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COST EFFECTIVENESS ANALYSIS OF HYPERTENSION AND DIABETES MELLITUS TREATMENT AT EFARINA ATAHAM HOSPITAL PANGKALAN KERINCI

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Abstract

Hypertension is a condition in which blood pressure increases above (≥140/90 mmHg). The prevalence in Indonesia is 32.2% and only 24.2% of these hypertensive patients are diagnosed and receiving treatment. Diabetes mellitus (DM) is a metabolic disorder characterized by glucose levels exceeding normal values or perglycemia (≥200 mg/dl). to evaluate the cost-effectiveness of antihypertensive and anti-diabetic in patients who are hospitalized at Efarina Etaham Berastagi Hospital, Karo. This research is non-experimental using data taken from patient medical records retrospectively for the period January-June 2017. The analytical method used is Cost Effectiveness Analysis (CEA). The Cost Effectiveness Average Ratio (CEA Ratio) and Incremental Cost Effectiveness Ratio (ICER) methods were used to analyze the most cost-effective antihypertensives and antidiabetics. The results of this study showed that the hypertension therapy regimens used were amlodipine, captropil, valsartan, amlodipine + captropil, amlodipine + valsartan, captorpil + valsartan, and amlodipine + captorpil + valsartan. In the anti-diabetic therapy regimen used are insulin analogues, metmorphine and insulin analogues + metmorphine. The most cost-effective antihypertensive based on the CEA and ICER is amdolpine + captropil and the most cost-effective diabetic liver based on the CEA and ICER is metmorphine. amlodipine + captropil, amlodipine + valsartan, captorpil + valsartan, and amlodipine + captorpil + valsartan. In the anti-diabetic therapy regimen used are insulin analogues, metmorphine and insulin analogues + metmorphine. The most cost-effective antihypertensive based on the CEA and ICER is amdolpine + captropil and the most cost-effective diabetic liver based on the CEA and ICER is metmorphine. amlodipine + captropil, amlodipine + valsartan, captorpil + valsartan, and amlodipine + captorpil + valsartan. In the anti-diabetic therapy regimen used are insulin analogues, metmorphine and insulin analogues + metmorphine. The most cost-effective antihypertensive based on the CEA and ICER is amdolpine + captropil and the most cost-effective diabetic liver based on the CEA and ICER is metmorphine.

Keywords: Hypertension and Diabetes Mellitus, Antihypertensive, Antidiabetic Cost Effectiveness Analysis.

INTRODUCTION

Hypertension is a silent killer which is widely recognized as a very common cardiovascular disease. Hypertension is defined as an increase in systolic blood pressure of more than 140 mmHg and diastolic blood pressure of more than 90 mmHg. Hypertension has become a major problem in society in Indonesia and in several countries in the world (Ministry of Health, RI., 2006).

Various factors can trigger hypertension, although the majority (90%) of the causes of hypertension are unknown. The cause of blood pressure is an increase in heart rate, an increase in resistance (resistance) from the peripheral blood vessels and an increase in the volume of blood flow (Kurniawan, 2002).

According to JNC-VII, worldwide prevalence estimates for hypertension may be as high as 1 billion people and approximately 7.1 million deaths each year are related to

hypertension. The World Health Organization (WHO) reports that suboptimal blood pressure (systolic blood pressure >115 mm Hg) was associated with 62% of cerebrovascular disease and 49% of cardiovascular disease, with little variation on the basis of sex. Suboptimal blood pressure is the number one risk associated with death worldwide (Chobanian, et al., 2003). The incidence of hypertension in Indonesia tends to increase. In 20001, residents suffer from hypertensionas much as 8.3% then in 2004, the population suffering from hypertension increased to 27.5% (Rahajeng, 2009).

Diabetes mellitus is a clinical symptom characterized by classic complaints, namely polyuria, polydipsia and polyphagia and is accompanied by an increase in blood glucose, characterized by an increase in blood glucose concentration when ≥20 mg/dl. If diabetes is not treated immediately, there will be disturbances in fat and protein metabolism and an increased risk of developing microvascular or macrovascular disorders (Suherman, 2007).

Pharmacoeconomic analysis is a comprehensive way to determine the economic and alternative effects of drug therapy or other health interventions. Assessment of the clinical effectiveness of a new intervention in health services, including medication, is very important in determining the role of the therapeutic regimen in clinical practice. In pharmaceutical interventions, pharmacoeconomics is used to assess whether there are additional benefits from an intervention. Pharmacoeconomics is defined as the description and analysis of the cost of therapy in a society or health care system. Pharmacoeconomics identifies,

Hypertension and diabetes mellitus are the most common diseases and the number increases every year in the category of internal medicine at the Efarina Etaham Hospital in Pangkalan Kerinci, where the cost of treatment also increases from year to year. For this reason, it is necessary to carry out a pharmacoeconomic analysis on the use of antihypertensives and antidiabetics at the Efarina Etaham Hospital, Pangkalan Kerinci.

Formulation of the problem

Based on the background, the formulation of the research problem is:

a. Is there a difference in cost-effectiveness between the use of hypertension drugs that are hospitalized at the Efrina Etaham Hospital, Pangkalan Kerinci?
b. Is there a difference in cost-effectiveness between diabetes mellitus drug users who are hospitalized at Efarina Etaham Pangkalan Kerinci hospital?
c. Are there demographic variations of hypertension patients who are hospitalized at the Efarina Etaham Hospital, Pangkalan Kerinci?
d. Are there demographic variations of diabetes mellitus patients who are hospitalized at the Efarina Etaham Hospital in Pangkalan Kerinci?

METHODS

Types of research

This research is a non-experimental study that is designed retrospectively, namely research conducted by observation, collecting data at one time and using past data.

Population and Sample

Population

The population in this study were all medical records of patients with hypertension and diabetes mellitus who were hospitalized at the Efarina Etaham Hospital, Pangkalan Kerinci for the period January 2017-June 2017.

Location and Time of Research

Research sites

The research was conducted at the Efarina Etaham Pangkalan Kerinci hospital.

Research time

The research was conducted in July 2017-August 2017.

Data analysis

The research results were analyzed by descriptive analysis. The cost is calculated to obtain whether or not there is cost effectiveness in patients with hypertension and diabetes mellitus who are hospitalized.

Cost-effectiveness analysis is calculated using the Cost Effectiveness Average (CEA) formula which is calculated based on the total costs incurred by patients with hypertension and diabetes mellitus on the effectiveness of drug use with the following formula:

CER = Cost of drug use

Effectiveness of drug use

Comparisons between other therapeutic models are analyzed using the incremental Cost Effectiveness Ratio (ICER) with the following formula:

ICER = Cost of drug A-Cost of drug B

Effectiveness of drug A-Effectiveness of drug B

RESULTS AND DISCUSSION

Therapeutic Regimen

Based on the results of research conducted using the patient's medical records, antihypertensive therapy inpatient at the Efarina Etaham hospital, patient medical, antihypertensive therapy inpatient at the Efarina Etaham hospital Pangkalan Kerinci were grouped into 7 antidiabetic therapy regimens grouped into 3 regimens. In this case the antihypertensive and antidiabetic therapy regimens are monotherapy and combination groups that are used by patients while they are being treated in the hospital until the patient is declared cured by the doctor and allowed to go home.

The most widely used antihypertensive therapy regimen was captopril in 17 people (30.36%). Then the second highest was in the amlodipine + captopril combination therapy regimen, namely 11 people (19.65%), then in the amlodipine therapy regimen, there were 10 people (17.86%), then the amlodipine + valsartan combination therapy regimen, namely

6 people (10 .71%), namely the valsartan therapy regimen, the combination of captorpil + valsartan and the combination of amlodipine + captopril + valsartan.

Cost effectiveness analysis

Cost-effectiveness analysis is used for pharmacoeconomic studies to compare two or more health interventions that provide different effect sizes (Rascati, 2009). Pharmacoeconomic studies always consider two sides, namely costs (cost) and treatment results (outcome). In fact, in studies that examine the economic side of this treatment, the cost factor is always associated with the effectiveness, utility or benefit of the treatment given (Ministry of Health RI, 2013).

Discussion of the percentage of outcomes of patients with hypertension and diabetes mellitus who are hospitalized at the Efarina Etaham Hospital, Pangkalan Kerinci. In this study the outcome was assessed based on the length of the day of hospitalization until the patient was declared cured and allowed to go home by the doctor.

Therapeutic regimens, namely amlodipine, captopril, amlodipine+captopril, amlodipine+valsartan produced different outcomes, so they were analyzed using the cost-effectiveness analysis method. There are 3 therapy regimens that produce the same outcome so they cannot be analyzed using the cost-effectiveness analysis method,

Medical Direct Expenses

Direct medical costs are costs incurred by patients related to medical services, which are used to prevent or detect diseases such as patient visits, prescribed drugs and length of stay (Vogenberg, 2001). The direct medical cost data used in this study is only the cost of antihypertensive or antidiabetic drugs and hospitalization costs. Other costs such as doctor consultations, laboratory tests are not included in the direct medical costs because each patient has different costs.

Based on the cost distribution of antihypertensive use converted by 100 people, it was found that the highest drug cost was the ARB class, namely valsartan, Rp. 2,572,500,-. The lowest drug cost is the ACEI class, namely captopril, Rp. 144,294,-.

In the combination of 2 antihypertensive groups, the highest costs were the CCB and ARB groups, namely the combination of amlodipine + valsartan with a drug cost of Rp. 3,483,917,-. The lowest cost is for the CCB and ACEI groups, namely the combination of amdolpin + captopril with a total price of Rp. 734,318,-.

In the combination of 3 antihypertensive groups, namely the CCB, ACEI, and ARB groups, namely the combination of amdolpin + captorpil + valsartan with a total price of Rp. 3,860,500,- and is the highest cost of all antihypertensive therapy regimens.

Calculation of Cost Effectiveness Ratio (CER)

The results of CER are generally described as a cost/effectiveness ratio (C/E ratio), the numerator of the ratio shows the total cost and the denominator of the ratio is the outcome variable (Andayani, 2013), which the lower the CER value, the more cost-

effective with low health care costs, it is able to provide higher therapeutic results (Dipiro, 2005).

The point on the plane where the X and Y lines meet indicates the starting point of the cost and effectiveness of the standard comparison, the point in the plane for the alternative compared to the standard, shows how much the cost difference is compared to the starting point Y and how much the effectiveness difference is compared to the starting point X. If an alternative is more expensive and more effective than the standard comparator, then the point is in quadrant I. If an alternative is cheaper and more effective, the point will be in quadrant II. If an alternative is easier and less effective, the point will be in quadrant III. If an alternative is more expensive and less effective, then the point will be in quadrant IV.

In the antihypertensive therapy regimen, based on the calculation of the CER and ICER the most cost-effective is the amodipine + captopril therapy regimen, which has the lowest CER and ICER values. The most cost-effective value intervention is seen from the lowest CER and ICER values (Philips, 2009). With a lower price and better effectiveness which is located in quadrant II.

In the antidiabetic therapy regimen, based on CER and ICER calculations, the most cost-effective regimen is metformin therapy, which is cheaper and provides better effectiveness, so it is located in quadrant II.

CLOSING

Conclusion

a. Based on cost-effectiveness analysis:
   i. In hypertensive patients, the most cost-effective therapeutic regimen is the amlodipine+captopril therapy regimen with a CER value of Rp. 317,146, - and the ICER value is Rp. -25,467,137,-.
   ii. In diabetes mellitus patients, the most cost-effective therapeutic regimen is metformin therapy with a SER value of Rp. 393,729, - and the ICER value is Rp. -13,769,278,-

b. Based on patient demographics:
   i. In hypertensive patients, based on gender, there were 23 male patients (44.6%) and 31 female patients (55.4%). Based on the length of stay, there were 17 people (30.4%) with less than 4 days and a greater than 5 days of hospitalization for 39 people (69.6%). Based on antihypertensive therapy, monotherapy was used in 31 people (55.4%) and combination therapy in 25 people (44.6%). Based on the age group, the most were at the age of 51-60 years as many as 19m people (33.9%).
   ii. In diabetes mellitus patients, based on gender, there were 20 male patients (55.6%) and 16 female patients (44.4%). Based on the length of hospitalization for less than 4 days, there were 8 people (22.2%) and the long hospitalization for more than 5 days was 28 people (77.8%). Based on antidiabetic therapy, monoitherapy was used in 29 people (80.6%) and

combination therapy in 7 people (19.4%). Based on the age group, 18 people (50%) were at the age of 51-60 years.

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