RESEARCH ARTICLE

Drug cost analysis of outpatients with cardiovascular disease under the national health insurance scheme

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Abstract

Background: Cardiovascular disease is one of the catastrophic diseases that absorbs the most health budgets. Reimbursement of healthcare costs from the National Health Insurance Agency is done through the case-based groups (INA-CBGs) and fee-for-service (non-INA-CBGs) methods based on e-catalogue drug prices. Drug costs are a concern. **Objective:** To evaluate drug prescription compliance to the national formulary, total drug cost and drugs cost included in the INA-CBGs package. **Method:** This observational study used retrospective prescription data from the outpatient Cardiology Clinic. A quantitative analysis was conducted for prescription compliance with formulary and drug costs. **Result:** Out of the 4,443 prescriptions, the prescription alignment with the national formulary was 98%. The difference between the total e-catalogue and the actual drug costs was IDR4,818,252 (0.9%) ($p > 0.05$). Drug costs constitute 19% of the INA-CBGs package. **Conclusion:** Drug prescribing is quite efficient with 98% compliance with the formulary and drug costs constitute 19% of the INA-CBGs package.

Introduction

Cardiovascular disease is one of the main causes of death globally, which is around 17.9 million (32%) of all deaths worldwide (WHO, 2021). The incidence of heart disease is increasing every year. About 15 out of 1000 people or 2.7 million individuals in Indonesia suffer from heart disease (MoH, 2019). Heart disease is one of the catastrophic diseases that absorbs a large portion of Indonesia's health budget, namely, IDR8.6 trillion for 12.9 million cases (MoH, 2021).

Achieving Universal Healthcare Coverage (UHC) is one of the targets of the nations of the world to achieve the 2030 SDGs. Health inequality continues to be a fundamental challenge for UHC (WHO, 2022). Insurance is one way to achieve equity in health (CMS, 2022). Indonesia launched UHC (Jaminan Kesehatan Nasional, JKN) in 2014 with a target of covering about 98% of its population by 2024. (Cheng *et al.*, 2022;

Hermansyah *et al.*, 2018). By the end of 2021, about 87% of Indonesia's population was covered by the JKN (MoH, 2021). The most common reimbursement methods used in insurance are line-item budget, global budget, per diem, case-based, fee-for-service, and capitation (WHO, 2017). JKN uses capitation for primary health care and case-based/Indonesian-Case Based Groups (INA-CBGs) for secondary health care (MoH, 2016a). For hospital outpatients, reimbursement aside from using INA-CBGs which includes the cost of drugs for acute therapy and seven days of use of chronic disease drugs (MoH, 2016b), there are claims for non-INA-CBGs (fee-for-service) with certain formulas for the chronic medication (Hermansyah *et al.*, 2020).

Expenditures for drug prescription costs are the third largest after hospital care and physician expenses (Rosso, 2022). Average total drug spending per hospital admission increased by 18.5% between 2015 and 2017

(NORC, 2019). Efficiency in drug use needs to be carried out, one of which is through adherence to clinical pathways especially to avoid unnecessary drugs that take part in the INA-CBGs package (MoH, 2016a; Ross & Dutta, 2018).

The provision of drugs under the JKN scheme based on the national formulary is with a predetermined price (e-catalogue) (MoH, 2018). Failure to meet up with this regulation due to non-compliance or inappropriate planning thereby resulting in drug shortages and the purchase of non-e-catalogue drugs at higher prices will increase hospital losses (Mendrofa & Suryawati, 2016).

This study aims to evaluate drug prescription compliance to the national formulary, analyse differences in the total actual drug costs and the total e-catalogue drug costs, and assess the cost of drugs included in the value of the INA-CBGs package for patients with cardiovascular disease.

Methods

Design

This observational study used retrospective prescriptions data of outpatients at the Cardiology clinic, Universitas Airlangga Hospital, Indonesia from January to March 2020. Collected data included the type and number of drugs, the source of the drug (national formulary or non-national formulary), and drug prices (actual prices and e-catalogue prices).

Data analysis

Data analysis was conducted using IBM SPSS version 25.0. Descriptive statistics were used to summarise the data, i.e. the percentage of drugs that complied with the National formulary, total actual drug costs, total e-catalogue drug costs, INA-CBGs drug costs, and non-INA-CBGs drug costs. An independent t-test was used to assess differences between the actual and the e-catalogue drug costs. Statistical significance was set at $p < 0.05$.

Results

Out of the 4,443 prescriptions for outpatients with cardiovascular disease, there were 125 types of drugs, with total use of 482,457 items. The five drug therapeutic classes prescribed was shown in Figure 1. Drugs prescription that complied to the National formulary was 98% as shown in Figure 2.
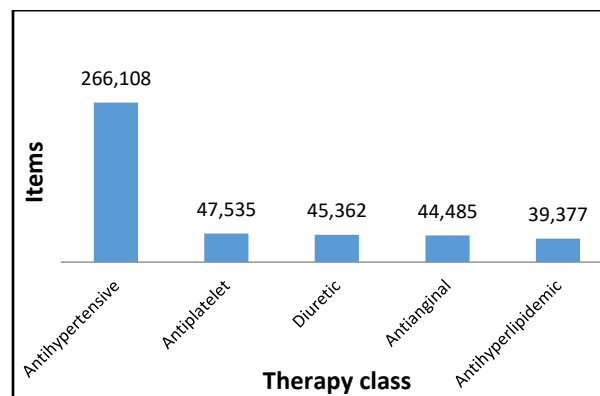

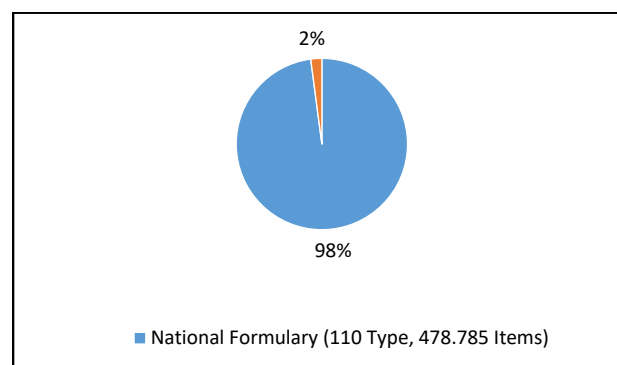**Figure 1: Top five common drugs used at the cardiology clinic by therapeutic classes**

Figure 2: Percentage of national formulary and non-national formulary drugs used by JKN outpatients at the cardiology clinic

The total three-month actual drug costs for outpatients with JKN was IDR565,267,071 (Table I), consisting of INA-CBGs package of IDR154,209,256 and non-INA-CBGs of IDR411,057,815 (Table II). The total e-catalogue drug costs was IDR560,448,818 (Table I). The difference between the total actual drug costs and the e-catalogue drug costs was IDR4,818,252 (0.9%) but it was not significantly different (*p*-value more than 0.05) as shown in Table I. The average drug cost included in the INA-CBGs claim was IDR34,708 (19%).

Table I: The difference between actual and e-catalogue drug costs

Cost	Amount (IDR)	%	Significance
Total e-catalogue drug costs	560,448,818		
Total actual drug costs	565,267,071		
Difference	-4,818,252	0.9	0.667

Table II: INA-CBGs and non-INA CBGs drug costs for JKN outpatients at the Cardiology Clinic

Drug	Total cost (IDR)	Average (IDR)	Range (IDR)
INA CBGs	154,209,256	34,708*	450 - 390,720
Non-INA CBGs	411,057,815	97,039	943 - 904,681
Total	**565,267,071**	**65,874**	**450 – 904,681**

* 19% of drug costs against total INA-CBGs packages.

Discussion

This study revealed the top five drugs used at the Cardiology Clinic i.e. antihypertensive, anti-platelet, diuretic, anti-anginal, and antihyperlipidemic drugs as shown in Figure 1. The conformity of drug prescription to formulary was 98% as shown in Figure 2. The non-national formulary drugs (2%) include symptomatic drugs such as analgesics, ambroxol, and vitamins and only one drug for cardiovascular therapy namely nebivolol.

The National formulary is an important component in developing a prescription policy for hospitals. The formulary is considered an important instrument for health organisations to encourage interprofessional efforts in promoting the rational use of drugs. A well-managed formulary will create harmony between drug prescription policies, therapy, and drug stock in pharmaceutical installations (Ciccarello *et al.*, 2021). Non-national formulary prescriptions may result in hospital losses, increase the burden of drug costs, and not get reimbursement. For such prescriptions, it is necessary to re-examine whether these drugs are needed in patient treatment. If needed, then it should be proposed to be included in the Hospital formulary and National formulary, e.g. Nebivolol. In this study, non-national formulary drug prescriptions amounted to 2%.

Inappropriate planning and procurement can lead to a shortage of e-catalogue drugs in pharmacies, resulting in non-e-catalogue drug procurement. These will also add to the hospital's losses because drug costs are only reimbursed for e-catalogue drugs. There were 18,307 drug items (5%) whose purchase prices were above the e-catalogue prices due to regular purchases at higher prices and the use of non-national formulary drugs. This will cause a difference between the actual and the e-catalogue drug cost. Thus, the hospital must control supplies by guaranteeing the availability of drugs in the right quantity (Mendrofa & Suryawati, 2016). Table I showed the differences between the total actual and e-catalogue drug costs, which was IDR4,818,252 (0.9%)

(p = 0.667). Even though the difference is small, this shows the potential for failure to comply with the standard, reaching 100% (MoH, 2008). Dissemination of drug use policies according to the formulary and improvement of drug planning needs to be carried out continuously.

The INA-CBGs rate for outpatients with minor chronic diseases is generally IDR183,300, covering all components of hospital resources for services (MoH, 2016b). The results of this study showed that the average rate of INA-CBGS drugs for outpatients at the Cardiology Clinic was IDR34,708 (19%) of the total expenditure of INA-CBGs as shown in Table II. The result is more efficient than in a previous study in which the average cost of the INA-CBG drugs was > 40% (Ramadhan *et al.*, 2021). The average drug costs that include non-INA-CBGs for outpatients at the Cardiology Clinic during the study period was IDR97.039 as shown in Table I. This cost adds to the insurance burden for the drug for this group of patients.

The average drug cost for cardiovascular disease outpatients in India was INR1,799.66 (1 INR = 186 IDR) (Shastry *et al.*, 2015). The average cost of health services for outpatients with heart failure in the USA in 2014-2020 was USD 1,499 (1 USD = IDR 14,790) per visit (Urbich *et al.*, 2020). In South Korea, the annual cost of treatment after inpatient service for acute heart failure was KRW 8.3 million, with pharmaceutical costs of KRW 605,000 (1 KRW = IDR11.12) (Kim *et al.*, 2018). Meanwhile, in Cameroon, ischemic heart disease charged USD 340.6, and hypertension cost USD300.7 (Aminde *et al.*, 2021). This study showed lower drug costs than in other countries.

The prevalence of cardiovascular disease is quite high with high health costs. Efficiency can be achieved through inter-professional collaboration, adherence to formularies and good procurement planning. Optimal therapy and continuous patient education are needed to prevent, slow down complications, and prevent the burden of higher health costs.

Conclusion

The alignment of prescriptions with the National formulary was good at 98%. The difference in actual drug costs and e-catalogue was IDR4,818,252 (0.9%) with p = 0.667 (more than 0.05). Drug costs constitute 19% of the INA-CBGs package.

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