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Analysis of Drug use in Participants of the Kartini Madu II Elderly Posyandu, Kartini Surya Khatulistiwa Institution, East Pontianak

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ABSTRACT
There is a decline in body abilities and a decline in physiological functions. Increased use of drugs used by the elderly can increase the risk of drug-related problems. This study aims to analyze drug use in the elderly at the Kartini Madu II Elderly Health Post, Kartini Surya Khatulistiwa Institution, Pontianak in 2019. This descriptive analytical study with a cross-sectional design involved 55 elderly patients who met the inclusion criteria. The results showed that the majority of patients were women (87.3%) with the largest age range between 60-69 years (65.4%). The most common complaints were dizziness, itching, and coughing. The most commonly used types of drugs were mefenamic acid, captopril, and paracetamol. This study also found that there were drugs that did not meet the STOPP criteria (diclofenac sodium and CTM) and START (kalk and captopril). The results of this study can be used as a reference to improve the rational use of drugs in the elderly.

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INTRODUCTION

Elderly is an advanced stage of the aging process characterized by a decline in physical abilities and physiological functions. In Indonesia, the percentage of elderly people has doubled in the last five decades, reaching 9.6% (25 million people) in 2019. Female elderly people outnumber male elderly people, and young elderly people (60-69 years old) dominate at 63.82%. Several provinces already have an aging population structure, with the percentage of elderly people exceeding 10%. West Kalimantan has an elderly percentage of 7.87%, indicating that the elderly population in Indonesia remains high.

Physiological changes in the elderly can influence the prescribing and use of medications. Increasing age is associated with an increase in drug side effects. Prescribing medications to the elderly requires consideration of whether the medication offers more benefits or potential harms. Polypharmacy, inappropriate dosages, or unnecessary medication use are concerns for clinicians when prescribing medications to elderly patients. Analysis shows that age can influence the incidence of adverse drug reactions (ADRs). The incidence of ADRs is higher in the elderly than in non-elderly patients. The elderly are vulnerable due to the complexity of treatment, high comorbidities, aging-related drug metabolism disorders, decreased physiological reserves (liver, kidney, and cardiovascular function), and malnutrition.

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Medication use in the elderly and the risk of related problems: As health problems increase with age, medication use becomes one way to manage them. However, increased medication use in the elderly also increases the risk of medication-related problems (DRPs). Research shows that approximately 82.70% of elderly patients experience DRPs, including unnecessary medication use, excessive dosages, and inappropriate medication selection. Therefore, better medication management is needed to reduce the risk of DRPs in the elderly.

The safety of prescribing medications in the elderly can be evaluated using the STOPP START criteria, which is a widely used standard. This study aims to examine issues related to medication use in elderly patients at the Kartini Madu II Elderly Health Post (Posyandu Lansia Kartini Madu II) of the Kartini Surya Khatulistiwa Institute in East Pontianak. Factors examined include medication type, dosage, and frequency of use. This Posyandu was chosen because it has a routine program for the elderly that is implemented every month. This study is expected to provide information on medication use in the elderly and improve the safety of treatment therapy.

METHODS

This study used a descriptive analytical design with a cross-sectional approach to analyze medication use in the elderly based on the STOPP START criteria. This study was conducted at the Kartini Madu II Elderly Health Post (Posyandu Lansia Kartini Madu II) in the Kartini Surya Khatulistiwa Institute, Pontianak, in July 2021.

This study used a population of medical records of elderly patients participating in the Elderly Integrated Health Post (Posyandu) at the Kartini Surya Khatulistiwa Institute. The study sample was the medical records of elderly patients who came for treatment and became participants in the Kartini Madu II Elderly Health Post (Posyandu Lansia Kartini Madu II) at the Kartini Surya Khatulistiwa Institute and met the study inclusion criteria. The sample size used was 55 elderly patient medical records, selected using the total sampling method due to the relatively small population size. The inclusion criteria for this study sample were elderly patients aged 60 years or older and receiving at least 2 medications. Meanwhile, the exclusion criteria were incomplete patient medical records or data that did not include patient characteristics and medication criteria.

Research Variables and Data Processing

The research variable was medication use among elderly participants of the Kartini Surya Khatulistiwa Pontianak Elderly Health Post (Posyandu Lansia Kartini Surya Khatulistiwa Pontianak). Data collected from patient medical records were then processed and presented in tabular form, including patient characteristics, types of medications used, dosages, patient complaints, and history of medical visits. Data were analyzed using Microsoft Excel and presented in frequency distributions and tables to facilitate interpretation of the results. Furthermore, an evaluation was conducted to determine the appropriateness of medication dosages given to elderly patients.

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RESULTS AND DISCUSSION

Distribution of Drug Use in Elderly Patients Based on the STOPP START Criteria

Table 1. Distribution of Drug Use in Elderly Patients Based on STOPP Criteria

STOP	Types of Drugs	Number (n)	Percentage (%)
NSAID drug class	Diclofenac sodium	14	30.43
First generation antihistamines	Chlorphenamine	32	69.52

Table 2. Distribution of Drug Use in Elderly Patients Based on START Criteria

START	Types of drugs	Number (n)	Percentage (%)
Calcium and vitamin D, calcium supplement and bisphosphonate	Calc	12	26.67
Angiotensin converting enzyme inhibitor (ACEI)	Captopril	33	73.33

Discussion

Profile of Type, Dose and Frequency of Drugs

The use of hypertension medication at the Kartini Madu II Elderly Posyandu of the Kartini Surya Khatulistiwa Institute in the table shows that the most commonly used medications are NSAIDs, namely mefenamic acid (12.94%), ACEI drugs, namely captopril (10.68%), analgesics, namely paracetamol (10.68%), and antihistamines, namely chlorpheniramine or CTM (10.36%). NSAIDs are Nonsteroidal Anti-Inflammatory Drugs, namely drugs that are usually used in symptomatic osteoarthritis patients. Acetaminophen (paracetamol) is the first choice drug for treatment in the elderly and for cases of musculoskeletal pain with monitoring of dosage and side effects. However, NSAIDs are stated to be superior in treating pain in osteoarthritis with short-term therapy. Mefenamic acid is an NSAID drug that works by inhibiting prostaglandins. The use of this drug is widely purchased by the public without a doctor's prescription.

ACE inhibitors can be given as a single treatment or in combination due to their effectiveness and safety. ACE inhibitors are effective for mild, moderate, and severe hypertension. In hypertensive crises, ACE inhibitors such as captopril are used, which are effective in most patients. Their effects include vasodilation and reduced salt and water retention. Despite their vasodilatory effects, unlike other vasodilators, captopril does not cause edema or reflex tachycardia. Captopril is also used in patients with mild to severe hypertension and in cardiac decompensation. Although renin and angiotensin levels increase with long-term administration, discontinuation of this drug does not result in rebound hypertension.

Paracetamol (acetaminophen) is the first-line drug for treating chronic pain in the elderly. However, its use should be minimized due to potential side effects, including liver damage. Long-term use of acetaminophen up to 4000 mg per day has been linked to liver damage in adults. According to the US Food and Drug Administration (FDA-USA) recommendations, acetaminophen use for chronic pain in the elderly should be limited to

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2000 mg/day. If NSAIDs are prescribed, the primary choice is a selective NSAID that inhibits COX-2, as it has minimal gastrointestinal side effects. This selectivity refers to inhibition of the enzyme cyclooxidase-2 (COX-2). This enzyme works to reduce inflammation and pain. By inhibiting COX-2, prostaglandin formation is prevented, thus preventing pain, while still providing protection to the stomach because COX-1 is not inhibited. In this analysis, selectivity towards COX-2 is divided into 3, namely selective, for example the celecoxib and rofecozib groups, partially selective, for example the meloxicam group and non-selective, for example the diclofenac, metamisole, piroxicam, paracetamol, acetosal, indomethacin, phenylbutazone groups, while mefenamic acid is classified separately as a prostaglandin inhibitor.

Chlorpheniramine Maleate (CTM) is a drug compound often used as an antihistamine or generally as an anti-allergic. Chlorpheniramine maleate (CTM) is an alkylamine derivative that works competitively by inhibiting the histamine H1 receptor that can penetrate the blood-brain barrier. CTM is a white, water-soluble crystalline powder. CTM is used to reduce allergy symptoms due to seasons or weather, such as inflammation of the nasal mucosa, sneezing, itching of the eyes, nose, and throat, and allergic skin symptoms, such as pruritus, urticaria, eczema, and dermatitis. Like other H1 antihistamines, CTM has common side effects such as sedation, gastrointestinal disturbances, and dry mouth.

Profile of Patient Complaints When Coming to Posyandu

Based on complaints from elderly patients obtained from medical records, elderly patients present with multiple complaints at a single visit. Generally, elderly patients suffer from more than one disease or multipathology, and these are usually chronic. This is due to decreased organ function, decreased functional status, and changes in pharmacokinetics and pharmacodynamics. The most common complaints experienced by elderly patients are coughing, itching, dizziness, stomach ulcers, and knee pain. Knee pain can be diagnosed as osteoarthritis, a slowly progressing disease that primarily affects the peripheral diarthrodial joints and the axial skeleton. This disease is characterized by the destruction and loss of articular cartilage, resulting in osteophyte formation, pain, limited movement, deformity, and disability. Along with increasing life expectancy, according to the WHO, the elderly population in Indonesia will increase by 414% by 2025 compared to 1990. In Indonesia, the prevalence of radiologically visible knee OA reaches 15.5% in men and 12.7% in women aged 40-60 years.

Knee pain occurs due to degeneration or damage to the joint surfaces, which is common in older adults, especially those who are overweight. These changes cause the connective tissue surrounding the joint, ligaments, and cartilage to lose elasticity due to degeneration, erosion, and calcification, resulting in decreased flexibility.

Besides osteoarthritis, other diagnoses include rheumatoid arthritis and gout. These conditions can cause pain, swelling, joint stiffness, and limited range of motion, which can interfere with daily activities.

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Profile of Medication Use in Elderly Patients

The use of medication in elderly patients in this study was less than 5 types of medication based on the table. Most patients (89%) in this study used more than one (1) type of medication. This is in accordance with the results of research conducted by Verlita and is also in accordance with other studies that used nursing homes in several other countries.

The table shows that 11% of elderly patients received prescriptions for polypharmacy. This may be due to the patient's multipathological condition. Polypharmacy is the use of five or more medications in a single prescription.44 Polypharmacy increases the likelihood of inappropriate or inaccurate prescriptions, which also meet the STOPP START criteria.

Use based on STOPP START Criteria

The STOPP START criteria are commonly used to detect prescribing errors. The STOPP criteria include medications that should be avoided in patients aged ≥ 65 years, including those affecting seven organ systems, medications with side effects that can lead to falls, analgesics, and duplicate drug classes. Patients with a history of falls in the last 3 months, and those using benzodiazepines, first-generation antihistamines, and long-term opiates should be avoided as they can trigger falls.

In this study, elderly Posyandu patients were given medications that met the STOPP criteria. These medications were chlorphenamine, a first-generation antihistamine, and mefenamic acid and diclofenac sodium, which are NSAIDs.

The STOPP criteria require consideration of whether elderly patients have other medical conditions, given the multipathological nature of elderly patients. For first-generation antihistamines, specifically diphenhydramine, chlorphenamine, and cyclizine, which fall under the category of central nervous system and psychotropic drugs, prolonged use, exceeding one week, can result in the risk of sedation and anticholinergic side effects.

Chlorphenamine maleate, commonly known as CTM, belongs to the antihistamine class, which works by targeting the histamine1 (H1) receptor and relieving itching, sneezing, and rhinitis. Antihistamines are available in oral (first- and second-generation) and intranasal forms. First-generation antihistamines (diphenhydramine, chlorpheniramine, and hydroxyzine) readily cross the blood-brain barrier and reversibly bind to central H1 receptors, which can cause sedation. They are also less specific because cross-linking also occurs with cholinergic receptors.α-adrenergic, and serotonergic, which can cause dry mouth, dry eyes, urinary retention, constipation, and tachycardia. The increasing use of first-generation antihistamines with potent anticholinergic properties has been associated with a higher risk of dementia. In contrast, second-generation antihistamines (fexofenadine, cetirizine, levocetirizine, loratadine, desloratadine, ebastine, epinastine, and bilastine) are more specific for peripheral H1 receptors and have limited penetration at peripheral H1 receptors.
Chlorphenamine maleate is widely used in this integrated health post (Posyandu). Use for more than three months requires caution, as its sedative properties can impair sensory perception. Consideration of its clinical value and side effects for each patient is necessary.

There are several factors that require caution in the NSAID class of drugs, including a history of peptic ulcers or gastrointestinal bleeding, moderate to severe hypertension, heart

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failure, and chronic kidney failure, especially in elderly patients with multiple pathologies. A history of peptic ulcers can lead to recurrence. In elderly patients with hypertension and heart failure, the condition can worsen. The risk of decreased kidney function can occur in elderly patients with chronic kidney failure.

NSAIDs are drugs that can damage the gastric mucosa. Diclofenac sodium is a nonsteroidal anti-inflammatory drug (NSAID) with analgesic, anti-inflammatory, and antipyretic effects. Diclofenac sodium works by activating the enzyme phospholipase, which converts phospholipids to arachidonic acid when cell membranes are damaged. These polyunsaturated fatty acids are then partially converted by the enzyme cyclooxygenase into endoperoxides and prostaglandins.

Long-term use can increase the risk of thrombosis in patients with cardiovascular disorders. Therefore, it is strictly contraindicated in patients with cardiovascular disorders or stroke. Monitoring data, such as blood pressure, is required for each patient. Long-term use may also increase the risk of kidney side effects.

Diclofenac sodium requires caution in the elderly due to decreased kidney function. Gastrointestinal bleeding (hematemesis, melena), ulceration, or perforation have been reported with all NSAIDs, including diclofenac, and may occur during treatment, with or without initial symptoms or a history of previous gastrointestinal bleeding. To reduce the risk of gastrointestinal toxicity in elderly patients, treatment should be initiated and maintained at the lowest effective dose.

The STOPP START criteria include the START criteria, which are used to justify inappropriate or inaccurate prescriptions. Among the START criteria, several medications were found to be used in this prescription, namely captopril, an angiotensin-converting enzyme inhibitor (ACEI) and calc, a calcium supplement and bisphosphonate.

ACE inhibitors are widely prescribed for patients with stage I hypertension due to their effectiveness and safety. This class of drugs can be given singly or in combination. ACE inhibitors are effective for mild, moderate, and severe hypertension. These drugs are effective in most patients, and the combination of ACE inhibitors with diuretics provides a synergistic effect. 45 ACE inhibitors work by inhibiting the conversion of angiotensin-I to angiotensin-II locally in the endothelium of blood vessels. Angiotensin-II is a potent vasoconstrictor that can stimulate aldosterone secretion. ACE inhibitors also reduce peripheral resistance without reflex tachycardia. This class of drugs is effective not only for hypertension with high renin levels, but also for hypertension with normal or low renin levels. This is because ACE inhibitors also inhibit the degradation of bradykinin, which has a vasodilatory effect. The use of ACE inhibitors is started at a low dose and blood pressure, kidney function, and potassium levels are monitored.

CONCLUSION

Based on the explanation in the discussion above, this study shows that the use of drugs in elderly patients at the Kartini Madu II Elderly Posyandu, Kartini Surya Khatulistiwa Institute has several important findings. First, there are drugs that do not meet the STOPP criteria (diclofenac sodium and CTM) and START (kalk and captopril), which indicates the need for

further evaluation of drug use in the elderly. Second, the characteristics of elderly patients are predominantly female (87.3%) with an age range of 60-69 years (65.4%), and the most common complaints are dizziness, itching, and cough. Finally, the most commonly used types of drugs are mefenamic acid, captopril, and paracetamol. The results of this study can be used as a reference to improve the rational and safe use of drugs in the elderly.

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