

THE AVAILABILITY OF ANTIHYPERTENSIVE DRUG IN ERA OF NHI: A STUDY IN THE PRIMARY HEALTH CARE CENTRE JAKARTA-INDONESIA

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ABSTRACT

Objective: The study was carried out to observe the impact of NHI to availability, usage, stock of antihypertensive drug enrolled in a national formulary in one of the primary health care centre in Jakarta.

Methods: A longitudinal time series design was performed retrospectively to analyse the availability, usage, and stock of antihypertensive drug. The data period was from January 2013 (1 y before NHI) to December 2015 (2 y after NHI). The Independent-Samples T or Mann-Whitney test was conducted to compare these parameters before and after NHI.

Results: We found amlodipine 5 mg and 10 mg tablet, hydrochlorothiazide 25 mg tablet, captopril 12.5 mg and 25 mg tablet, nifedipine 10 mg tablet were available in Primary Health Care. These drug were generic and tablet dosage form. The most common drug used was captopril and Nifedipine, respectively. The highest availability was diuretic hydrochlorothiazide. The availability of amlodipine 5 mg and 10 mg tablet, captopril 12.5 mg tablet increased significantly ($P < 0.05$) after NHI was implemented. Moreover, hydrochlorothiazide decreased ($P < 0.05$) as well. The usage of amlodipine and hydrochlorothiazide risen ($P < 0.05$) but the nifedipine decreased ($P < 0.05$) after NHI. All stock of antihypertensive except captopril 25 mg different significantly ($P < 0.05$) after the application of NHI.

Conclusion: This study highlights the implementation of NHI impacted the availability, usage, and stock of antihypertensive drug enrolled in national formulary.

Keywords: NHI, Drug availability, Drug used, Drug stock, Antihypertensive drug

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INTRODUCTION

The Indonesian government implemented National Health Insurance (NHI) known as *Jaminan Kesehatan Nasional* (JKN) on 1st January 2014. The aim of its implementation was to increase access and improve the quality of healthcare for Indonesian citizen [1]. In era of NHI in Indonesia, health policy has reformed, mainly the payment method, medicine utilization policy, and procurement.

The government changed the payment method from fee for service (FFS) to the Indonesian Case Base Group (Ina-CBGs) payment method. Ina-CBG was system for classifying patient care adopted by Drug Related Group (DRG). All treatment services, including medicines, were covered by insurance with FFS payment method. However, the payment method of Ina-CBGs limited covered of treatment cost regarding on package rate of diagnose [2]. The package rate of Ina-CBGs compose the cost of doctor, administration, medical examination, laboratory tests, and medicines. The package rate for one patient's different based on type and place of health care services [3].

The guideline for utilization of medicine was different before and after NHI. Before the implementation of NHI, the public health care center requested the drug based on plafond list of price drug known as *Daftar Plafon Harga Obat* (DPHO) [4]. Meanwhile, in era of NHI the public health care center should demand appropriate drug based on National Formulary [5]. Therefore, the demand of National Formulary medicine will be increase.

National Formulary contains the list of drug has created by government and improved continuously, mainly the prices of drug. The prices of National Formulary medicines are regulated under Presidential Decree No. 111 of 2013 [6]. The list of medicine in National Formulary were generic. The different finding in DPHO, there were available branded and generic drug. In Mexico, after the implementation of universal health coverage (UHC), the usage of generic increased and 17.3% patients did not get the medicine due to the limitation of drug availability [7]. Another study in Sudan,

medicine usage increased significantly after the implementation of UHC [8] and the similar result found in Korea [9].

Another health policy reformed after NHI implementation was the procurement. In era of NHI, the procurement of National Formulary medicine is limited by e-catalogue [10]. All public health care centers access e-catalogue online through an online link (<https://e-katalog.lkpp.go.id/>). Meanwhile, there is no limitation access to procure the medicine before NHI.

Hypertension is one of chronic disease require long treatment and medicine. The availability of antihypertensive is one of parameter to support the success of treatment. National health survey (2014) in Indonesia showed the prevalence of hypertension was 25.8%. This percentage increased compare to the previous. The 20% people in metropolitan city in Indonesia have diagnosed hypertension [11].

There are 24 antihypertensive drugs enrolled in National Formulary [5]. These drugs are divided some dosage forms, such as tablet, film coated tablet, extended coated tablet, injection, infusion. The list of drug in National Formulary generally consisted the drug choice for hypertension. The first choice antihypertensive by JNC 8 and European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC) the guideline for hypertension were angiotensin-converting enzyme (ACEI), such as captopril, Angiotensin receptor blocker (ARB) as valsartan, Ca channel blocker (CCB) as amlodipine and nifedipine, and diuretic hydrochlorothiazide [12, 13].

The health care facilities in Indonesia are divided to the first health care centre, such as primary health care and secondary health care. All member of NHI should visit firstly to primary health care to heal the ailment. Furthermore, the disease was not improved in primary health care; the patients refer to higher health care facilities. The patients are not allowed directly to secondary health care centre. After NHI was implemented, the number of patients visit to the primary health care center increase significantly. In addition, the research on impact of NHI in primary health care sites of Indonesia

are limited. Therefore this study was carried out to analyse the impact of NHI to the availability, usage, and stock of antihypertensive drug in primary health care centre in metropolitan city in Jakarta, Indonesia.

MATERIALS AND METHODS

Materials

The planning drug supply book, the report of drug used and drug demand, drug stock card, drug demand and supply book, DPHO 2011, and National Formulary were the data source in this study.

Study design

The availability of antihypertensive drug, drug used, and stock of drug was observed by longitudinal time series design study. The period of data was followed retrospectively was 2013 (1 y before NHI) to 2015 (2 y after NHI).

Inclusion and exclusion criteria

All antihypertensive drug found in National Formulary were included in this study. The uncompleted data of availability, usage, and stock of antihypertensive drug during data period (January 2013 to December 2015) were excluded.

Study indicators

Each indicator was analyzed based on the period before and after the implementation of the NHI. These indicators are as follows: the percentage drug used per availability of antihypertensive drug, the availability antihypertensive drug, the usage of antihypertensive drug, and the stock of antihypertensive drug.

Analysis of data

The statistical analysis was used to understand the different all parameters between before and after NHI. The data normally distributed was analysed by Independent-Samples T test. Mann-Whitney test was used to analyse the non-normal distribution data.

RESULTS

The percentage of drug used (U) and availability (A)

Table 1 showed that the highest availability antihypertensive drug in primary health care centre in Jakarta was hydrochlorothiazide tablet (tab) 25 mg and was followed nifedipine tab 10 mg, captopril tab 12.5 mg respectively. Meanwhile, the most frequent antihypertensive drug used (%U/A) was not the highest available. Captopril and nifedipine 10 mg were the most frequent used. The percentage of drug used and the availability increased after NHI from 23.12% to 31.14%.

Table 1: The average of the availability (A) and drug used (U) of antihypertensive drug

| Kind of medicine | 1 y before NHI (strip/blister) | | | 1 y after NHI (strip/blister) | | | 2 y after NHI (strip/blister) | | |
|-----------------------|--------------------------------|---------|-------|-------------------------------|---------|-------|-------------------------------|---------|-------|
| | A | U | % U/A | A | U | % U/A | A | U | % U/A |
| HCT tab 25 mg | 4154.42 | 144.58 | 3 | 3068.75 | 292.33 | 10 | 1855.5 | 251.67 | 14 |
| Nifedipine tab 10 mg | 2620.58 | 606.83 | 23 | 3210.5 | 522.00 | 16 | 1667.25 | 202.92 | 12 |
| Captopril tab 12.5 mg | 2447.42 | 1179.25 | 48 | 3068.75 | 1147.00 | 37 | 3560.83 | 1167.25 | 33 |
| Captopril tab 25 mg | 2345.00 | 728.92 | 31 | 3497.42 | 1046.42 | 30 | 1540.17 | 543.67 | 35 |
| Amlodipine tab 5 mg | 216.00 | 64.83 | 30 | 566.25 | 262.42 | 46 | 1327.25 | 892.42 | 67 |
| Amlodipine tab 10 mg | | | | | | | 478.67 | 189.92 | 40 |
| Total | 11783.42 | 2724.41 | 23.12 | 13411.67 | 3270.17 | 24.38 | 10429.67 | 3247.83 | 31.1 |

The statistical analysis

Table 2 showed the result of statistical analysis of the different availability, usage, and stock of antihypertensive drug between before and after NHI in the primary health care centre site. The availability, usage and the stock of amlodipine 5 mg tab increased significantly ($P < 0.05$). Meanwhile, there was no prescribed amlodipine 10 mg tab before NHI. The availability and stock of hydrochlorothiazide decreased ($P < 0.05$) even though this medicine

prescribed wisely after NHI. The increased of this medicine was not proportional with the availability and stock. Therefore, the availability and stock of hydrochlorothiazide were dropped after NHI. The availability and stock of captopril 12.5 mg raised significantly ($P < 0.05$). The different finding with the usage of this medicine was not different between before and after NHI. Captopril 25 mg tab was not different statistically related its availability, usage and stock ($P > 0.05$). Nifedipine tab was prescribed not frequent after NHI. Therefore the stock of increased significantly ($P < 0.05$).

Table 2: The statistical analysis availability, usage, and stock of antihypertensive drug

| Indicators | Mean±SD Before NHI | Mean±SD After NHI | Sig (2 Tailed) |
|-------------------------------|--------------------|-------------------|----------------|
| Amlodipine 5 mg tab | | | |
| The availability | 216±91.781 | 946.75±576.057 | 0.000** |
| The usage | 64.83±54.891 | 577.42±424.586 | 0.000** |
| The stock | 151.58±104.531 | 406.83±249.090 | 0.002** |
| Amlodipine 10 mg tab | | | |
| The availability | 0.00±0.00 | 239.33±333.992 | 0.011** |
| The usage | 0.00±0.00 | 94.96±119.321 | 0.011** |
| The stock | 0.00±0.00 | 144.79±240.606 | 0.027** |
| Hydrochlorothiazide 25 mg tab | | | |
| The availability | 4154.42±717.772 | 2462.13±1091.812 | 0.000** |
| The usage | 144.58±56.784 | 272.00±136.315 | 0.002** |
| The stock | 3843.17±934.311 | 2226.46±1054.634 | 0.000** |
| Captopril 12.5 mg tab | | | |
| The availability | 2447.42±776.251 | 3529.13±1107.737 | 0.005* |
| The usage | 1179.25±222.796 | 1157.13±337.424 | 0.402** |
| The stock | 1461.50±621.854 | 2360.75±1063.083 | 0.011* |
| Captopril 25 mg tab | | | |
| The availability | 2345±568.659 | 2375.33±1334.003 | 0.638** |
| The usage | 728.92±227.950 | 795.04±355.189 | 0.840** |
| The stock | 1616.08±628.445 | 1579.04±1107.668 | 0.568** |
| Nifedipine 10 mg tab | | | |
| The availability | 1787.25±426.446 | 1922.50±687.280 | 0.856** |
| The usage | 606.83±255.727 | 362.46±242.887 | 0.008* |
| The stock | 1181.92±409.925 | 1560±523.245 | 0.036* |

Before: the period before was January to December 2013. After: the period after was January 2014 to December 2015. *Independent-Samples T test and **Mann-Whitney test. ($P = 95\%$)

The impact of NHI to the availability, usage, and stock of antihypertensive drug hydrochlorothiazide tab 25 mg

The availability and stock of hydrochlorothiazide in the end of 1 y before NHI tend to be decrease until the first quarter year the implementation of NHI (fig. 1). The different result was found in the second quarter in the first-year implementation of NHI, the availability increased significantly until September 2014 and tend to be decrease in the lowest availability. Furthermore, the usage of this drug slightly increased after NHI implementation because the number of patients visit the primary health care centre increased as

well. The statistical analysis showed the availability and stock of drug decreased significantly ($P < 0.05$).

Nifedipine tab 15 mg

Nifedipine tab 15 mg was the second-highest available antihypertensive drug in the primary health care centre in Jakarta. Fig. 2 showed the available and stock of nifedipine rise significantly in the first semester NHI implemented and then fluctuated decrease and became stable in the second year of NHI. Furthermore, the usage of this tablet was not different between before and 1 y after NHI but slightly decreased after NHI.

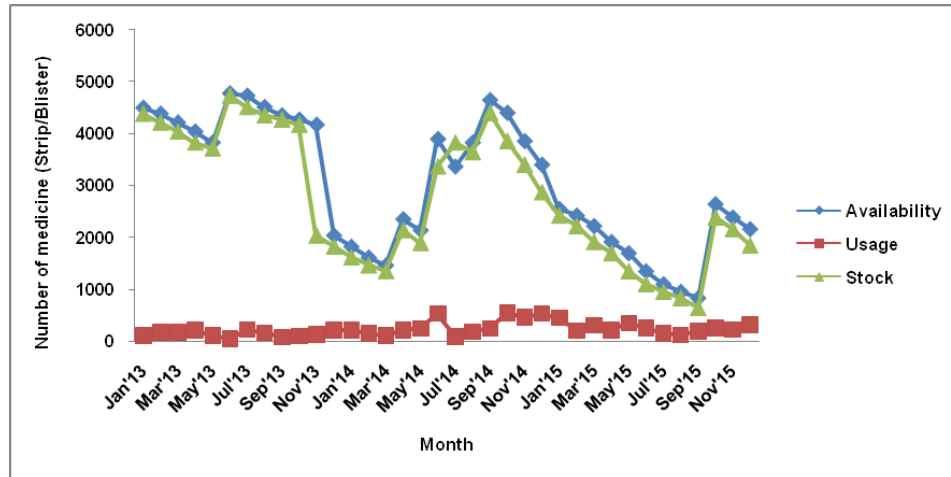


Fig. 1: Trend of the availability, usage, stock of hydrochlorothiazide tab 25 mg

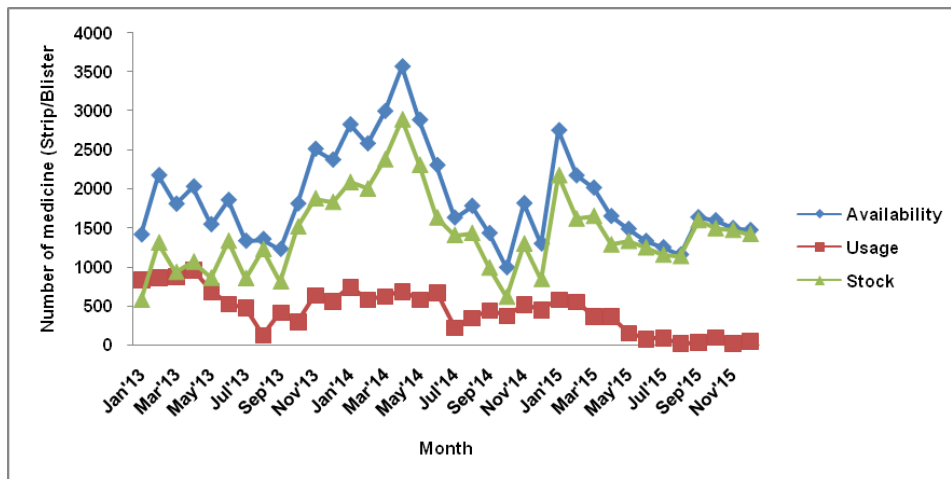


Fig. 2: Trend of the availability, usage, stock of nifedipine tab 10 mg

Captopril tab 12.5 mg

Captopril is one of the first choices drugs to treat the hypertension. This drug also available in primary health care. Its availability found increasing after NHI even fluctuated. The frequency of prescribe this drug was not different before and after NHI (fig. 3).

Captopril tab 25 mg

Fig. 4 showed that the usage of captopril tab 25 mg increased after NHI implemented. The availability decreased in the first quarter 1 y after NHI and became fluctuated and tend to be decreased in the second year of NHI. the trend of the stock of drug was similar with the availability.

Amlodipine tab 5 mg

Fig. 5 described that the availability and stock of amlodipine tab 5 increased significantly after NHI both first and second year NHI implementation. The drug used found grew up significantly after NHI. The important finding issue was the usage of amlodipine similar with the availability in the September 2014. Therefore, the stock of drug was zero.

Amlodipine tab 10 mg

Amlodipine tab 10 mg also available in the first health care in metropolitan city Jakarta. This drug was not found before and the first year NHI because there is limitation of availability of this drug. The finding availability and stock of amlodipine tab 10 mg tend to be increased each month.

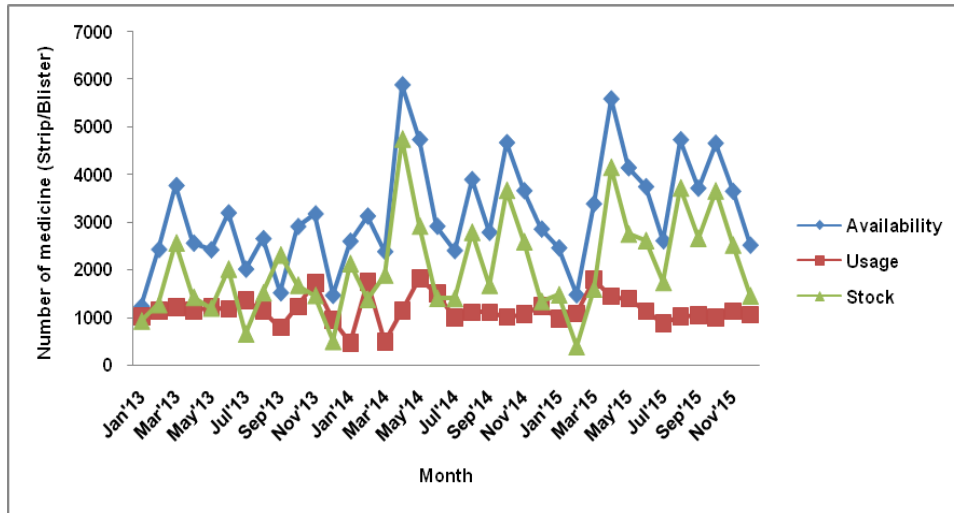


Fig. 3: Trend of the availability, usage, stock of captopril tab 12.5 mg

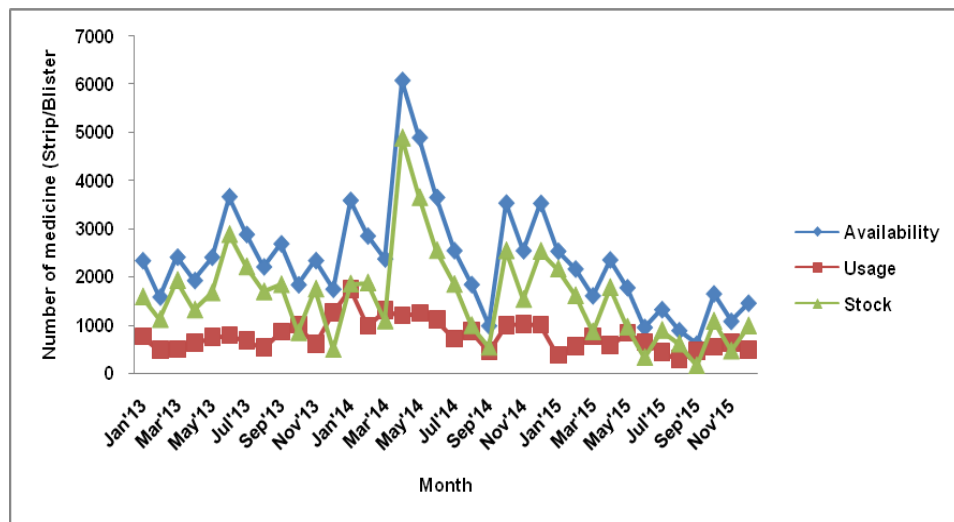


Fig. 4: The availability, drug used, and stock of drug of captopril tab 25 mg

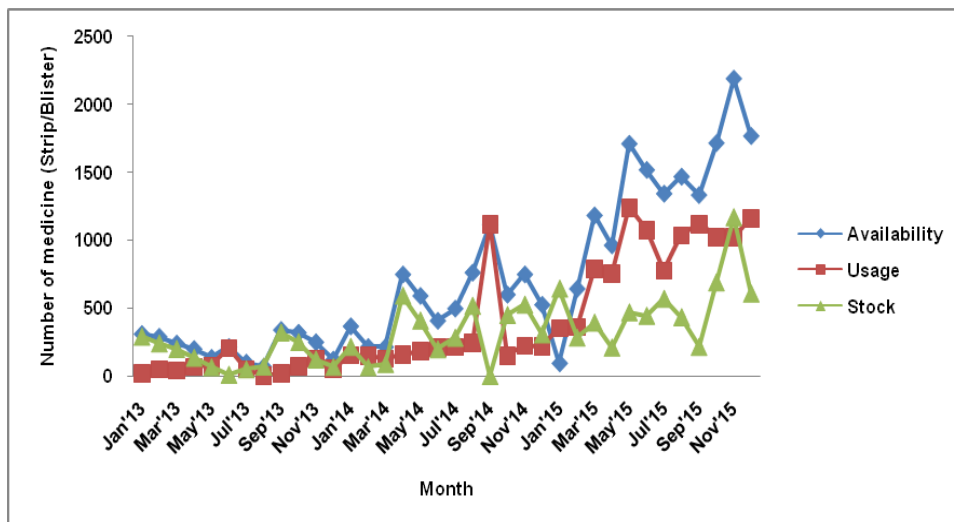


Fig. 5. Trend of the availability, usage, and stock of amlodipine tab 5 mg

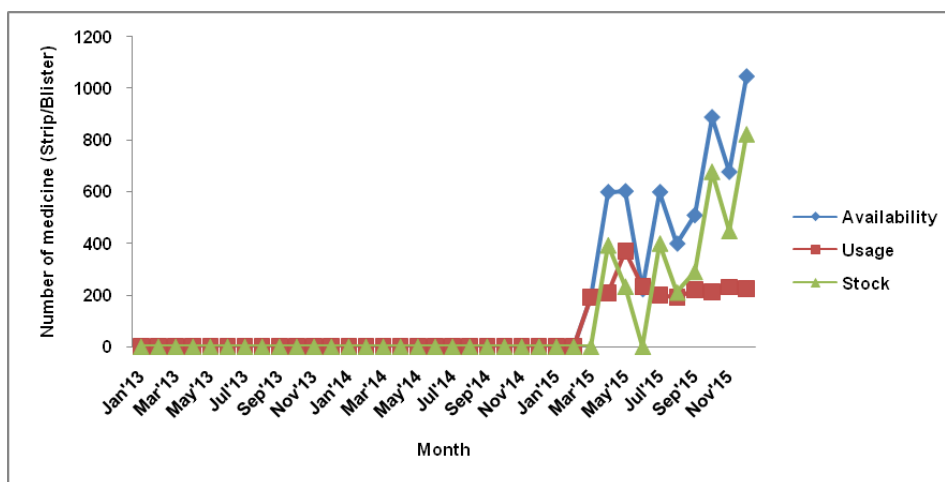


Fig. 6: Trend of the availability, usage, and stock of amlodipine tab 10 mg

DISCUSSION

There are 24 antihypertensive drugs enrolled in National Formulary [5]. These drugs are divided some dosage forms, such as tablet, film coated tablet, extended coated tablet, injection, infusion. In this study, we found 6 (25%) kinds of antihypertensive drug available in National Formulary, such as amlodipine tab 5 mg and 10 mg, hydrochlorothiazide tab 25 mg, captopril tab 12.5 mg and 25 mg, nifedipine tab 10 mg. Furthermore, during period of study, antihypertensive medicine was found entirely generic and tablet dosage form. One of the reason was the rule of the government. The government (The Ministry of Health) asked the public health care centre used the generic drug [14]. Therefore, the primary health care centre as public health care prescribed antihypertensive drug mostly generic. In African region, 68% patients in primary health care centers were prescribed generic medicine [15]. WHO recommended the generic medicine 100% in the health care center. Unfortunately, the generic medicine was prescribed very low in private than public healthcare centers [16, 17].

In era of NHI, The primary health care is the first place for the patient who use public insurance (NHI) should visit. Patients who had a serious health problem will refer to hospital that have better facilities. Therefore, only the selected drug was available in this place, mainly the first choice for hypertension [12]. All antihypertensive was found in this study were included the first choice for hypertension. The first choice antihypertensive by JNC 8 [12] and European Society of Hypertension (ESH) and the European Society of Cardiology (ESC) [13] were angiotensin converting enzyme (ACEI), such as captopril, Ca channel blocker (CCB) as amlodipine and nifedipine, and diuretic hydrochlorothiazide. However, Angiotensin Receptor Blocker is the first choice for hypertension too; this medicine was not available in primary health care centre.

The availability of drug higher than the drug used, with estimated only 30% drug used every year. The stock of drug in the end of the month became availability for the first next month. After NHI, the percentage drug used and availability increased due to the number of patients visit increased as well.

The demand of antihypertensive drug depend on the trend drug used. For example, hydrochlorothiazide was the highest available drug 1 y before NHI. Unfortunately, the drug used less. Therefore, the percentage drug used and availability became down. The demand of this drug became lower in the first year of NHI.

The captopril and amlodipine were frequently prescribed due to the patients prefer to use it. The most frequency of antihypertensive drug used was captopril 12.5 mg and 25 mg and Nifedipine tab 10 mg. These drugs were very popular among other antihypertensive drugs. One study in Spanish found that there is no different efficacy, side effect, and quality of life among patients using ACEIs and CCB in

primary health care centre [18]. In China, the most frequency of antihypertensive used was CCB [19]. In another drug utilization study, 645 prescriptions were analyzed. A total of 697 antihypertensive drugs prescribed, of which 33.57 % were ARBs, 16.79 % ACEIs, 13.63 % were BBs and 11.91 % CCBs. About 32 % of the antihypertensives prescribed were from the essential medicine list [20]. In Jordan, ACEI were the most commonly prescribed monotherapy [21]. Jarary *et. al* (2016) also found a similar result [22]. The different finding in Eastern Ethiopia, the most frequently prescribed class of antihypertensive drugs, was diuretics [23].

The implementation of NHI also had impact to the availability, stock of drug, and the usage of antihypertensive drug predominantly in the first year of NHI implemented. For example, the availability of amlodipine 5 mg and 10 mg tablet, captopril 12.5 mg tablet increased significantly ($P < 0.05$) after NHI was implemented. It was caused these drugs were the most frequency used. Moreover, hydrochlorothiazide decreased ($P < 0.05$) as well due to the availability this drug was very high before NHI. The percentage medicine used compared the availability was very low. It was only 3%. Therefore, the demand of this drug was limited after NHI. All stock of antihypertensive except captopril 25 mg tab different significantly ($P < 0.05$) after the application of NHI. Captopril 25 mg tab was the most frequently prescribed in this study. The trend of availability, stock, and usage of this medicine was slightly increased but not different statistically. Therefore, the stock of medicine was persistent as well.

The finding medicine increased after NHI due to the number of patients who visited primary health care raised as well. The curiosity of citizen also supported the increase of drug. The government was not allowed patients to visit directly the second health care centre, such as hospital. Therefore the number of patients increased significantly in the first health care centre.

CONCLUSION

The availability and usage of amlodipine, hydrochlorothiazide, and captopril 12.5 mg tab were significantly different after NHI. The usage of amlodipine, hydrochlorothiazide increased significantly but the consumed of nifedipine decreased. All stock of hypertensive drug except captopril 25 mg tab changed significantly after NHI. This study clearly indicated NHI impacted to the availability, usage, and stock of antihypertensive drugs in the primary health care centre site in Indonesia.

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AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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