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Inappropriate Use of The drugto Elderly Patients with Type-II Diabetes Mellitus in Makassar Indonesia

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ABSTRACT

Polypharmacy is common among the elderly patient with Diabetes Mellitus (DM).It can increases the risk of drug side effects, drug-drug interaction, and drug-disease interaction, and inappropriate prescribing. This researchaims to describe the potential inappropriate use of the drug to theelderly patients with Type II Diabetes Mellitus at Private Hospital of Makassar Indonesia. From Januari to December of 2013 all elderly inpatient with Type II DM were randomly sampled for study. This research uses a descriptive study using the medical records of the patients with the retrospective data collection. The selection of this research subjects by the purposive sampling. The inappropriate use of the drug was evaluated by Start-Stopp criteria. The results of the research by using the inappropriate of drugs based on the Stopp Criteria are 30% with the use of antidiabetic drugs is glibenclamide (10.5%).

Key words: diabetes mellitus, elderly, start-stopp criteria

INTRODUCTION

Aging is a comprehensive change process starts from the childhood, puberty, and adult to the old age. The aging process in the form of deterioration of the function of cells, tissues, and organs can occurs the change with gradual and progressive. The aging process which has resulted in a change in the organs of the body such as the gastrointestinal system, the endocrine system, immunological system, central nervous system, and cerebrovascular system[1].Older people tend to multiple comorbid conditions, so are more likely to be prescribe multiple medications simultaneously which increases the risk of adverse drug event, drug-drug, and drug-disease interactions[2,3].

Diabetes mellitus (DM) is a group of metabolic diseases with the characteristic of hyperglycemia due to abnormalities in the insulin secretion, insulin action or both of it. Hyperglycemia is a condition where the blood glucose levels in plasma exceeded to normal limits. The Chronic hyperglycemia can cause damage, dysfunction of multiple organs, especially the eyes; nerves, kidneys, and other complications due to impaired the microvascular and macrovascular. Various of complications may arise as a result of the blood sugar levels are not controlled, such as neuropathy, hypertension, coronary heart disease, retinopathy, nepropati, etc[4].

According to the World Health Organization (WHO), Indonesia is a country which ranks 4th largest in the prevalence of diabetes mellitus on the number of people with diabetes in the world after India, China and the United States. In epidemiology, in 2000 there were 8.4 million people with diabetes in 2030 and it is expected to increase to 21.3 million people. It is proves that the diabetes mellitus is a public health problem, which is very seriouse and needs proper treatment for the sufferers[5].The current demographic changes, generally characterized by a dramatic improvement in life expectancy and resulting increase in population rates aging is, among other things, showing new health needs, among which include high frequency of comorbidities and using associated polypharmacy[6].

Polypharmacy is common among the elderly patient with DM. They used the polypharmacy with the use of five or more drugs at the same time. The patients with DM, the polypharmacy may be unavoidable because in addition, it is needed to control the blood sugar level, and the medications are needed to overcome the interference of the blood pressure, dyslipidemia, and vascular complications. In fact, in addition to increases the risk of drug side effects. Many studies have found that various numbers of medications are associated with negative health outcomes. Using multiple medications may cause problems such as the increased risk of use of medications, nonadherence, and adverse effect. Health care professional should be aware of the risk and fully evaluate all medications at each patients visit to prevent polypharmacy from occurring[7].

Pharmacokinetics and pharmacodynamics changes in older people are of much relevance in dose regiment. Lack of awareness of these change can contribute to innapropriate medicines use, which can cause adverse drug effect. One of the effects in the elderly patients with the diabetes mellitus is the most serious hypoglycemia. A potentially inappropriate medication is assumed when the risk of adverse effect outweighs the expected clinical benefit, especially when a safer and more effective alternative therapy is available for the same conditions[8].Suboptimal or inappropriated prescribing has been linked to excess mordibity and hospitalization[9].

Appropriate prescribing can be assessed by explicit indicators developed by consensus approaches. The most commonly used explicit criteria to review drug treatments and to identify PIP are the *Beers* criteria. This tool include a list of inappropriate drug that should be avoided in older patients because of toxicity relating to the agent, too-frequent dose or too-large accumulative daily doses (independent of diagnosis), plus a list of criteria considering diagnoses with possible drug-disease interactions[10]. Although the *Beers* criteria have been applied widely in many studies to define potential inappropriate medication used in older people, several studies considered that these criteria present a number of serious flaws and are of doubtful relevance to routine geriatrics pharmacotherapy, especially in European countries[11,12]. For these reason, the new potential inappropriate medication criteria have been devised and validated (Start-stopp Criteria). The Start-stopp Criteria used to detect the potential errors in prescribing and medication indicated for the geriatric population[13,14,15]. Recently, this criteria have been adopted by the European Union Geriatric Medicine Society, and have been translate into several European languages[16,17]

MATERIALS AND METHODS

The samples were the prescription data of the elderly patients with the diabetes mellitus who underwent inpatient private Hospital Makassar in Indonesia period of January 2013 to December 2013. The research has done descriptively in the elderly patients with a diagnosis of diabetes mellitus who are underwent as inpatient inprivate Hospital Makassar period of January to December 2013, with retrospective tracing the improper use of drugs by the Start-Stopp Criteria. The selection of research subjects by purposive sampling that samples taken adapted to the purpose of the study and met the study criteria.

RESULTS AND DISCUSSION

As the increasing of the age, human physiological changes that not only affect the physical appearance but also to a decrease in the function of cells, tissues, and organs. Therefore, the aging process that occurs in the elderly is a natural process. The elderly patients are more susceptible to get the complications of disease, resulting in the medication therapy needed an attention.

Table 1. Characteristics of patients with the type II diabetes mellitus in private hospital Makassar

Characteristic	n (%)	Min	Max	Mean (SD[a])
Male	15 (30)	-	-	-
Female	35 (70)	-	-	-
Age	50 (100)	60,00	78,00	65,00 (4,46)
RBG[b]	50 (100)	139,00	521,00	292,60 (94,99)
FPG[c]	49 (98)	97,00	428,00	204,08 (63,31)
2hr-PPG[d]	45 (90)	148,00	488,00	271,62 (76,86)
HbA1c[e]	15 (30)	3,80	13,80	9,12 (3,27)
SGPT[f]	38 (76)	7,00	28,00	17,69 (5,67)
SGOT[g]	38 (76)	8,00	30,00	14,95 (5,84)
Urea	7 (14)	16,00	64,00	35,86(18,36)
Creatinine	7 (14)	0,50	1,20	0,93 (0,29)

[a]Standard deviation (SD), [b]Random Blood Glucose (RPG), [c]FastingPlasmaGlucose (FPG), [d]2-hourPost Prandial Glucose (2hr-PPG), [e]Hemoglobin A1c (HbA1c), [f]Serum Glutamic Piruvic Transaminase (SGPT), [g]Serum Glutamic Oxaloacetic Transaminase (SGOT)

Its characteristics include gender, age, and the laboratory results elderly inpatients with type II diabetes mellitus in the Private Hospital Makassar. It can be seen in the Table 1.

The characteristics of 50 elderly patients with the diabetes mellitus were 35 patients (70%) women and 15 patients (30%) males, are described in Table 1. The patient data showed that the majority patient was women, this influenced by the scarcity of women exercising, thus allowing the accumulation of fat that lead to obesity and metabolic disturbances. So, that they are triggering the diabetes mellitus.

The patients with the diabetes mellitus usually above the age of 30-40 years, this is evidenced from the patients with the type II diabetes mellitus in private hospital began at the age of 30 years and continues to increase until the old age. The increasing age the prevalence of diabetes mellitus is increasing as well. The old age affects the function of cells, tissues, and organs. The part of the body is unchanged β-cells of the pancreas that produce the insulin hormone and affect the blood glucose levels. The age of the elderly patients who serve as the sample is over 60 years old. The results of the study in Table 1 shows, the average age of the elderly patients with diabetes mellitus was 65 years old. The age of the patients with the diabetes mellitus are at least 60 years, and maximum age is 78 years.

Elderly patients with the type II of the diabetes mellitus with the improper use of drugs and the use of appropriate medications based on criteria stop private hospital in Makassar, can be seen in Table 2 below.

Table 2.Number of geriatric patients identified with inappropriate drugs according to Start-stopp Criteria in private hospital Makassar

	Stopp criteria	n (%)
DM* Patient	The uses of inappropriate drugs	15 (30)
	The uses of the appropriate drugs	35 (70)

**Diabetes melitus (DM)*

The data of the study, patients were included in the use of inappropriate drugs by Stopp criteria of 15 patients (30%) of 50 patients with the diabetes mellitus type II, described in Table 2. The patients were given the antidiabetic drug glibenclamide by stopp criteria, are 2 patients (10 , 5%). The patients who do the right treatment therapy based on more the criteria stopp that 35 patients (70%) of 50 patients, compared to the patients who did not appropriate the therapeutic treatment based on the stopp criteria. It seem like prevalence potential inappropriate medication among elderly medical inpatient in Taiwan by using Start-Stopp criteria was 36,2%[18].

Patients with drug use are not appropriate to give the effect to the patient's length of stay. can be seen in Table 3 below.

Table 3. Effects of drug use on Length of hospitalization

Criteria	Mean (SD[a])	P
LOH[b]The uses of inappropriate drugs	11,85 (7,60)	0,000
The uses of the appropriate drugs	5,73(3,50)	

[a]Standard deviation (SD)
[b]Length Of Hospitalization (LOH)
p> 0.005 does not different significantly
p<0.005 significantly different

The patients with the drug use improper influence on length of the stay of the patients with the diabetes mellitus type II. It is evident from the statistical analysis of independent samples test was performed. The patients who use drugs inappropriately with an average length of stay (11.85 days). The patients who use the right medications with an average length of stay (5.73 days), so the longer of the hospitalization of patients may give effect to the use of inappropriate drugs ($p < 0.005$).

The improper use of drug influence on length of the stay of patients, because of the use of the drugs in a longer period will cause the effects of the drug. Thus, it allows the patient to be hospitalized any longer. To avoid the uses of drugs to the elderly patients, more attention to the start-stopp criteria to avoid improper uses of drugs.

The drugs that are used for elderly patients with the type II diabetes mellitus elderly based on Stopp criteria at private hospital Makassar, can be seen in the Table 4 below.

Table 4.The use of drugs according to the Stop criteria of elderly patients with diabetes mellitus inIbnu Sina Hospital Makassar

Criteria	Drug	Number Patient (n)	%
Stopp	Glibenclamide	2	10,5

Some patients are also gives an oral hypoglycemic drug of the sulfonylurea class. Such as glibenclamide, gliquidone, and glimepiride. The drugs that included in the stopp criteria or cannot be given to the elderly patients is glibenclamide. Glibenclamide administration due to type II diabetes mellitus can cause the hypoglycemic risk. The hypoglycemic can be avoids if the elderly patients are given drugs with the shortest duration. The glibenclamide is the drug of the sulfonylurea class with a long duration. So, the glibenclamide can prolong the hypoglycemic risk. The glipizide has the lowest risk of hypoglycemia, so that these drugs can be gives to the elderly. All the drugs of sulfonylureas can cause hypoglycemia, but it must start with a low dose, increased gradually to reach a target of the blood sugar and are gives special attention to prevent the occurrence of the side effects. This class is give if the patient has a contraindication to the metformin. The sulfonylurea class can be gives to the patients with the type II diabetes mellitus due to work by stimulating insulin secretion in the pancreas gland, so given these drugs for patients who are still able to produce insulin. Therefore, these drugs cannot be administers to patients who have experienced damage to β-cells of the pancreas[19].

The *start criteria* is not do an analysis of the use of drugs that is gives because it is not knows yet when the drugs begin to gives as a criteria from the start. Besides, the patient has to perform with the appropriate treatment with drugs when the criteria use for the elderly already known. This highlight the need for regular reviews and adjustment of the treatment taken by this population. By means of a pharmaceutical care service, pharmacist can help detect potential medication problems and improve medication selection appropriateness in older people[20].

CONCLUSION

The results of the research by using the inappropriate of drugs based on the Stopp Criteria are 30% with the use of antidiabetic drugs isglibenclamide (10.5%).

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