Original article

Analysis of Chronic Disease Direct Cost at Public Primary Health Cares in Indonesia

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Abstract:

Objectives: This study aims to analyze the of drug costs for patients with chronic diseases in the capitation system in public primary health cares (Public PHCs). ***Materials and Methods***: This research is a quantitative study with an observational cross-sectional approach at 16 Public PHCs. Data collection used the retrospective method. The total sample was 293 outpatients in 2016. ***Results***: The results showed that 63% of patients are female. The most patients are aged between 56-65 years (37%). The average drug cost for patients receiving more than 3 types of drugs is IDR 7,726. The biggest drug cost is patients with DM type 2 with which the average cost is IDR 7.400. And the metformin treatment is 17 (6%) patients with the cost IDR 4,500,-. Chi-square analysis shows that the quantity of drug items, type of disease and prescriptions there are have significant effect on drug cost (p-value <0.05). However, gender and age group there are no significant effect on drug cost (p-value >0.05). Drug prescriptions are an important component in managing chronic diseases patients. Prescribing costs provide important information in the sustainability of the management of chronic disease programs. ***Conclusion***: This study recommends that the *prolanis* policy in public PHCs is focused on the elderly age group patients and female group.

Keywords: Universal Health Coverage; Chronic Disease; Drug Cost; Capitation; Indonesia

Introduction:

WHO data showed that chronicle disease claims the lives of more than 35 million people, including young and middle-aged people [1]. Chronic diseases treatment becomes a global problem for health care providers. Therefore it is hoped that the patients adhere to treatment since it closely deals with health financial sources [2], [3],[4]. Patients with hypertension and type 2 diabetes mellitus in the world are increasing every year; it is estimated that by 2025 there will be 1.5 billion people suffering from hypertension. Diabetes mellitus (DM) type 2 is included in the ten non-communicable diseases, which placed at the highest ranks with the most cases happened, and it raises the highest financial costs. It is estimated that every year, there are 9.4 million people die from hypertension, and [4];[5]. DM type 2 places a substantial economic burden on patients and the health care system [6]. In the US, the costs of pre-diabetes and diabetes have increased from $ 174 billion to $ 245 billion in 2012, including direct medical costs of $ 176 billion and $ 69 billion indirect costs due to severe disability and loss of productivity [7], [8].

WHO predicts an increase in the number of people with DM type 2 in Indonesia, starting from 8.4 million in 2000 to around 21.3 million in 2030 [9]. The

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prevalence of hypertension is 25.8%, and it is the fifth leading cause of death. Data from the national health indicator survey in 2016 shows an increase in the prevalence of hypertension in people at the aged 18 years and above. The prevalence of DM in Indonesia increases from 1.1% to 2.1% [10], and it becomes the third highest cause of death in Indonesia [11]. According to the data of indonesian national health insurance system (BPJS), the cost of service for hypertension has increased steadily every year, namely 2.8 trillion IDR in 2014, 3.8 trillion IDR in 2015, and 4.2 trillion IDR in 2016. Yogyakarta Province is one area with the highest prevalence of DM type 2 patients based on doctor diagnosis in Indonesia; it is 2.6%[7].

The cost of national health insurance (JKN) participants who have high chronic diseases will threaten the sustainability of the JKN program. DM type 2 and hypertension is one of ten chronic diseases that are expensive in Indonesia. *Prolanis* is one of the programs carried out by BPJS of health to improve services quality, efficiency, and cost effectiveness. *Prolanis* is carried out by firs-rate health facilities as gatekeepers for JKN services with a focus on type 2 DM and hypertension [12]. *Prolanis's* goal is to encourage participant independence, improve participant health and satisfaction, and to control health care costs. It is important to understand the main health burden faced by the current population and medical costs, especially the cost of medicines. Also, informing future program design and developing health promotion programs can stand or reduce the burden on public health and health care costs[12]. Although the literature on the prevalence and costs associated with chronic diseases has grown rapidly in the past few years, there have been no studies in Indonesia regarding the cost of medicines in the *Prolanis* program in the national health insurance era. This study aims to analyze the utilization of drug costs for patients with chronic diseases in the capitation system in Public PHCs.

MATERIAL AND METHODS:

Research design:

This research is a quantitative study with an observational cross-sectional approach. Data collection used the retrospective method from January 2016 until December 2016, Secondary data obtained from management information systems in the form of prescriptions data. The study was approved by the Gadjah Mada Health sciences ethical committee with approval number KE/

FK/1001/EC/2017. All prescriptions outpatients in 16 public Public PHCs in Yogyakarta city, Bantul districts, Sleman districts, and Kulonprogo districts, Yogyakarta Province were included in the study based on inclusion criteria (patients in all ages with hypertension and Diabetes mellitus (DM) type 2 as the primary diagnose). Total prescriptions used were 293 of DM Type 2 and hypertension patients. The prescriptions of outpatient obtained were recorded in the data collection sheet, and then the data were tabulated in excel datasheet. Direc cost covers the drug cost , the data were classified into tables, they were type of disease; DM Type 2 and hypertension, gender, age group, and drug items.

Data analysis:

Patients' total costs of drugs were calculated by multiplying all drugs dispensed (in the prescriptions received) with the unit cost of each drug, descriptive statistics were used to explain the characteristics of the respondents (age group, type of disease,drug item. Chi-square analysis were used to observe the influence of gender, age group; drug items received on drug cost in chronic disease (*prolanis)* at public primary health cares (Public PHCs).

RESULTS:

The patient characteristics and mean direct cost of this research can be seen in table 1. Quantity of drug items and drug cost results are presented in table 2. Prescriptions and drug cost are presented in table 3.

Table 1. Patient Characteristics and Mean Direct Cost

Patient Characteristics	n (%)	Mean Drug Cost (IDR)	SD	Min-Max (IDR)	P-Value
Gender					
Male	109 (36)	5,859	5,921	4,696-7,023	0.498
Female	191(63)	5,465	6,461	4543-6387	
Age					
17-25	2 (5)	9,670	12,614	750-18,590	
26-35	7 (2)	4,786	4,018	700-10,885	
36-45	16 (5)	6,297	3,863	1,000-12,640	
46-55	64 (21)	5,207	5,616	700-39,060	
56-65	112 (37)	5,626	7,741	620-29,333	0.418
>65	92 (30)	5,702	5,034	700-22,644	
Type of disease					
Hypertension	171 (58)	4,355	4,747	3,639-5,072	
DM type 2	48 (17)	7,400	5,674	5,752-9,048	
Hypertension and DM type 2	39 (13)	7,303	3,947	6,023-8,582	0.001*

The relationship of drug cost based on patients, age group of Diabetes Mellitus and Hypertension.

*Statistically significant (p<0.05). SD: Standard deviation.

Table 2. Quantity of Drug Items and Drug Cost

Drug item	n (%)	Mean drug cost (IDR)	SD	Min-Max (IDR)	P-Value
≤3	80(27)	5,267	4,428	1,180-22,485	0.045*
>3	213(72)	7,726	5,749	1,938-39,060	

*Statistically significant (p<0.05). SD: Standard deviation

Table 3. Prescriptions and Drug Cost

Drug prescriptions	n (%)	Mean drug cost (IDR)	SD	Min-Max (IDR)	P-value
Amlodipine-glimepirid	8(3)	2,400		2,170-2,400	
Amlodipine	102(35)	930	47	700-930	
Gemfibrozil	6(2)	3,710	112	3,710-7,420	
Amlodipin-gemfibrozil	9(3)	4,410	2,422	4,410-8,350	
Amlodipin-metformin	11(4)	3,700	1,858	1,660-5430	
Captopril	22(8)	1,483	381	750-2,250	
Amlodipine-captopril-metformin	5(2)	6,670	628	4,440-6,670	
Metformin-glimepirid-amlodipin	11(4)	7,405	659	4,930-5,160	
Metformin	17(6)	4500	1,205	2,760-8,280	
Metformin-glimepirid-amlodipin-gemfibrozil	8(3)	11,465	2,105	8,640-8,870	
Captopril-metformin	7(2)	7,050	806	3,510-10,530	0.000*
HCT	6(2)	2,325	4,215	1,085-2,325	
Captopril-HCT	8(3)	4,575	599	1,835-4,,575	
Amlodipin-HCT	7(2)	3,025	306	1,785-5,505	
Captopril-glimepirid-metformin	5(2)	8,220	418	4,980-15,030	
Amlodipin-HCT-glimepirid-metformin	6(2)	8,995	659	6,015-16,035	
Metformin-glimepirid	30(10)	5,970	2,105	4,230-12,780	
Amlodipine-HCT-metformin	5(2)	7,525	1,126	4,545-11,535	
Glimepirid	6(2)	1,470	659	1470-4,500	
Metformin-gemfibrozil-amlodipin	6(2)	5,110	1,126	7,170-16,630	
Metformin-glibenclamid	8(3)	1,890	2,422	1190-7,090	
			659		

*Statistically significant (p<0.05). SD: Standard deviation

DISCUSSION:

This study aims to analyze the utilization of drug costs for patients with chronic diseases in the capitation system in public PHCs. The findings indicate that the characteristics of patients visiting public PHCs are female, namely 191 (63%) of the 56-65 age group (37%) with the highest mean cost of male patients is IDR 5,859. These study findings are in line with the previous study conducted in the US, Indonesia, Michigan,and India[13],[14],[15],[16],. Female tend to suffer chronic disease than male because they have estrogen hormone [17], [18]. However, the prescription mean of male is 14% -26% more expensive than female. Dealing with the treatment pattern, Male are prescribed with the different drugs especially on Cardiovascular (CVD) [19].

DM type 2 is a society health burden which is always increasing and have high prevalence in elderly patients. The cost treatment of chronic disease in elderly is 14% increasing during the last five years. Most of the cost are related to DM type 2 and comorbidities. The Chi-square analysis shows that the gender and age group have no significant effect on drug cost (p-value >0.05) of *prolanis*. These study findings are not in line with the previous study conducted in German, It shows that gender influences drug cost in chronic disease [19].

The data of the quantity of drug items and drug cost show that *prolanis* given ≥ 3 with the cost IDR 7,726,-. It is in line with previous study conducted in Beirut[20] which shows that patients are prescribed more than 3 drug items. Moreover, it is also in line with WHO-determined indicators, namely the number of prescribed drug items, with the mean of drug items ≥3 (R /) per prescription [21],[22].

Our findings highlight the highest mean cost is DM type 2 + hypertension and it is followed by DM type 2 with the cost range between IDR 6,023 – 8,582 per person. This study is in line with the previous study that shows the drug cost for hypertension. The cost range is between IDR 5,833 to IDR 313,285 [15]. international diabetes federation (IDF) reports that in developed countries the cost reaches USD 1500-9000/person per year (2012). In developing countries, the cost of treatment for DM type 2 patients is around USD 50-2000 / person per year. While in Indonesia, the cost of treatment for DM type 2patients is USD 80.22 / person per year. The low cost of organizing people suffering from DM type 2 in Indonesia deals with the non-intensive management of patients [12]. The Management of DM type 2 with non-complication patients requires USD 40/patient per year. Moreover, DM type 2 patients with complications require higher costs, it is USD 800 /patient per year.

The number and percentage of every group and preparation used by the Hypertension and DM type 2 patients both for type of monotherapy treatment and combination therapy can be seen in Table 3 (result of the analysis). Hypertension patients most receiving monotherapy in calcium channel blocker (CCB) group of amlodipine tablet treatment are 102 (35%) patients with the cost IDR 930,-. These study findings are in line with the previous study conducted in China and Mexico [14, 23, 24, 25] that amlodipine is the economical therapy compared with ARB and calcium channel blockers (CCB), namely 42,8%. It is also in line with the latest guideline in hypertension treatment as stated in JNC8 guidelines (the guidelines by the Joint National Commission) recommending calcium channel blockers as well as angiotensin-converting enzyme inhibitors as first main drug. Therefore, it is widely used as the prescription pattern. Combination therapy and captopril-HCT treatment is 8 (3%) patients with the cost IDR 4,575,-. While those suffering from hypertension are given amlodipine. It is not in line with the previous study [22] stating that the patients are given sulfonylurea since it costs lower. These study findings are not in line with the previous study conducted in China reporting that combination therapy in hypertension patients is more effective than monotherapy[24.].

DM type 2 patients most receiving single preparation with metformin are 17 (6%) patients the cost IDR 4,500,-. On the other hand, the most combination of metformin-glimepiride is 30 (10%) patients with the cost IDR 5,970,-. Hypertension and DM type 2 patients most receiving metformin-glimepiride-amlodipine are 11 (4%) patients with the cost IDR 7,405,-. While the highest cost found in the combination of metformin-glimepiride-amlodipine-gemfibrozil is IDR 11,465 given to 8 (3%) patients. Chi-square analysis shows that there are have significant effect on drug cost (p-value <0.05). This study is in line with the previous study [26] shows that the treatment of DM type 2 patients using metformin & glimepiride is significantly more economical if it is used as a first combination therapy in decreasing HbA1c and FPG.

The cost of chronic disease is increasing and the number of patients also increase every year. The existence of the chronic disease management program (*prolanis*) is one of the promotive and preventive programs developed by BPJS of Health. [27, 28]. This program is specifically developed at PHC. Drug prescriptions are an important component in managing chronic diseases patients. Prescribing costs provide useful information in the ongoing management of chronic disease programs to calculate the cost and pattern of drugs prescribing in general.

This study has several limitations; it only focuses on the utility study of drug costs in major diseases. However, there is no drug analysis carried out in comorbidities that seemed to affect the drug costs. Furthermore, it does not provides analysis in hospitalization for chronic diseases and specialist outpatient facilities because the pattern of drug use in these may be more complex. Although this study is conducted only in 16 public PHCs with 293 patients, it can describe the drug cost issued by PHC in Indonesia. Incomplete data in the medical report is using interview with the officer in charge. In the *prolanis* program rules, it is given drugs for one month but the results of the study state that this is not the case and the number of *prolanis* participants is not balanced between public PHCs.

CONCLUSIONS AND RECOMMENDATIONS:

The prevalence of elderly patients with chronic disease (Hypertension and DM type 2) is continuously increasing. Furthermore, drug prescriptions are an important component in managing chronic diseases patients. Prescribing costs provide important information in the sustainability of the management of chronic disease programs.

This study recommends that *Prolanis* in PHC focuses on two groups, the elderly age group and female group.

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CONFLICT OF INTEREST:

The authors declare no conflict of interest.

AUTOR'S CONTRIBUTION

Study design and gathering: Indriyati Hadi Sulistyaningrum, Susi Ari Kristina, Ali Ghufron Mukti, Satibi

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