

# DRUG UTILIZATION PATTERN AND COST ESTIMATES OF ANTI-HYPERTENSIVE DRUGS IN PHARMACIES UNDER THE NATIONAL HEALTH INSURANCE PROGRAM

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## ABSTRACT

**Background:** National health insurance facilitating patient with hypertension to obtain anti-hypertensive drug at the pharmacy. The drug need plan done to guarantee the availability and quality of anti-hypertension drug at low price. The drug utilization pattern and cost estimate are important elements to calculate the drug need plan in the pharmacy. This study aimed to examine the drug utilization pattern and cost estimates of anti-hypertensive drugs in pharmacies under the national health insurance program.

**Subjects and Method:** This was descriptive study conducted at 12 pharmacies with national health insurance in Indonesia. The theme of this study was drug utilization pattern and cost estimates of anti-hypertensive drugs in pharmacies under the national health insurance program. The data were obtained from the secondary document of drug cost. Cost analysis was based on Ministry of Health, 2018. Drug utilization was estimated by the daily defined doses (DDD). The drug cost utilization was 90%. It was obtained from the number of drug multiplied by the purchase price and divided by the use of drug per DDD. The data was analyzed accordingly.

**Results:** The most commonly used hypertension drugs were amlodipine (38.9%), candesartan (13.6%), and ramipril (11%). Nine pharmacies had a drug need plan and 3 pharmacies did not have. Pharmacies with drug need plan had the highest drug cost per DDD of Rp 6,204 and the lowest drug cost per DDD of Rp 415. The average drug cost was Rp 2,453. Pharmacies without drug need plan had an average cost of Rp 826. The highest drug cost per DDD was Rp 1,171 and the lowest drug cost was Rp 196. There was no association between drug cost per DDD and drug need plan.

**Conclusion:** The most commonly used anti-hypertensive drugs were amlodipine, candesartan, and ramipril. There is no association between drug costs per DDD and drug need plan.

**Keywords:** hypertension, preparation of drug needs, drug cost, pharmacy

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## BACKGROUND

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Back Referral Program (BRP) is one of the programs to improve the quality as well as to facilitate healthcare access and drugs delivery to participants who suffer from chronic diseases. Among others is stabilized hypertension which still needs long term treatment or nursing care (BPJS, 2015). In BRP service, pharmacies as the primary healthcare facility should ensure the availability of drugs that is written down in Drug Need Plan which prioritizes the availability of essential drugs

that may improve access and rationality of drug utilization.

Based on Health Minister's Regulation No. 5/2019 about Drug Planning and Procurement Based on Electronic Catalogue, every governmental and private institution that collaborates with BPJS is required to submit Drug Need Plan to the Minister. The data of Directorate General of Pharmacy and Medical Devices reveals that in 2017 and 2018 there is a decrease of healthcare facilities, both governmental and private, that

do not submit the report. In 2017 there are 1387 or 46.23% of all working unit and in 2018 there are 884 or 28.31% of all governmental and private working units. The occurrence of healthcare facilities that do not submit the Drug Need Plan potentially generates out of stock and excessive stock of certain drugs and set off loss in pharmacy industry (Wijaya, 2018).

The process of drug need planning is initiated with drug selection stage to determine drugs that are actually needed in accordance with diseases pattern. The basis of drug selection is conducting evaluation of drug utilization that aims to ensure that the drugs are utilized appropriately, safely, and effectively to improve medication therapy and rational drug utilization.

The method used in conducting utilization evaluation is Anatomical Therapeutic Chemical (ATC)/Defined Daily Dose (DDD). It is a classification and measurement system of drugs utilization which is becoming one of the main concern in the development of drug utilization study. Drug utilization evaluation is easily conducted by using ATC/DDD method (WHO, 2003). Drug Utilization 90% (DU 90%) method is a method that indicates drug classification which belongs to 90% utilization segment that is often used along with ATC/DDD method. Assessment toward drugs that are classified in 90% segment is needed to emphasize the drug segment in terms of evaluation, utilization control and drug procurement planning (Mahmudah et al., 2016)

The study aims to discover the utilization pattern of antihypertension and examine the correlation between Drug Need Planning formulation and hypertension drug cost based on its utilization.

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## SUBJECTS AND METHOD

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### 1. Study Design

This was a descriptive study by using cross sectional design, with retrospective data collection. Data collection was obtained from secondary data in the Analysis of BRP Drug Cost in BRP Pharmacies conducted by Health Ministry in 2019.

### 2. Analysis Data

The analyzed data were purchasing and utilization data of hypertension drugs in 12 BRP pharmacies at Jakarta Special Capital Region (5 pharmacies), West Java (3 pharmacies), Central Java (2 pharmacies), East Java (1 pharmacy), Banten (1 pharmacy). The method of the study was by calculating the quantity of drug utilization by using defined daily doses (DDD) calculation method.

Cost measurement was obtained by multiplying the quantity of drugs with the purchasing cost, divided by drugs utilization per DDD. Drug utilization data was then put in order based on the DDD rank started from the biggest. Afterward, items of drugs that contributed to the 90% of drug utilization segment (DU) were identified and the cost per DDD in DU 90% was calculated. Data analysis was conducted by testing the difference of drug cost average per DDD between pharmacies that prepared and did not prepare drug need plan.

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## RESULTS

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Based on table 1, there are 3 (three) non-network pharmacies that have conducted e-purchasing and 9 (nine) network pharmacies that have not yet conducted e-purchasing.

Table 1. Pharmacies Profile

No	Pharmacy Working Area	Type of Pharmacy	E-purchasing
1	West Java	Network	No
2	West Java	Network	No
3	Central Java	Non Network	Yes
4	Central Java	Network	No
5	West Java	Non Network	Yes
6	Jakarta Special Region	Network	No
7	Jakarta Special Region	Network	No
8	Jakarta Special Region	Network	No
9	Jakarta Special Region	Network	No
10	Jakarta Special Region	Network	No
11	East Java	Non Network	Yes
12	Banten	Network	No

Table 2. The Pattern of Hypertension Drug Utilization in 12 BRP Pharmacies

No	Drugs' Name	DDD/1000 patients	%	DU segment	Drug Purchasing Cost (%)
1	Amlodipin	321,966	39.73		9.66
2	Candesartan	113,082	13.95		19.00
3	Ramipril	91,045	11.23		1.01
4	Bisoprolol	45,585	5.62		8.63
5	Irbesartan	44,616	5.51		18.59
6	Clonidine	43,016	5.31		0.32
7	Telmisartan	42,878	5.29		9.16
8	Valsartan	34,728	4.29	90%	9.21
9	Nifedipine	31,180	3.85		13.65
10	Lisinopril	12,228	1.51		1.45
11	Atenolol	7,308	0.90		0.31
12	Imidapril	6,431	0.79		2.58
13	Captopril	5,799	0.72	10%	0.23
14	Diltiazem	5,489	0.68		4.82
15	Hidroklortiazid	4,759	0.59		0.07
16	Verapamil	317	0.04		0.04
17	Propranolol	8	0.00		0.00

Based on table 2. There are 8 items of drugs included in 90% segment. The most used is amlodipine (39.73%) and the least used is valsartan (4.29%). And there are 9 items of drugs included in 10% segment. The most used is nifedipine (3.85%) and the least used is propranolol (0.00%). The highest pur-

chasing cost in DU 90% is candesartan (19%) and in DU 10% is nifedipin (13.65%). The lowest purchasing cost in DU 90% is clonidine (0.32%) and in DU 10% is propranolon (0.00%).

Table 3. Distribution of Pharmacies that formulate Drug Need Plan and Drug Cost/DDD DU 90% dan 10%

No. Pharmacy	Formulate Drug Need Plan	Items of Drugs DU 90%	Items of Drugs DU 10%	Drug Cost/DDD DU 90% (Rp)	Drug cost/DDD DU 10% (Rp)	Total of Drug Cost/DDD
1	Yes	4	6	1,450	17,250	18,700
2	Yes	3	8	942	6,398	7,340
3	Yes	3	6	5,018	35,777	40,795
4	Yes	3	6	3,586	19,519	23,105
5	Yes	7	6	416	270	686
6	Yes	9	8	1,706	3,861	5,567
7	Yes	5	10	6,204	19,910	26,114
8	No	6	5	196	138	334
9	No	6	9	1,111	4,717	5,828
10	Yes	6	8	597	7,381	7,978
11	Yes	6	8	2,165	5,552	7,717
12	No	4	10	1,171	20,118	21,289
<b>Mean</b>		5	8	2,047	11,741	13,750
<b>Median</b>		5-5	8	1,310	6,889	7,850
<b>SD</b>		1.85	1.67	1,907	10,740	12,250
<b>Range</b>		3-9	6-10	196-6.204	138-35.777	334-40.795

Based on table 3 there are 3 pharmacies that do not prepare Drug Need Plan. The biggest drug cost per DDD DU 90% is Rp 6,204,- the smallest is Rp 196,-. The biggest drug cost per DDD DU 10% is Rp 35,777,- and the smallest is Rp 138,-. There are more items of drug included in DU 10% than in 90% segment. Types of drug included in DU 90% between 3-9 drugs and in 10% segment between 6-10. The average drug cost/DDD DU 90% is smaller than drug cost/DDD DU 10% which is DU 90% segment which are Rp 2,047,- and Rp 11,741,-. A test was conducted between total drug cost/DDD with Drug Need Plan preparation by using non parametric statistic method with man-whitney test and it generated  $p > 0.062$ , it means that there was no difference in average of total drug cost/DDD with Drug Need Plan preparation.

## DISCUSSION

### a. Utilization pattern of hypertension drug

Drug utilization pattern is obtained by conducting Drug Utilization Evaluation (DUE). Drug Utilization Evaluation aims to discover

the drug utilization in quantity and quality, identify problems related to drug utilization, and determine intervention for solving the problem of drug utilization and assessment on the impact of drug utilization intervention

DUE is obtained from monthly utilization data for certain range of time (for example drug utilization in the past year). The result of DUE can be utilized by health-care facilities as well as regional and national level as input in formulating policy.

DUE is obtained by using ATC/DDD analysis method which recommended by WHO. It is a system of classification and drug measurement unit in structural group based on active substance in accordance with the organ/system where it works, the purpose of the therapy, pharmacology and chemistry nature of the drug. ATC/DDD analysis method may represent the quantity and quality of drug utilization in healthcare facilities.

The quantity of drug utilization is assessed by using DDD which is obtained by calculating the total of antihypertension use divided by DDD definitive value, determined by WHO based on each antihypertension. For

the utilization data of outpatient or community drug it uses a calculation of DDD per 1,000 patients which is the total of DDD is divide by the number of patients and is multiplied by 1,000. DDD per 1,000 outpatients indicates the quantity of drugs being used per 1,000 patients.

The quality of drug utilization is assessed by analyzing the number of drug items used as many as 90% (DU 90%) from the total utilization and compared with the number of drug item used as many as the rest 10% (DU 10%). The selection toward the drugs that come into the 90% segment of utilization is needed to emphasize the drug segment in term of evaluation, utilization control and drug utilization planning.

From the study it obtained result that can be seen in table 2, which indicates that amlodipine is the frequently used type of drug that is as many as 39.7%. It is in line with a study conducted (sedayu 2015) in DR.M Djamil Padang Central Hospital in 2013, in which amlodipin is the most used antihypertension drug compared to HCT as well as Captopril. Amlodipin is antihypertension that belongs to calcium antagonist group which functions as monotherapy or is either combined with drugs of other group such as diuretics, ACE-inhibitor, ARA II or beta blocker in hypertension management. Amlodipin is also one of first stage antihypertension since JNC IV and WHO-ISH 1989 in addition to diuretics which is JNC VII recommendation as the first stage antihypertension drug. Amlodipin holds the same mechanism with calcium antagonist from other dihydropyridine group which is relaxing the arteriole of blood vessel. Amlodipin is vasculoselective in nature, holds relatively low oral bioavailability, and slow absorption that prevent blood pressure from dropping in a sudden. Amlodipin is also drug which is advantageous to overcome emergency hypertension since the initial

dosage is 10mg, it may lower down the blood pressure in 10 minutes (Nafrialdi, 2008).

### **b. Drug Cost per DDD**

Drug utilization study is defined as the study of prescription distribution and drug utilization in the community by special emphasis on the generated medical, social and economical consequence. Calculation of pharmacoeconomy cost may be used to discover economic impact of inappropriate prescription and to measure the cost effectiveness of various therapeutic interventions (Sacristan, 1994).

The occurrence of comparisons of drug utilization in different places is beneficial to discover the existence of substantial differences that will guide to conduct further evaluation if substantial differences are found, which in the end will lead to problem identification and system improvement of drug utilization (Bergman et al., 2014)

In table 3, the average drug cost per DDD and types of drugs included in DU 90% segment is smaller than the drug cost per DDD and types of drugs included in DU 10% segment. It indicates that in the 12 pharmacies there are more utilization of drug and cost in DU 10%. Technical Guidelines for Evaluation of Drug Utilization in Healthcare Facilities (Kemenkes, 2017) states that drug included in DU 10% segment means it is used in small volume therefore it is not a priority to be procured except the drug is an emergency drug such as antidote.

In table 4 about distribution of pharmacies that prepared Drug Need Plan and drug cost/DDD of DU 90% 10%, there are pharmacies that do not yet prepare Drug Need Plan. Based on a study (Adiatmoko, 2012) the experienced hindrance in the drug need planning is non-optimal evaluation of drug need and the lack of pharmacy workers. In addition, table 4, presents  $p = 1$ , it means there is no difference of cost proportion between those that prepare and do not

prepare Drug Need Plan. Based on a study (Wijaya, 2018) healthcare facilities that do not submit Drug Need Plan still can make purchasing for drugs in e catalogue with the price according to e catalogue.

Based on the Health Minister's Regulation No, 48/2013 concerning the Implementation Guidelines of Drug Procurement by Using E-Purchasing Procedure based on E-Catalogue, the implementation of electronic procurement aims to improve effectiveness and efficiency in the management of goods and service procurement process. Table 1 presents that network pharmacies do not conduct e-purchasing. The result of the study is in line with a study conducted by (Ekasari, 2018) in which BRP pharmacies which are included in network pharmacies, in the drug management process do not use e-purchasing because it is still hindered by utilization permit. The result of a study conducted by Health Research and Development (Maryani et al., 2019) reveals that pharmacies face a lot of hindrances in conducting drug order by using e-purchasing, therefore pharmacies conventionally conduct order.

The limitations of the study are that the researcher did not make in – depth interviews with study subjects to discover factors that become hindrances in formulating Drug Need Plan nor the analysis of prescription pattern by doctors in the service for BRP patients. The small number of subjects of the study generates the analysis result between Drug Need Plan and the total cost per DDD does not indicate cost difference.

The most used hypertension drug is amlodipine, candesartan, and ramipril. In order to make national drug purchasing is fulfilled, it is necessary to implement disincentive for pharmacies that do not prepare their Drug Need Plan and the implementation of DUE in healthcare facilities can be conducted periodically and continually so

that healthcare facilities can use DUE as the basis of plan for the upcoming year and can minimize the drugs that come into the 10% segment.

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