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Original Research

Medicine Costs of Chronic Diseases Outpatient in an Indonesian Hospital Under National Health Insurance

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Abstract
Background: The prevalence of chronic diseases continues to rise. Indonesian health insurance covers the costs of outpatients with chronic diseases. Patient with chronic disease tends to use complex medicines, which impact the cost.
Objective: This research aimed to determine medicine costs, claims, the effect of the number of medicines, the type of clinics and the presence of secondary diagnoses on medicine costs.
Methods: This research used a quantitative descriptive method and was conducted at Prof. Dr. Chairuddin P. Lubis Hospital in Indonesia. Data were collected from outpatient prescriptions of chronic disease patients in 2023 at the national health insurance services. The data were analyzed using SPSS Version 22 and presented as numbers and percentages.
Results: The results were the average medicine cost of IDR 218.782.13, the average claims of IDR 206.702.95, and additional medicine claims of IDR 170.847.84. The burden of medicine costs on claims reached 57.95%. The number of medicines and secondary diagnoses did not affect medicine costs. The type of clinic significantly affects medicine costs.
Conclusion: Chronic disease results in high medicine costs. Hospitals had to manage the medicine costs and claims well, especially in clinics, contributing to high medicine costs.

Keywords: chronic disease; claims; hospital; medicine costs; national health insurance

Background

Healthcare systems worldwide face challenges from the need to improve the quality of care and balanced the cost (Almehwari et al., 2024). Cost is an important and interesting variable in health research, because the data is needed by the government and non-government in designing the costs of a health service or intervention (Wong & Skead, 2019). In a hospital, costs include direct expenses such as salaries, medical equipment, and medicine costs, as well as indirect costs such as administrative overhead, patient management, and logistical support. (Dianingati & Riewpaiboon, 2019). Medicine costs were one of the largest expenses (Rosso, 2024). Medicine cost was influenced by diseases, patient's age, type of insurance, number of medicines, and types of medicine (Hadiningsih, 2015).

The cardiovascular diseases, diabetes, cancer, and stroke were categorized as chronic diseases. Chronic diseases are defined as health conditions that last a year or more and necessitate ongoing medical attention and limit daily activities (Centers for Disease Control and Prevention, 2023). The prevalence of chronic diseases continues to rise. One in three adults globally suffers from chronic diseases (Hajat & Stein, 2018). The Indonesian basic health research found that almost 10% of respondents in Indonesia had chronic diseases, and this number continues to rise (Arifin et al., 2022).

Patients with chronic diseases will receive complex medicine according to their morbidity (Unni, 2023). They tend to be prescribed polypharmacy in various outpatient clinics (Rieckert et al., 2018). The increasing number of drugs has an impact on increasing medicine costs (Hacker, 2024).

Through national health insurance, the Indonesian government covers the outpatient treatment of chronic diseases. The chronic disease patients are prescribed one-month medicines supply on each hospital visit. The services were paid prospectively based on Diagnose-Related Groups (DRGs) and additional medicine claims (Happy, 2018). Some previous studies in inpatients stated that actual costs were higher than the claims (Monica et al., 2021). On the contrary, studies on how these medicine costs and claims are portrayed are limited. Therefore, this study will provide an overview of medicine costs incurred by hospitals and the value of claims paid by the national health insurance program. Furthermore, key factors influencing medication costs were identified by statistical correlation analysis of medicine costs to the number of drugs, type of clinic, and the presence of secondary diagnoses. The results are expected to provide evidence-based recommendations for hospital management to optimize efficiency and cost-effectiveness.

Methods

Study design

This research used a descriptive method with a quantitative approach. Descriptive research aims to accurately describe a population, situation, and phenomenon and the characteristics. The quantitative approach is expected to provide important values in concluding (Ghanad, 2023). The study design was chosen to correctly depict the medicine costs and claims.

Setting

The research was conducted at Prof. Dr. Chairuddin P. Lubis Universitas Sumatera Utara Hospital. This Hospital is a teaching hospital in North Sumatra and is categorized by the Indonesian Ministry of Health as a C-Class hospital.

Sample

Data were obtained retrospectively from prescriptions and medical records of chronic disease outpatients under the national health insurance programs in the period from April to June 2023. This period was selected because the newest medicine claim value was applied. The population in this research included 6.905 prescriptions. The sample size was calculated using Raosoft.com software, with a 95% confidence level and a 5% margin of error. This yielded a required sample size of 400 prescriptions from the total population of 6.905. A stratified random proportional sampling method was applied based on the number of patients at each clinic. This sampling method is expected to provide a realistic description. Pending and failed claims may have decreased claim value due to factors beyond this study. So, they were excluded from the study to avoid bias.

Variables

The variables in this study are medicine costs, claims, number of drugs in prescriptions, the clinic where the prescription originated, and the number of diagnoses. Medicine costs were measured as the total cost of medications prescribed per visit. The claims were total hospital claims that consist of DRG claim and additional medicine claims. The DRG claims are defined as paid hospital claims based on diagnosis, on the provision of national health insurance. While additional medicine claims are paid for medicine for chronic disease. The value is based on the provisions for 23 days' use of chronic medicine. The type of clinics was categorized into outpatient specialist clinics.

Data analysis

Data were analyzed using SPSS Version 22 and presented as numbers and percentages. The Kruskal-Wallis test was used to examine differences in medicine costs across different types of clinics and the number of medicines prescribed, as it is appropriate for comparing non-parametric data with more than two groups. The Mann-Whitney test was used to assess the correlation between secondary diagnoses and medicine costs, as it compares two independent groups. A p-value of less than 0.05 indicates statistical significance, meaning less than 5% probability that the observed results are due to random chance.

Ethical consideration

This research was approved by the health research ethics committee of Universitas Sumatera Utara with the registration number 942/KEPK/USU/2023 in September 2023

Results

As in Table 1, 407 prescriptions were presented in each clinic. The samples were distributed to nine clinics. The clinics with low percentages of patients classified as others consisted of pediatric, nephrology, ophthalmology, and Ear Nose Throat (ENT) clinics. Cardiovascular and Internal Medicine became the most significant sample in this study (more than 20% of each proportion), indicating the high number of patients in these clinics. Both clinics were the most visited clinics in the national health insurance era (Wulansari et al., 2024).

Table 1. Distribution of Population and Sample

Clinic	Population n (%)	Sample n
Cardiovascular	3.064 (44.37)	178
Endocrine Metabolic Diseases	346 (5.01)	21
Internal Medicine	1.512 (21.90)	89
Neurology	193 (2.80)	12
Oncology and Gynecology	123 (1.78)	8
Psychiatry	471 (6.82)	28
Pulmonology	609 (8.82)	36
Urology	481 (6.97)	28
Others (Pediatric, Nephrology, Ophthalmology, ENT)	106 (1.54)	7

Medicine Costs and Claims

The claims under national health coverage consisted of DRG claims and additional claims for chronic medicine (Indonesia, 2004). Statistical medicine costs and claims in the prescription of the outpatient clinic were shown in Table 2.

Table 2. Statistical Medicine Costs and Claims Overview

Medicine Costs and Claims	Total (IDR)	Average (IDR)
Medicine costs	89.044.327	218.782.13
DRGs claims (a)	84.128.100	206.702.95
Additional medicine claims (b)	69.535.069	170.847.84
Total Claim (a+b)	153.663.169	377.550.79

The total medicine cost exceeded IDR 89 million for 407 prescriptions. The average medicine cost was IDR 218.782.13 per prescription. In the United States, the high costs of managing and treating chronic diseases were estimated at 4.1 billion dollars in the year 2023 (Benavidez et al., 2024). In Asian countries, the burden of chronic diseases was estimated at 1 to 7 trillion USD (Bloom et al., 2020). At the same time, total claims were DRG and additional medicine claims valued at IDR 153.663.169. The comparison between medicine costs to total claims shows a proportion of 57.59%. Previous studies have shown that medicine costs are greater than claims for some chronic diseases, with the average proportion value being greater than 40%. The claim value should align with hospital billing. The hospital billing consists of not only the medication costs, but also other costs such as registration, physical examination, supporting examination, and other medical procedures (Ramadhan et al., 2021). Therefore, the high cost of medication requires attention. Cost-effectiveness studies need to be conducted.

The Number of Medicines and Medicine Costs

This research correlated the number of medicines and medicine costs, as shown in Table 3. The results indicated that most of outpatient chronic disease patients were given two or more medicines. The highest prescription cost average was for 2-5 medicines valued at IDR 228.789.35. The number of medicines was related to health status and multimorbidity (Rieckert et al., 2018).

The highest prescription cost average was in the group of 2-5 medicines valued at IDR 228.789.35. Statistic Kruskal-Wallis stated the correlation between variable. A p-value of less than 0.05 indicates statistical significance, meaning there is less than 5% probability that the observed results are due to random chance. This threshold is commonly used to determine meaningful correlations between the variables. A P-Value of 0.242 stated no correlation between number of medicines to the medicine costs. This finding was not in line with other studies showing the number of medicine affecting the cost of medicine (Sulistyaningrum et al., 2022). The difference was related to the selection of different sampling methods. Previous research focused on one to two types of diseases, whereas this research was conducted on all outpatient services without a specific disease group

Table 3. The Number of Medicines, Clinics, and the Medicine Costs

Variable	Prescription n (%)	Total Medicine Cost (IDR)	Average Medicine Cost (IDR)	Statistic Kruskal-Wallis
Number of Medicines				
1	28 (6,88)	5.005.073	178.752.61	p=0.242
2-5	204 (50,12)	46.674.864	228.798.35	
>5	175(43)	37.364.390	213.510.80	
Clinics				
Cardiovascular	178(43,73)	23.758.460	133.474.49	
Endocrine Metabolic Diseases	21(5,16)	8.153.466	388.260.29	
Internal Medicine	89(21,87)	22.277.522	250.309.24	
Neurology	12(2,95)	3.192.224	266.018.67	
Oncology and Gynecology	8(1,97)	6.695.043	836.880.38	p=0.000
Psychiatry	28(6,88)	9.645.618	344.486.36	
Pulmonology	36(8,85)	10.221.542	283.931.72	
Urology	28(6,88)	4.283.713	152.989.75	
Others (Pediatric, Nephrology, Ophthalmology, ENT)	7(1,72)	816.739	116.677.00	

Types of Clinics and Medicine Costs

Chronic diseases are treated in various outpatient clinics. The correlation the type of clinic to the medicine costs was tabulated in Table 3. The three highest average medicine costs came from Oncology and Gynecology, valued at IDR 836.880.38; Endocrine Metabolic Diseases, valued at IDR 388.260.29; and Psychiatry, valued at IDR 344.486.36. Kruskal-Wallis test resulted in p=0.000 which meant a strong correlation between the type of clinics and medicine cost. A previous study stated that the type of clinics correlated to the number of medicines and medicine cost (Hirsch et al., 2018).

Secondary Diagnoses and Medicine Costs

Secondary diagnoses are health conditions that co-occur with the primary diagnosis and can affect treatment (World Health Organization., 2011). The correlation of secondary diagnoses to medicine costs was conducted, as shown in Table 4.

Table 4. Secondary Diagnoses and Medicine Cost

Secondary Diagnose	Patient n (%)	Total Medicine Costs (IDR)	Average Medicine Costs (IDR)	Statistic Mann-Whitney
Without secondary diagnosis	354 (86.98)	74.922.913	211.646.65	P=0.647
With secondary diagnosis	53 (13.02)	14.121.414	266.441.77	

This research found that the most chronic disease outpatients had no secondary diagnosis (86.98%). Secondary diagnoses in outpatients were less noticed (Klabunde et al., 2000). Secondary diagnoses were known to affect the number of medicines given and were accompanied by increased costs (Alharbi et al., 2019). The contrary result was found in this research. The statistical value confirmed a low correlation between the present secondary diagnoses and medicine costs with a p-value > 0.005.

DISCUSSION

In the context of the hospital studied, medicine costs accounted for 57.95% of the total claims, which aligns with previous findings indicating that medications are a significant portion of hospital expenditures (Rosso, 2024). Hospital management could use cost assessment tools to control medicine costs associated with chronic diseases (Wongpairin et al., 2024). Knowing factors that affect the medicine costs could minimize the burden.

Although polypharmacy is generally associated with higher expenditures in hospital (Kwak et al., 2022), our study found no significant correlation. This may be due to the high variability in the prices of medications and the use of both generic and brand-name drugs, which could mask any potential effect of polypharmacy on total medicine costs (Barlas, 2019). The medicine prices in Indonesia vary significantly (Pisani et al., 2023). The wide price variation could cause the addition of medicines that do not provide statistically significant value. Furthermore, it may be related to the use of generic or brand medicine. Generic medicines significantly impact reducing costs (Conrad Randall, 2019). Even though the government has promoted regulations on the use of generic medicines, unfortunately, not all generic preparations are available (Kharisma & Ardi, 2020). Periodic reviews of prescription patterns and the ongoing implementation of prescription policies are important to conduct (Aeenparast et al., 2024).

In this study, Oncology and Gynecology, Endocrine Metabolic Diseases, and Psychiatry contributed the highest medicine costs to the clinics. In the oncology clinic, the high medicine costs are associated with chemotherapy medications such as antineoplastic hormones. It contributed significantly to the overall medicine costs, similar to previous research that highlighted the financial burden of cancer treatment medication (Yue et al., 2020). Other findings indicated a high financial burden during cancer treatment on prescribed medicine to treat symptoms that arise (Gupta et al., 2022). Likewise, Endocrine and Metabolic Diseases, in which diabetes is one of the diseases being treated. Diabetes management was known to be expensive. They are treated with insulin or non-insulin medicines to control blood sugar levels. In the United States, this treatment's expenditures increased to 10 billion dollars in a decade (Herman & Kuo, 2021). Therefore, the psychiatric clinics indicated the presence of several non-generic medicine that tend to be more expensive. Additionally, the prices of antipsychotics have continued to rise (Wickware, 2022). By focusing on clinic with high medicine costs, hospital management can target high-cost areas to implement more efficient cost-control measures.

Indonesian Universal Health Coverage adopted the Diagnosis-Related Group (DRG) in the claim system. While secondary diagnoses are known to significantly increase hospital costs (Wongpairin et al., 2024), our study found no correlation between secondary diagnoses and increased medicine costs in outpatient settings. This may be due to the nature of outpatient care, where secondary diagnoses have less impact on prescription patterns compared to inpatient care (Hidayat et al., 2021). Given that this study was limited to a single hospital, further research is needed to examine medicine costs and claims across a broader range of hospitals in Indonesia, particularly those of different hospital classifications, to better understand the national landscape of chronic disease treatment under Universal Health Coverage.

Conclusion

High medicine costs were incurred by outpatients with chronic diseases at the Hospital. The medicine cost was significantly influenced by the type of clinic. Meanwhile, the number of medicines and the presence of secondary diagnoses did not influence it. Further evaluation of medicine costs is needed in oncology, gynecology, endocrine metabolic diseases, and psychiatry clinics.

Declaration of conflicting interest
The authors declare no conflict of interest in this study.

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Author contributions
Authors contributed to study conception and design, data collection, analysis and interpretation of results, draft manuscript preparation, and reviewed the results of the manuscript.

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