

POTENTIALLY INAPPROPRIATE MEDICATION IN ELDERLY OUTPATIENT OF TERTIARY HOSPITAL IN INDONESIA

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ABSTRACT

Increased percentage of geriatric population has an impact on more health issues. The older the geriatrics, the more susceptible they are to various physical complaints due to either natural factors or diseases. To described the prevalence of potentially inappropriate prescriptions in geriatric outpatients

A retrospective, cross-sectional study was done for three months in the Medical Record Department, in one of tertiary hospitals in Indonesia. The data was analyzed using Beers Criteria 2012 and described as descriptive statistics.

A total 400 prescriptions were collected in the study during the period of 3 months. The estimated prevalence of potentially inappropriate prescription use in tertiary hospitals in Indonesia reached 24.5%. The most common potentially inappropriate prescription were nonsteroidal anti-inflammatory drugs (NSAID) (17 %) and benzodiazepine (12%). NSAID was the most prescribed potentially inappropriate agents of 66 events.

Keywords: Beers Criteria 2012, Geriatrics, Indonesia, Potentially Inappropriate Prescription

INTRODUCTION

Improved health and prosperity in Indonesia have led to higher life expectancy and greater number of geriatrics from year to year. Indonesia ranks among the top five countries with the most number of elderly people in the world. The census in 2020 reported that the elderly population in Indonesia reached 28.8

million or 11.34% of the total population (Statistik, 2021)

Increased percentage of geriatric population has an impact on more health issues. The older the geriatrics, the more susceptible they are to various physical complaints due to either natural factors or diseases (Statistik, 2021). The disease pattern among geriatrics is mainly

dominated by degenerative diseases (Noorkasiani, 2009). Varied pathological conditions, polypharmacy, reduced organ functions, and nonspecific disease manifestation in geriatrics have posed a challenge to disease management for this age group (Kementerian Kesehatan, 2017). Inappropriate medication use among the elderly has been a serious health issue as such situation may raise morbidity, mortality, and healthcare cost (Namirah Muh. Syuaib AS, Darmawan and Mustofa, 2015). In addition, inappropriate medication use can increase the risk of drug side effects and deaths (O'Mahony and Gallagher, 2008).

Beers Criteria are among the explicit guidelines to identify potentially inappropriate medication use in older adults. Their advantages include simple application, easy guidelines to follow, reproducible data (Rumore and Vaidean, 2012), strong evidence, and inexpensive cost (Elliott and Stehlik, 2013). A study using Beers Criteria to evaluate geriatric inpatients suffering from osteoarthritis showed that 7 patients

(38.90%) received medications included in the sections of Beers Criteria 2012 (Namirah Muh. Syuaib AS, Darmawan and Mustofa, 2015). However, this study merely used a few samples, analyzing only inpatients; therefore, further studies involving a greater number of subjects and outpatients need to be conducted.

The aim of the present study was to describe the prevalence of potentially inappropriate prescriptions in geriatric outpatients.

RESEARCH METHOD

This was a cross-sectional, retrospective study carried out at Tertiary Hospital in Yogyakarta. The study obtained approval from the Ethics Committee of the Faculty of Medicine of Universitas Islam Indonesia(29/Ka.Kom.Et/70/KE/X/2016). Data were collected from hospital's medical record used by the outpatient at the polyclinic of internal medicine. Participants data were encoded by numbering, ensuring anonymity of the included subjects. We recorded all the geriatric prescription's from January to

December 2015. Patients were eligible for inclusion if they met the following criteria during this time periode : ≥ 60 years old at the time of their most recent polyclinic of internal medicine visiting.

Elderly persons were adults aged 60 years or above at the time data was collected (as defined by World Health Organization, for developing countries). The 2012 version of the Beers Criteria was applied for evaluating the potentially inappropriate prescription in geriatric.

To understand the prescription trend of geriatric's medication, we used descriptive statistics to demonstrate the trend of elderly prescription, stratified by age, gender, dan most medication prescribing for elderly patients. All statistical analyses were conducted using Microsoft excel software.

RESULT

A total 400 prescriptions were collected in the study during the period of 3 months. The demographic profiles of patients were found to be : 81.75 % patients were found in the age range of 60-69 years, 11.50 %

patients were found equally in the age range of 70-79, 6.5 % patients were found in the age range of more than 80 years . The proportion of females was higher at 58.5% as compared to males who were only 41.5% . Hypertension (45.75%) was the most commonly identified disease among the study population followed by diabetes mellitus (42.5%), myalgia (20%), osteoarthritis (9%), bronchial asthma (7.25%), upper respiratory tract infection (6.25%), gastritis (5%), gout (2.25%), and congestive heart failure (1%).

The commonly prescribed category of drugs to the elderly patients were antidiabetic drugs, cardiovascular agents, analgesics, antihistamines, antibiotics, vitamins, drugs acting on central nervous system, respiratory drugs and eyes drops. Most commonly used drug was Metformin 27,5%, followed by an antihypertensive drug that is amlodipine 20% (Fig. 1).

The number of drugs prescribed in each prescription was evaluated and it has found that 68.5% of prescription had 1-3 drugs, 27.75% of the prescription had 4-6 drugs, and

3.75% of the prescriptions had 7-9 drugs.

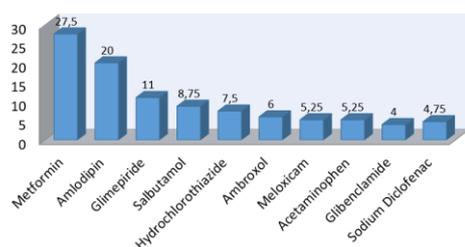


Figure 1. Medications Most Prescribed for Geriatric (n=400)

Potentially Inappropriate Medications

Table 1. Potentially inappropriate medications most prescribed to geriatric's patients

Medication	Frequency	Percentage (%)
Meloxicam	24	6
Diclofenac	19	4.75
Ibuprofen	15	3.75
Insulin	9	2.25
Mefenamic acid	7	1.75
Diazepam	6	1.5
Alprazolam	6	1.5
Pioglitazone	5	1.25
Diltiazem	4	1
Amitriptyline	2	0.5
Ketoprofen	1	0.25

Using Beers Criteria 2012, we identified that the prevalence potentially inappropriate prescriptions was 26.75% (400 prescription orders). The following drugs were identified in prescriptions based on Beers Criteria 2012 and

presented in the Table 1. The 5 medications that were responsible for the greatest number of potential drug therapy problems were Nonsteroidal anti-inflammatory drugs (NSAIDs) (16.5%), Benzodiazepines (BZDs) (3%), insulin (2.25%), Pioglitazone (1.25%), and diltiazem (1%).

DISCUSSION

In this study, it was found that the prevalence of PIMs were 26.75%. Rahmawati et al. studied the database in the one of hospital in East Java and found that the prevalence of PIMs in elderly outpatients was 18.30% (Negara, Machlaurin and Rachmawati, 2016). Syuaib et al. evaluated 18 registries of geriatric hospitalized patients found a prevalence of PIMs in 38.9% of patients (Namirah Muh. Syuaib AS, Darmawan and Mustofa, 2015). Previous study in United States found that the prevalence of PIMs was around 23% in geriatric outpatients applied the 2003 version of Beers criteria (Buck *et al.*, 2009). The differences of the prevalence of PIMs is according to the time and site of data gathering , as well as other

aspects such as the criteria, study design and data gathering period (Piccoro *et al.*, 2000). The Beers Criteria study conducted by Page *et al.* (2010), on 389 geriatric patients hospitalized, reported 27.5% of patients receiving drugs in the scope of Criteria Beers, and 9% experienced undesired effects (Page *et al.*, 2010).

The most frequently prescribed PIMs for geriatric patients were NSAIDs, BDZs, insulin, pioglitazone and diltiazem. NSAIDs are a common component of pain management. Nonselective NSAID as well as selective Cox-2 inhibitor have been associated with side effects, including renal dysfunction, heart failure, gastrointestinal toxicity and increase risk cardiovascular side effect (Society, 2012). The primary mechanism of action of NSAIDs is inhibition of the Cox enzyme (prostaglandin synthase), thus impairing conversion of arachidonic acid to prostaglandins, prostacyclin, and thromboxane. Cox-1 and Cox-2 are the primary isoforms of the Cox enzyme. They differ in the tissues in which they are present, which is important to understanding their

different effects. Cox-1 is expressed in a wide variety of tissues, but to different degrees and is involved in regulation of gastric protection, kidney function and platelet function. Cox-2 is primarily upregulated in states of inflammation (Martin *et al.*, 2018).

Benzodiazepines (BZD) effect central nervous system (CNS)) and may cause several pharmacological effects, including adverse reactions. The use of these drug has been associated, in the elderly, to increase number of falls (Chaimowicz, De Jesus Xavier Martins Ferreira and Miguel, 2000) decrease cognitive functioning, dementia, pneumonia, weight gain and adverse effects on glycidic and lipid metabolism. In spite of the risk inherent to using BDZ drugs, they bring important benefits for the elderly including decrease anxiety, fear, sleep induction and maintenance, and prevention of epileptic seizure (van Strien *et al.*, 2013).

The American Geriatrics Society (2012) explains that all types of benzodiazepines (short and long acting) can increase the risk of

cognitive impairment, delirium, falls, fractures, and motorized accidents in geriatrics. In addition, geriatrics are sensitive to benzodiazepines and tend to have a slow metabolism against long-acting benzodiazepines, which increases the risk of side effects. In some cases related to patient sleep disorders, non-pharmacological therapy (sleep hygiene) is recommended to overcome the patient's medical problems, if this non-pharmacological therapy is not effective, pharmacological therapy is an option (Society, 2012). Some alternative medicines that are safe and effective can be used including zolpidem (≤ 5 mg / day), trazodone, mirtazapine and doxepin (low dose). If the alternative medicine is not available in the hospital, it is necessary to reduce the dose of benzodiazepine to 1/2 of the usual dose, then be applied and stopped. During the use of benzodiazepines, monitoring of the side effects of the drug (cognitive function, alertness, history of falls, ataxia) and the duration of therapy is shortened (Holt, Schmiedl and Thürmann, 2010).

In studies based on the Beers criteria version 2012, amitriptyline, NSAIDs, antipsychotic were the most frequently prescribed PIMs (Negara, Machlaurin and Rachmawati, 2016). Previous studies by Passarelli at al. reported that diazepam, amiodarone, nifedipine, methyldopa and cimetidine were the most prescribed in hospitalized elderly patients (Passarelli, Jacob-Filho and Figueras, 2005). Coelho et al. found that NSAIDs, methyldopa, digoxin, and long-acting BZD were the most frequently used by elderly patients in urban area in Brazil (Coelho Filho, Marcopito and Castelo, 2004).

Differences of PIMs prescription among studies may occur because of several reasons. Some drugs in beers criteria are not available in Indonesia such as guanethidine, quazepam, halazepam. Beers criteria version 2012 has several limitation. The Beers criteria do not provide information of underuse of medication, drug interaction, and duplicated therapeutic classes. It is difficult to find name of drugs because drugs are not listed alphabetically, or by

category action site or therapeutic class. However, the Beers criteria may be adapted to computer system, and may be used readily for educational purposes (Fick *et al.*, 2008).

There are limitation to generalizing the result to general population; this study was the small sample size, although the limitation existed, these result effectively represent the experiences of our tertiary hospital. Probably, elderly patients have some comorbidities may have been seen by other specialist, which may have influenced the prescription profile.

Future research can be focus to provide evidence that Beers criteria involvement leads to improved detection and management of drug therapy problems using Beers criteria. Besides pharmacist, another healthcare professional that cure elderly patient should also learn the appropriate prescription practices, by accessing medication use guidelines and continue education because mostly Indonesians healthcare professional are not still familiar with

tools for identified inappropriate prescription including Beers criteria.

CONCLUSION

This descriptive study describes the prevalence of potentially inappropriate prescriptions in elderly outpatients. The prevalence of PIMs in this study was 26.75%. NSAIDs and Benzodiazepines were most prescribed in elderly patients in Indonesia.

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