

# Identification of Potentially Inappropriate Prescribing in Outpatient Geriatric using STOPP/START Criteria at X Hospital Jakarta

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**Keywords:** Geriatrics, STOPP/START Criteria, Potentially Inappropriate Medicine (PIM), Adverse Drug Reactions.

**Abstract:** Chronic diseases and decreased physiological function in geriatric patients play a role in the increased Potentially Inappropriate Prescribing (PIP) and Adverse Drug Reactions (ADR). STOPP/START Criteria (Screening Tool of Older Person's Prescriptions/Screening Tool to Alert to Right Treatment) is one of the screening tools to identify Potentially Inappropriate Prescribing. The purpose of this study was to find out how much Potentially Inappropriate Medicines (PIM) potential and Potency Prescribing Omissions (PPO) at X hospital using STOPP START toolkit. This was a non-experimental descriptive study. Samples were collected retrospective in January-March 2017. STOPP/START criteria were used as a screening tool to identify Potentially Inappropriate Medication (PIM) and Potential Prescribing Omissions (PPO). In 91 samples of outpatient geriatric at X hospital, the potential for PIM according to the STOPP Criteria was 1.9% of a total of 560 drugs with criteria were for the administration of benzodiazepines in patients with a history of falls, anticholinergics and antipsychotics in dementia patients, glimepiride administration in geriatric patients with DM type 2. For the potential of negligence in drug administration according to the START Criteria, there was 3.8% with the most occurrence being the administration of acetylcholinesterase inhibitors in dementia patients. Of the 560 medications administered to outpatient geriatric patients, 1.9% were included in the STOPP criteria and 3.8% included in the START criteria.

## 1 INTRODUCTION

The phenomenon of population ageing is a phenomenon that has occurred worldwide. Between 2015 and 2050, the population of 60 years or older is expected to increase from 12% to 22%. By 2050 it is estimated that the number of elderly people in the world reaches 2 billion inhabitants (Iona *et al.* 2015). In Indonesia, the elderly population in 2017 numbered approximately 23.66 million people (9.03%) and is estimated to increase to 48.19 million in 2035 (Kementrian Kesehatan RI 2017).

A large number of elderly population in Indonesia will have an impact on the health sector in the form of health decline which resulting in increased service costs (Kementrian Kesehatan RI 2017). Increasing age in the elderly can alter the body's physiological system, but it may also alter the pharmacokinetic and pharmacodynamic profile of the drug. The elderly group has multiple comorbidities and is more often hospitalized, which

increases the risk of polypharmacy and the potential for inappropriate prescribing (Corsonello *et al.* 2009).

Some lists of drugs have been made by experts for use by medical circles in the treatment of geriatric patients i.e. Beers Criteria (The American Geriatrics Society 2012) or Canadian Criteria (McLeod *et al.* 1997). The STOPP/START Criteria (Screening Tool for Older Person's Prescriptions / Screening Tool to Alert to Right Treatment) were made to identify potentially inappropriate medication (PIM) (Gallagher *et al.* 2011). STOPP/START criteria were made according to the body's physiological system consisting of 80 STOPP Criteria and 34 START Criteria (O'Mahony *et al.* 2014). The STOPP/START criteria were created in 2003 with the aim of addressing the possible shortcomings of the Beers criteria. The criteria consist of Potentially Inappropriate Medication (PIM) described by STOPP, and Potential Prescribing Omissions (PPO) prescriptions,

Table 1. PIM Frequency According to STOPP Criteria

Criteria Code	Descriptions	N
K1	Benzodiazepin that increase the risk of falling in geriatric	4
A3	Concurrent use of one class drug or its derivatives	2
D8	Anticholinergics in geriatric patients with delirium or dementia	1
D9	Antipsychotics in the elderly with BPSD (dementia)	1
C3	Aspirin in the elderly with uncontrolled hypertension	1
J1	Glimepiride in the elderly with type 2 diabetes mellitus	1
Total		10

Table 2. The Frequency of PPO According to Criteria START

Criteria Code	Descriptions	N
C3	Acetylcholinesterase inhibitors in dementia patients	5
G1	Alpha 1 blocker in patients with BPH	5
G2	5a reductase inhibitor in BPH patients	5
E3	Vitamin D and calcium in patients with osteoporosis	3
A4	Antihypertensive in patients with blood pressure > 140 / 90mmHg	1
E6	Xanthine oxidase inhibitors in gout arthritis patients	1
C4	Topical prostaglandin or prostamide or topical beta blockers in glaucoma patients	1
Total		21

described by the START. This START method is intended to improve treatment success in geriatric patients (O'Mahony *et al.* 2014).

The result of PIM identification with STOPP and START screening tool has not been well documented in Indonesia especially in DKI Jakarta hospital. X Hospital (RSUPN DR. Cipto Mangunkusumo) is a government hospital located in Central Jakarta and is a referral of the National Geriatric Center. From the results of the survey to the hospital, the outpatient geriatric patients from January to March 2017 at X hospital were numbered 1047 patients.

## 2 METHOD

This experiment was a cross sectional study. Samples were collected retrospectively in January - March 2017. STOPP/START criteria were used as a screening tool to identify Potentially Inappropriate Medication (PIM) and Potential Prescribing Omissions (PPO). The total population of 1047 patients and samples taken according to Taro Yamane formula amounted to 91 using systematic sampling (Moch Imron 2011). Inclusion criteria were geriatrics aged 60 years or older, received the

medicine, diagnosis data, physical examination data and laboratory data required. The exclusion criteria were patients with forced home, and the patient died.

The data collected were secondary data in the form of medical record number, patient initials, age, sex, diagnosis, comorbidities, physical examination, drugs used and laboratory information. Data analyzed using STOPP/START Criteria to determine the precision of prescribing that adjusted to the medical record of the patients.

## 3 RESULTS

The results of the study showed that improper use of medicines according to STOPP criteria included giving benzodiazepines which could potentially cause a risk of falls in the elderly. Besides that, there were also the used of drug duplication, anticholinergics, antipsychotics and Glimepiride (Table 1).

The results study, the PPO according to the START Criteria numbered to 3.8% or 21 incidents. The highest incidence in this study was an omission of acetylcholinesterase inhibitor therapy in 5 dementia patients, alpha-1 blocker therapy and 5a reductase inhibitor in patients with BPH of 5 cases,

respectively. Furthermore, vitamin D and calcium therapy were given in 3 patients with osteoporosis, antihypertensive in 1 geriatric patient with blood pressure > 140 / 90mmHg, xanthine oxidase inhibitor therapy in 1 patient with gout arthritis and topical prostaglandin or prostamide or beta-blocker therapy in 1 patient with glaucoma (Table 2).

## 4 DISCUSSION

The most prevalent PIM criteria were the use of benzodiazepine-class drugs in 4 geriatric patients (40%). The use of benzodiazepines class of drugs may lead to reduced sensory and impaired balance (O'Mahony *et al.* 2014). In the elderly the benzodiazepine profile may undergo changes related to altered cytochrome P450 enzyme activity (Sotaniemi *et al.* 1997) otherwise it may be caused by other things such as diminished albumin which leads to increased concentrations of benzodiazepines in a free form (Hammerlein *et al.* 1998). In the elderly there is also an increase in the sensitivity of benzodiazepines to the central nervous system (Hillmer *et al.* 2007; Sera *et al.* 2012; Naranjo *et al.* 1995). In a previous study, more than 40% of elderly who received benzodiazepine-class drugs entered emergency care after falling out (Cengotitabengoa *et al.* 2018).

Concurrent use of one class of drugs or the derivatives occurred to 2 patients (20%), i.e, the use of dopamine agonist (pramipexole and levodopa) drugs. Drug duplication will increase as patients develop chronic illness and the range can reach 40.38% to 43.50% with 1.45-1.62 duplications (Cheng *et al.* 2014). Drug duplication were associated with polypharmacy which may increase the risk of adverse drug reactions (Bushardt *et al.* 2008). Constipation, nausea, headache and excessive daytime sleepiness are among adverse drug reactions of dopamine (Pagano *et al.* 2014; Tholfsen *et al.* 2015). Other adverse drug reactions such as hallucinations (both visual and audio), peripheral edema, heart valve disorders to heart failure have been reported as an adverse drug reaction of dopamine agonist therapy (Lockett *et al.* 2015; Wood 2010).

There is one incident (10%) of anticholinergics administered to dementia patients. The provision of anticholinergic prescriptions should be done cautiously given the side effects to the elderly. Adverse drug reactions of anticholinergic will worsen the state of dementia (O'Mahony *et al.* 2014; Gerretsen *et al.* 2011). There is one incident (10%)

of antipsychotics given in elderly patients. The antipsychotic administration was included in the STOPP Criteria as it may increase the risk of stroke in the elderly (O'Mahony *et al.* 2014). In previous studies, the use of antipsychotics in older adults may increase the cardiovascular risk to death. The risk will increase if the elderly develop dementia (Mittal *et al.* 2011).

The use of aspirin in the elderly was one incident (10%). When aspirin was given to uncontrolled hypertension (> 140 mmHg and > 90 mmHg) patients, it will increase the risk of bleeding (O'Mahony *et al.* 2014; Lip 2011; Pisters *et al.* 2010).

Glimepiride used with caution in elderly patients as it may lead to hypoglycemia (Katzung *et al.* 2012). In this study, there was one incident (10%), and in previous studies, there was an incidence of hypoglycemia in 23 patients out of a total of 143 patients (Shihara *et al.* 2017).

According to the START Criteria, there were three most potential Omissions in drug administration: acetylcholinesterase inhibitor therapy in dementia patients (23.8%), alpha 1 blocker therapy and 5a reductase inhibitor in patients with BPH (23.8%), vitamin D and calcium therapy in geriatric patients with osteoporosis. Study on the comparison of the use of acetylcholinesterase inhibitors with placebo found a significant difference seen from the value of ADAS-Cog (The Alzheimer's Disease Assessment Scale-Cognitive subscale) and MMSE (Mini Mental State Exam) after patients were given therapy for six months (Mochammad *et al.* 2017). Acetylcholinesterase inhibitors not only improve cognitive function but can also increase psychological function and habits (DiSanto *et al.* 2013).

Alpha 1 blockers administered together with a 5a reductase inhibitor are the START Criteria in BPH patients. In elderly who had moderate to severe prostate disturbance when given a combination of both drugs resulted in much better improvement compared with tamsulosin or dutasteride monotherapy (Roehrborn *et al.* 2008). Vitamin D and calcium therapy were PPO in 5 geriatric patients with osteoporosis. Vitamin D and calcium therapy are strongly recommended to improve the state of osteoporosis and prevent fractures (Weaver *et al.* 2016). In the study had found that the used of Vitamin D and calcium in osteoporosis patients can reduce the risk of fracture in the elderly group (Weaver *et al.* 2016).

Geriatric patients with blood pressure > 140 / 90mmhg included to the START Criteria for not

getting antihypertensive (O'Mahony *et al.* 2014). Blood pressure target for elderly (< 140/90mmHg), the treatment may be based on JNC8 guidelines and may be combined with expert consensus guidelines ACCF/AHA 2011 (Arthur *et al.* 2015).

In this study, xanthine oxidase inhibitor therapy in gout patients include to the START Criteria. Febuxostat was recommended if elderly patients have moderate to severe renal impairment (Fravel *et al.* 2011).

Geriatric patients with glaucoma who are not receiving antiglaucoma therapy (topical prostaglandin, prostamide or beta-blockers) included to the STOPP Criteria. Comparison of the effectiveness of topical prostaglandin (latanoprost bunod 0.024%) once daily in the afternoon showed better results than the topical beta blocker (timolol 0.5%) twice daily given to glaucoma patients for three months (Medeiros *et al.* 2016).

## 5 CONCLUSIONS

From the results of this study, it could be concluded from 560 drugs given to outpatient geriatric patients at X hospital, there is 1.9% of PIM incidence for STOPP criteria and 3.8% incidence of PPO for START criteria.

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