPOE) systems can help healthcare professionals access patient medication histories, identify potential drug-drug interactions, and enhance communication among healthcare providers. Additionally, mobile applications and telemedicine platforms can facilitate medication adherence, medication reminders, and remote monitoring of older adults, promoting safer and more effective medication use [6].

Conclusion

Geriatric pharmacology encompasses the study of medication use in older adults, taking into account age-related changes in pharmacokinetics, pharmacodynamics, and the complex needs of this population. Healthcare professionals must navigate challenges such as limited evidence, polypharmacy, comorbidities, and ageism to optimize medication therapy. Individualized approaches, interdisciplinary collaboration, and strategies like de prescribing and technology integration are crucial in ensuring safe and effective pharmacotherapy in geriatric patients. By applying the principles of geriatric pharmacology, healthcare providers can enhance patient outcomes and improve the quality of life for older adults.

Acknowledgement

Conflict of Interest

None.

References

1. Deyo, Richard A., Daniel C. Cherkin and Marcia A. Ciol. **"**Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases." *J Clin Epidemiol* 45 (1992): 613-619.

2. Geddes, John R., Stuart M. Carney, Christina Davies and Toshiaki A. Furukawa, et al. "Relapse prevention with antidepressant drug treatment in depressive disorders: A systematic review." *Lancet* 361 (2003): 653-661.

3. Wang, Qing, Zhiwei Liu, Yinong Wang and Qingya Pan, et al. "Quantitative ultrasound assessment of cartilage degeneration in ovariectomized rats with low estrogen levels." *Ultrasound Med Biol* 42 (2016): 290-298.

4. Srikanth, Velandai K., Jayne L. Fryer, Guangju Zhai and Tania M. Winzenberg, et al. "A meta-analysis of sex differences prevalence incidence and severity of osteoarthritis." *Osteoarthritis cartilage* 13 (2005): 769-781.

5. Kratz, Anna L., Susan L. Murphy and Tiffany J. Braley. "Ecological momentary assessment of pain, fatigue, depressive, and cognitive symptoms reveals significant daily variability in multiple sclerosis." *Arch Phys M* 98 (2017): 2142-2150.

6. Bae, Jae Nam and Maeng Je Cho. "Development of the Korean version of the geriatric depression scale and its short form among elderly psychiatric patients." *J Psychosom Res* 57 (2004): 297-305.

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