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THE ROLE OF PHARMACOECONOMICS IN DETERMINING TREATMENT SELECTION IN INDONESIA: A SCOPING REVIEW

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ABSTRACT

Background: Pharmacoeconomic analysis is a crucial tool for assessing the economic impact of alternative drug therapies, especially amid rising healthcare costs in Indonesia. It evaluates whether the benefits of a treatment justify the additional costs, supporting pharmacists in selecting effective and cost-efficient therapies that enhance patient quality of life. Four main types of pharmacoeconomic studies are commonly used: Cost Effectiveness Analysis (CEA), Cost Minimization Analysis (CMA), Cost Utility Analysis (CUA), and Cost Benefit Analysis (CBA). **Objective:** This review aims to provide an overview of pharmacoeconomic studies that can serve as a reference for pharmacists in Indonesia in selecting appropriate treatments, focusing on literature from national journals published within the last 10 years. **Methods:** A literature review was conducted using primary data from national research publications accessed via Google Scholar. Inclusion criteria were studies involving pharmacoeconomic evaluations related to therapy selection, published from 2015 onward in national journals. Studies examined include those covering drug utilization patterns, cost estimation, and alignment with the national formulary. **Results:** CEA and CUA are the most frequently applied pharmacoeconomic methods in Indonesia, particularly for evaluating antihypertensive, anti-infective, and cardiovascular drugs. These methods offer valuable insights that help pharmacists determine clinically effective and economically viable treatment options. **Conclusion:** Pharmacoeconomic studies are essential in supporting pharmacists in balancing treatment efficacy with cost considerations. Their application is particularly important in the context of the National Health Insurance (JKN), where informed decisions are needed to ensure cost-effective, sustainable healthcare delivery.

Keywords: Cost Benefit Analysis; Cost Effectiveness Analysis; Cost Minimization Analysis; Cost Utility Analysis; Pharmacoeconomics.

INTRODUCTION

Pharmacoeconomic analysis is a good way to determine the economic impact of alternative drug therapies in health care. Pharmacoeconomics is used to measure whether the additional benefits of an intervention are worth the additional costs of the intervention[1]. Currently, health costs in Indonesia continue to increase, so it is very necessary to have knowledge about pharmacoeconomic studies as a basis for selecting treatment, especially by a pharmacist, so that they can provide more effective treatment options and provide benefits, but can still provide a good improvement in the quality of life of patients[2].

Understanding pharmacoeconomics can help pharmacists compare inputs (costs for pharmaceutical products and services) and outputs or outcomes of treatment. Pharmacists can make important decisions about formulary determination, disease management, and treatment assessment by utilizing pharmacoeconomic analysis[3].

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There are four types of pharmacoeconomic studies, namely Cost-Effectiveness Analysis (CEA), Cost-Minimization Analysis (CMA), Cost-Utility Analysis (CUA), and Cost-Benefit Analysis (CBA). These four types of pharmacoeconomic studies can help drug selection policies for diseases suffered by patients so that the pharmacoeconomic aspect becomes very important to prioritize in the world of health. The simplest pharmacoeconomic method is the Cost Minimization Analysis Method, which is used to compare unrelated treatments and different therapeutic outcomes if the effects of health programs or treatments are compared equally[1].

In CEA, calculations are described in the ACER (Average Cost Effectiveness Ratio) or ICER (Incremental Cost Effectiveness Ratio) ratio with a formula that will be explained in the results and discussion section[2]. In AMB, the calculation is done by calculating the average total cost of treatment and then comparing it with the average total cost of other alternative treatments[4]. In AUB, the results are described in the Cost Utility Ratio and Incremental Cost Utility Ratio (ICUR). They are calculated using the formula that will be explained in the results and discussion section. In cost-benefit analysis, net benefits can be calculated by subtracting the costs from the benefits. Or by dividing the benefits by the cost[5].

A cost can be defined as the value of the resources utilized in a drug program or therapy. Economic theory states that the opportunity cost or value of the best choice passed up or the next best alternative is the "true" cost of a resource. This expense does not need to be a monetary sum obtained. A product or service's resources cannot be utilized for another product or service[1]. In pharmacoeconomic studies, there are three types of costs incurred by patients, namely direct medical costs, direct non-medical costs, and indirect costs. Direct medical costs are all patient care costs related to medical services, including the cost of drugs and medical goods, surgery costs, laboratory check services, and doctor visits. Direct non-medical costs are all costs incurred by patients but are non-medical, such as administration, patient transportation, patient meals, and patient caretaker families. While indirect costs are all costs associated with loss of productivity due to patients suffering from an illness, such as loss of salary due to not working, and loss of overtime pay. Cost of illness is the sum of direct and indirect costs[6].

Cost analysis is a technique used to determine the financial sacrifice (cost) required to accomplish objectives, both direct and indirect. Cost analysis, according to Hamka, is a method of gathering and organizing an agency's financial data and information in order to determine and compute the cost-of-service output. According to Sulistyorini, several inputs are needed to determine the cost of a product (output). Cost is the sum of the value of the various inputs used to create a product in the form of products or health services, such as medications, medical equipment, medical and non-medical workers, electricity, buildings, and so forth[6].

Based on the introduction above, a pharmacoeconomic study is necessary for the treatment selection process. Therefore, the author is interested in conducting a review article that aims to provide a study of pharmacoeconomics that pharmacists can use as a basis for selecting appropriate treatment for patients.

METHODS

This review paper uses a literature review based on primary data from published national research publications accessed online via Google Scholar. Keywords used to search for relevant journals include “pharmacoeconomics,” “cost-effectiveness analysis,” “cost-minimization analysis,” “cost-utility analysis,” and “cost-benefit analysis.”

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Selected journals are limited to those conducting analyses in the field of pharmacy in Indonesia. The authors established inclusion and exclusion criteria to determine which journals were selected. Inclusion criteria included conducting pharmacoeconomic research on therapy selection, publication within the last ten years, and publication in national journals. However, journals published before 2015 were excluded. No formal quality appraisal was performed, and 2-3 journals from each type of cost analysis were included in the table.

RESULTS

Based on the journal search that will be used in the literature review, three pharmacoeconomic journals with different disease types were selected for each type of cost analysis, resulting in a total of 11 national journals. The results of the comparison of each journal used are presented in Table 1, which contains a comparison of the drugs used, payment perspectives, and patient criteria used as research samples. More detailed review results regarding the title, methods, results, and decisions in each journal obtained will be explained in Table 2.

The desired outcome of each pharmacoeconomic study reviewed will facilitate the process of determining the type of treatment to be used when conducting studies using pharmacoeconomic methods. The treatment to be used will depend on the desired outcome of each pharmacoeconomic study, taking into account the level of effectiveness at the lowest cost and the desired benefits[18].

Table 1. Summary of the Included Studies

Method	First Author, year	Comparison	Perspective	Participants
CEA	Ruru et al, 2018	Ceftriaxone, Ciprofloxacin	Provider	Patients with urinary tract infection who received Ceftriaxone and Ciprofloxacin therapy were hospitalized, aged ≥18 years.
CEA	Amal et al, 2021	- Bisoprolol 5mg + Candesartan 8mg - Amlodipine 5mg + Candesartan 16mg - Amlodipine 5mg + Candesartan 8mg - Amlodipine 5mg + Diovan 80mg - Amlodipine 10 mg + Candesartan 8 mg - Amlodipine 10 mg + bisoprolol 5 mg - Amlodipine 10 mg + Captopril 25 mg - Amlodipine 10 mg + Furosemide 40 mg - Candesartan 8 mg + Furosemide 40 mg - Captopril 25mg + Furosemide 40mg	Provider	Patients with stage 2 hypertension aged >18 years with or without comorbidities who have used two combination antihypertensive therapies at least 3 times consecutively.
CEA	Fitria et al, 2022	Metformin, Metformin + Glimepiride	Provider	Patients with type 2 Diabetes Mellitus aged 15-64 years.
CMA	Akbar et al, 2018	Ranitidine, Pantoprazole	Provider	All inpatients with chronic gastritis in 2017
CMA	Nabila et al, 2021	Ceftriaxone, Cefotaxime	Provider	Patients aged 17-59 with Pneumonia who received Ceftriaxone or Cefotaxime therapy
CMA	Amirah et al, 2024	Methyldopa, Nifedipine	Provider	237 pregnant patients with hypertension were treated as outpatients. 208 samples received 250mg of Methyldopa, 19 samples received

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Method	First Author, year	Comparison	Perspective	Participants
				10mg of Nifedipine, and 10 samples received 30mg of Nifedipine
CUA	Safnurbaiti et al, 2018	Sevelamer Carbonate, CaCO3	Provider	Chronic kidney disease patients undergoing routine hemodialysis twice a week for 3 months, aged ≥18 years, receiving standard phosphate binder therapy, namely CaCO3.
CUA	Saadah et al, 2022	Antacids + Ranitidine, Antacids + Lansoprazole	Provider	200 patients with dyspepsia complaints were given a combination of antacids and ranitidine with lansoprazole antacids with or without complications from other diseases and had been undergoing outpatient treatment for at least 3 months.
CUA	Anggriani et al, 2024	Metformin-Gliclazide, Metformin-Pioglitazone	Payer	Type II diabetes patients undergoing outpatient treatment with a combination of metformin-gliclazide and metformin-pioglitazone, patients with comorbidities (gout, hypertension, and high cholesterol)
CBA	Azizan et al, 2020	- Self-managed: Hospitals purchase and manage their own hemodialysis machines and supplies - Operational Cooperation: Hospitals cooperate with hemodialysis machine providers (PT BB, PT GIN, and PT FMC).	Provider	All services for patients undergoing hemodialysis from July 2016 to December 2017, with benefits totaling Rp.3,708,630,000 from 4,167 patient visits.
CBA	Meilawati et al, 2022	Primary clinics that conduct home visits, primary clinics that do not conduct home visits for patients with prolanis hypertension	Payer	Patients with mild to moderate hypertension aged ≥ 35 years and registered as Prolanis participants for at least 1 year. 33 respondents from the home visit group and 33 respondents from the no home visit group.

Table 2. Results for Literature Relating to Pharmacoeconomic Studies

Pharmaco-economics Study	First Author, Year	Journal Title	Method	Results	Decision
Cost Effectiveness Analysis	Ruru et al, 2018 [7]	Cost Effectiveness Analysis of Urinary Tract Infection Treatment Using Ceftriaxone and Ciprofloxacin Antibiotics at Prof. Dr. RD Kandou General Hospital	Using a descriptive research method with retrospective data collection based on medical records	The ACER value of Ceftriaxone (Rp 503,438.33 / day) is smaller than the ACER value of Ciprofloxacin (Rp 529,169.69 / day) and the ICER value obtained is -102,418.18 / day to determine additional costs for each increase in effectiveness if a switch from ceftriaxone to ciprofloxacin antibiotics will be carried out	More cost-effective antibiotics in the treatment of UTI is Ceftriaxone.
	Amal et al, 2021 [8]	Cost Effectiveness Analysis of the Use of a Combination of Two Antihypertensive Drugs in Outpatient Hypertensive Patients at	Non-experimental research with data collection conducted retrospectively, taken from outpatient medical records, antihypertensive drug cost data,	The most used combination is CCB + ARB, costing Rp144,382,764. The lowest cost combination is CCB + ACEI, costing Rp83,741.33 with REB 1,116,551, and the highest cost combination is CCB +	The most effective combination therapy is CCB + ACEI (Amlodipine 10 mg + Captopril 25 mg) with a percentage of 75.00%.

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Pharmaco-economics Study	First Author, Year	Journal Title	Method	Results	Decision
		Karawang Regional Hospital	registration cost data and examination cost data for at least 3 (three) consecutive months.	BB, costing Rp183,091.42.	
	Fitria et al, 2022 [9]	Cost Effectiveness Analysis of Metformin–Glimepiride Use on Reducing Fasting Blood Sugar Levels in Type 2 Diabetes Mellitus Patients at Andalas University Hospital	Descriptive research with retrospective sampling. The sample used was DM patients who made routine radiological visits for at least 4 months. The costs seen were direct medical costs.	From 114 patients, the value of the incremental cost-effectiveness ratio of fasting blood glucose was Rp 1,284.74 for every 1 mg/dl decrease. The use of metformin-glimepiride combination therapy requires higher costs and produces better effects compared to the single metformin group.	The most effective therapy is combination of metformin-glimepiride.
Cost Minimization Analysis	Akbar et al, 2018 [10]	Cost-Minimization Analysis of Gastritis Inpatients at Abdul Wahab Sjahranie Regional Hospital, Samarinda	Observational research, the data taken includes medical record data of inpatient gastritis patients, as well as a list of therapy costs originating from the finance department at Abdul Wahab Sjahranie Regional Hospital, Samarinda.	The average medical cost per patient is Rp 5,200,079 for patients using ranitidine, while the average medical cost per patient for pantoprazole is Rp 14,256,345. The price of ranitidine is cheaper compared to pantoprazole at Rp 95,000 per ampoule and pantoprazole at Rp 137,300.	The lowest cost analyzed using the CMA method was ranitidine.
	Nabila et al, 2021 [11]	Cost Minimization Analysis of Ceftriaxone and Cefotaxime Antibiotics in Adult Pneumonia Patients Hospitalized at NTB Regional General Hospital 2018	Descriptive non-experimental research with observational and cross-sectional methods. Data collection was done retrospectively by looking at medical records and medical cost data for pneumonia patients. The study was conducted from July to August 2019.	The average total direct medical cost for the ceftriaxone group was Rp 4,963,909, higher than the average total direct medical costs for cefotaxime, which amounted to Rp 3,666,080. So, the administration of the cefotaxime drug group was more cost-effective by Rp 1,297,829, or 26.1%, compared to ceftriaxone therapy	A more cost-minimizing analysis is cefotaxime antibiotic therapy.
	Amirah et al, 2024 [12]	Cost Minimization Analysis (AMiB) of Methyldopa Drug Use Compared to Nifedipine in Pregnant Women at Hospital X in 2023	Observational method with cross sectional design and retrospective data collection. The sample consisted of 237 pregnant women with outpatient hypertension.	The antihypertensive drug used by pregnant women that has the lowest cost based on the analysis of treatment costs in hospitals is Nifedipine with a value of IDR 165 compared to Methyldopa 250mg of IDR 137 and Nifedipine 30mg of IDR 4,247.	A more cost-minimizing analysis is Nifedipine.
Cost Utility Analysis	Safnurbaiti et al, 2018 [13]	Cost Analysis And Value of Utility for Patients in Hemodialysis with	This study was conducted using a quasi-experimental design with a	The baseline utility values and EQ-5D VAS scores in hemodialysis patients given sevelamer	There was an improvement in survival rates among patients

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Pharmaco-economics Study	First Author, Year	Journal Title	Method	Results	Decision
		Carbonic Cevelamer Therapy	"pretest posttest design with control group" on hemodialysis patients who received phosphate binder therapy for 8 weeks in October - November 2016.	carbonate were 0.91±0.13, respectively, and in the posttest, they changed to 0.93±0.08. In the group given $CaCO_3$, the results were 0.83 ± 0.14, and in the posttest, they also changed to 0.84 ± 0.14. Statistical analysis showed that the changes in utility values and scores in patients given sevelamer carbonate and $CaCO_3$ were not significantly different ($p > 0.05$).	using sevelamer, as sevelamer controls phosphate better than CaCO3.
	Saadah et al, 2022 [14]	Cost Utility Analysis of BPJS and Non-BPJS Dyspepsia Patients Combining Ranitidine and Lansoprazole Antacids	The research method used is descriptive analytical using a data collection form, SPSS statistical software, and a questionnaire containing statements related to the research variables.	Antacid + generic ranitidine (G1) at Rp 3,859 per QALY, antacid + branded generic ranitidine (B1) at Rp 38,666 per QALY with RIUB Rp 286. 242, Antacid + generic lansoprazole (G2) at Rp 8,605, and Antacid + branded generic lansoprazole (B2) at Rp 68,788 with an RIUB of Rp 610,439.	The use of branded generic drugs is greater than among BPJS patients because they are comparable in terms of quality or life expectancy.
	Anggriani et al, 2024 [15]	Cost-Utility Analysis Oral Antihyperglycemic Combination in Type II Diabetes Mellitus Patient in Dr. Soeratno Gemolong General Hospital	An observational pharmacoeconomic design using the cost-utility analysis (CUA) method with purposive sampling. Data were collected using a questionnaire on diabetes quality of life (DQoL)	The average total cost for the metformin-gliclazide combination is Rp 8,634,959 with a QALY of 2.33, while the average cost for the metformin-pioglitazone combination is Rp 10,030,517 with a QALY of 1.99. The ACER value for the metformin-gliclazide combination and the metformin-pioglitazone combination is Rp 3,705,991 and Rp 5,040,461, respectively, with an ICER value of – Rp 4,104,582.	The combination therapy of metformin-gliclazide has been proven to be more cost-utility
Cost Benefit Analysis	Azizan et al, 2020 [16]	Cost and Benefit Analysis of Various Schemes for Hemodialysis Services at Dr. Sitanala Hospital Tangerang	The method used is qualitative research by seeking empirical evidence to answer questions related to aspects related to the tariff application components of a hemodialysis service.	Benefits obtained from hemodialysis: Rp 3,708,630,000 from 4,167 visits (Rp 890,000 per visit). Total self-managed cost: Rp 6,447,055,810, operational cooperation from PT BB: Rp 4,167,786,608 from PT GIN, Rp 4,541,028,965 from PT FMC, and Rp 4,227,066,350 from PT FMC.	The most cost-benefit option is operational cooperation with PT BB because it provides the best cost efficiency.

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Pharmaco-economics Study	First Author, Year	Journal Title	Method	Results	Decision
	Meilawati et al, 2022 [17]	Comparative Analysis of Costs and Benefits of Implementing Home Visit Services for Prolanis Hypertension Patients at Primary Clinics and Primary Clinics That Do Not Implement Them in Bogor Regency	This study is an observational descriptive analytical study with a cross-sectional design conducted at primary clinics that carry out home visits and do not carry out home visits in Bogor Regency in September 2019 - December 2020.	The odds ratio (OR) value shows that patients who receive home visits are 2.125 times more likely to comply than patients who do not receive home visits, and are 1.688 times more likely to have controlled blood pressure than patients who do not receive home visits. The costs incurred by clinics conducting home visits are higher, but the benefits obtained are greater than the costs incurred. The cost-benefit ratio (in rupiah) obtained in this study is 1.36, which is greater than 1, indicating that the implementation of the home visit program at the Primary Care Clinic is acceptable.	The implementation of the home visit program at the Primary Care Clinic is more cost-effective.

DISCUSSION

Based on the search results from the literature sources, 11 scientific articles were obtained. It was found that the articles that were obtained used various methods, namely CEA, CMA, CUA, and CBA. The CEA pharmacoeconomic study has advantages over other pharmacoeconomic methods. In CEA, treatment is not expressed in monetary terms. Although there are advantages, CEA also has disadvantages, namely that the treatments or health programs being compared must have similar or relevant outcomes[19].

CMA is the simplest pharmacoeconomic analysis method, making it a distinct advantage over other methods. However, CMA also has a weakness; if the assumptions regarding the outcomes are inaccurate, the analysis results may be incorrect and unhelpful[10]. CUA is the only analysis method in pharmacoeconomics that considers quality of life in its calculations, which is the method's key advantage. However, the lack of standards in this method can lead to inconsistencies in data presentation. The main outcome of CUA is the cost per QALY or Incremental Cost Utility Ratio (ICUR), obtained by comparing the difference in costs and the difference in QALYs between the treatments being compared[20]. This makes it particularly suitable for therapies that impact quality of life, but its weakness lies in the lack of standard utility measurement and the difficulty in comparing between populations[21].

In CBA, to determine the net benefit in monetary terms, the net benefit calculation must be performed by subtracting the costs from the benefits expressed in monetary terms. The weakness of CBA lies in assessing health benefits in monetary terms, which are often subjective and difficult to measure[17]. One of the difficulties the author encountered was searching for CBA journals. There are very few national journals that discuss CBA, so the author had difficulty in the search process and only found two suitable journals.

Studies in Indonesia show that CEA and CUA are the most widely used pharmacoeconomic methods, particularly

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for antihypertensive, anti-infective, and cardiovascular drugs. When searching for cost-effectiveness analyses for treatments, a large number of results are found, both in national and international journals. Similar findings have been reported in other countries, where CEA remains the primary method for assessing the cost-effectiveness of health interventions, while CUA is increasingly used for therapies that impact patients' quality of life, such as cancer treatment or chronic disease management[21].

The application of pharmacoeconomics in therapy selection in Indonesia has been clearly evident in various policies and practices in hospitals and formulary committees. As an example of the application of the CEA method, a journal article written by Ruru et al., 2018, entitled "Analysis of the Cost Effectiveness of Treatment of Urinary Tract Infections Using Ceftriaxone and Ciprofloxacin Antibiotics at Prof. Dr. RD Kandou General Hospital." This study compared the effectiveness of ciprofloxacin and ceftriaxone in treating UTIs. The results showed that the ACER value for ceftriaxone (Rp 503,438.33/day) was lower than the ACER value for ciprofloxacin (Rp 529,169.69/day), and the ICER value obtained was -102. 418.18/day to determine the additional cost for each increase in effectiveness if switching from ceftriaxone to ciprofloxacin. As a result, ceftriaxone is more cost-effective than ciprofloxacin, so treatment recommendations in these hospitals tend to favor ceftriaxone as the first-line treatment for similar cases[7].

There are implications for pharmacoeconomics because it provides a scientific basis for pharmacists involved in formulary committees, both at the hospital level and in the Pharmacy & Therapeutics (P&T) review process. Pharmacists play a strategic role in proposing the addition or removal of drugs from the formulary based on the results of pharmacoeconomic analysis. They provide recommendations for cost-effective and efficient therapy to the medical team, particularly in the management of chronic diseases or high-cost therapies[22].

Internationally, particularly in the UK, the pharmacoeconomic approach has become the standard in healthcare decision-making through the National Institute for Health and Care Excellence (NICE) using cost-effectiveness analysis, particularly in the form of cost per QALY to recommend whether a drug or healthcare technology is eligible for funding by the National Health Service (NHS). NICE sets a cost-per-QALY threshold (e.g., £20,000–£30,000) as the primary benchmark for decision-making. This approach ensures that healthcare resources are used optimally to generate the greatest health benefits for the population[23].

In pharmacoeconomic studies, cost is one of the crucial elements used as the basis for calculations in every analysis method. Costs can be calculated based on three perspectives, namely, the payer, providers, and society. Costs are divided into several categories, namely direct costs, indirect costs, and costs due to illness (Cost of illness). Direct costs are further divided into medical and non-medical costs. Direct medical costs include all expenses directly related to the treatment, detection, and prevention of a disease. Examples of direct costs include drug prices, healthcare service costs, laboratory tests, and similar expenses[24].

Direct non-medical costs are expenditures related to services or products received. Examples of direct non-medical costs include ambulance fees and unofficial additional services. Indirect costs reflect the loss of productivity of patients due to the disease they are suffering from. For example, costs for patient accompaniment are included in indirect costs. The cost of illness refers to expenditures incurred due to illness and includes both direct and indirect costs. The types of costs used in pharmacoeconomic research will be determined by the objectives of each study[18].

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CONCLUSION

Pharmacoeconomic studies such as cost-effectiveness, cost-minimization, cost-utility, and cost-benefit analyses are essential tools for evaluating the value of therapies and guiding evidence-based decision-making, particularly in resource-limited settings like Indonesia. These evaluations support the National Health Insurance (JKN) system by helping to prioritize cost-efficient and sustainable health interventions. Therefore, the development and application of pharmacoeconomics in Indonesia are vital for optimizing healthcare resource allocation. Future research should incorporate broader references, including international literature, to enhance the comprehensiveness of findings.

CONFLICT OF INTEREST

This research has no conflicts of interest. The author of this study wrote it on their own. None of the writers has any personal or financial ties to any people or organizations that would improperly affect this study.

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REFERENCES

1. T. M. Andayani, Farmakoekonomi: Prinsip dan Metodologi, Cetakan Pertama. Yogyakarta: Bursa Ilmu, 2013.
2. Musdalipah, Muh. A. Setiawan, and E. Santi, “Analisis Efektivitas Biaya Antibiotik Sefotaxime dan Gentamisin Penderita Pneumonia Pada Balita di RSUD Kabupaten Bombana Provisi Sulawesi Tenggara,” Jurnal Ilmiah Ibnu Sina, vol. 3, pp. 1–11, Mar. 2018, doi: 10.36387/jiis.v3i1.104.
3. T. Makhinova, BS, and K. Rascati, “Pharmacoeconomics Education in US Colleges and School of Pharmacy,” Am J Pharm Educ, vol. 77, Sep. 2013.
4. C. Rahmawati and A. Nurwahyuni, “Analisis Minimalisasi Biaya Obat Antihipertensi antara Kombinasi Ramipril-Spironolakton dengan Valsartan pada Pasien Gagal Jantung Kongestif di Rumah Sakit Pemerintah XY di Jakarta Tahun 2014,” Jurnal Ekonomi Kesehatan Indonesia, vol. 1, Nomor 4, 2014.
5. H. Merliana and A. C. Sjaaf, “Analisis Minimisasi Biaya Amlodipin Generik dan Bermerk pada Pengobatan Hipertensi di RS X Pekanbaru Tahun 2015,” Jurnal Ekonomi Kesehatan Indonesia, vol. 1 No 3, no. 3, Jan. 2017, doi: 10.7454/eki.v1i3.1775.
6. A. Heryana, “Konsep Biaya: Aplikasi pada Pelayanan Kesehatan,” Dokumen Pribadi, 2019.
7. R. I. Ruru, G. Citraningtyas, and J. P. Uneputty, “Analisis Efektivitas Biaya (Cost Effectiveness Analysis) Pengobatan Infeksi Saluran Kemih Menggunakan Antibiotik Seftriakson dan Siprofloksasin di RSUP Prof. Dr. R. D. Kandou,” PHARMACON Jurnal Ilmiah Farmasi, vol. 7, no. 3, Aug. 2018.
8. S. Amal, L. Karlina, D. Astuti, and H. Hidayah, “Analisis Efektivitas Biaya (Cost Effectiveness Analysis) Penggunaan Kombinasi Dua Obat Antihipertensi Pada Pasien Hipertensi Rawat Jalan di RSUD Karawang,” Pharma Xplore Jurnal Ilmiah Farmasi, vol. 6, no. 2, pp. 13–26, Nov. 2021, doi: 10.36805/farmasi.v6i2.1938.
9. N. Fitria, M. Andela, Y. Z. Syaputri, and H. Nasif, “Analisis Efektivitas Biaya Penggunaan Metformin-GlimepirideTerhadap Penurunan Kadar Gula Darah Puasa Pada Pasien Diabetes Mellitus Tipe 2 di RS Universitas Andalas,” Jurnal Sains Farmasi & Klinis, vol. 9, pp. 202–207, Dec. 2022, doi: 10.25077/jsfk.9.sup.202-207.2022.

DOI: https://doi.org/10.24843/JPSA.2025.v07.i01.p05

10. M. Akbar, M. Ardana, and H. Kuncoro, “Analisis Minimalisasi Biaya (Cost-Minimization Analysis) Pasien Gastritis Rawat Inap di RSUD Abdul Wahab Sjahranie Samarinda,” Proceeding of Mulawarman Pharmaceuticals Conferences, vol. 7, pp. 14–21, May 2018, doi: 10.25026/mpc.v7i1.285.
11. A. Nabila, C. E. Puspitasari, and G. A. P. S. Erwinayanti, “Analisis Minimalisasi Biaya Antibiotik Ceftriaxone dan Cefotaxime pada Pasien Pneumonia Dewasa Rawat Inap RSUDP NTB 2018,” Jurnal Sains dan Kesehatan, vol. 3, no. 1, pp. 72–78, Feb. 2021, doi: 10.25026/jsk.v3i1.205.
12. S. R. Amirah, G. Wilar, and F. Puspita, “Analisis Minimalisasi Biaya (AMiB) Penggunaan Obat Metildopa Dibandingkan dengan Nifedipin pada Ibu Hamil di Rumah Sakit X Tahun 2023,” Jurnal Ilmiah Farmasi, vol. 3, no. 2, pp. 195–201, 2024.
13. D. P. Safnurbaiti, T. M. Andayani, and F. Irijanto, “Analisis Biaya dan Nilai Utilitas Pasien Hemodialisa yang Diberikan Terapi Sevelamer Karbonat,” Oceana Biomedicana Journal, vol. 1 No 2, Jul. 2018.
14. A. Saadah, P. Sarnianto, H. U. Ramadaniati, and Irmin, “Analisis Utilitas Biaya Pasien Dispepsia BPJS Dan Non-BPJS Kombinasi Obat Antasida Ranitidin dengan Antasida Lansoprazol,” Jurnal Kesehatan Komunitas, vol. 8, no. 2, pp. 352–361, Aug. 2022, doi: 10.25311/keskom.vol8.iss2.1234.
15. I. P. Anggriani, L. V. I. Dewi, K. W. Pradesthya, and I. R. Hanifah, “Analisis Utilitas Biaya Kombinasi Antihiperglikemia Oral pada Pasien Diabetes Mellitus Tipe II di RSUD Dr. Soeratno Gemolong,” Farmasains : Jurnal Ilmiah Ilmu Kefarmasian, vol. 11, no. 2, pp. 90–97, Oct. 2024, doi: 10.22236/farmasains.v11i2.12418.
16. N. Azizan, Sutoto, and M. S. Maryam, “Analisis Biaya dan Manfaat Berbagai Skema Untuk Pelayanan Hemodialisis di Rumah Sakit Dr. Sitanala Tangerang,” Jurnal Riset Bisnis Universitas Pancasila, vol. 4 (1), no. 1, pp. 39–48, Oct. 2020.
17. P. Meilawati, P. Sarnianto, N. Andayani, and Irmin, “Analisa Perbandingan Biaya (Cost) dan Manfaat (Benefit) Pelaksanaan Pelayanan Home Visit Pasien Hipertensi Prolanis di Klinik Pratama dengan Klinik Pratama yang Tidak Melaksanakan di Kabupaten Bogor,” Jurnal Ilmiah Indonesia, vol. 7 No.8, 2022.
18. Kementrian Kesehatan Republik Indonesia, “Riset Kesehatan Dasar,” Jakarta, 2013.
19. R. F. Susono, Sudarso, and G. F. Galistiani, “Cost Effectiveness Analysis Pengobatan Pasien Demam Tifoid Pediatrik Menggunakan Cefotaxime dan Chloranphenicol di Instalasi Rawat Inap RSUD Prof. DR. Mangono Soeekarjo,” Jurnal Farmasi Indonesia Universitas Muhammadiyah Purwokerto, vol. 11, Jul. 2014.
20. N. Tantai, U. Chaikledkaew, T. Tanwandee, P. Werayingyong, and Y. Teerawattananon, “A cost-utility analysis of drug treatments in patients with HBeAg-positive chronic hepatitis B in Thailand,” BMC Health Serv Res, vol. 14, no. 1, Apr. 2014, doi: 10.1186/1472-6963-14-170.
21. S. Khogta et al., “Economic Methods of Pharmacoeconomic Evaluation,” JETIR: Journal of Emerging Technologies and Innovative Research, vol. 6, 2019, [Online]. Available: www.jetir.org
22. P. Siti Hawa and R. Sumirat, “Analgesic Therapeutic Class of Tangerang City Health Department Drug Formulary,” Indonesiann Journal of Administrative and Clinical Pharmacy, vol. 1, no. 1, pp. 23–29, 2024.
23. K. Claxton et al., “Methods for the estimation of the NICE cost

DOI: https://doi.org/10.24843/JPSA.2025.v07.i01.p05

effectiveness threshold," Nov. 2013. [Online]. Available: https://eprints.whiterose.ac.uk/136514/

24. R. R. Tjandrawinata, "Peran Farmakoekonomi dalam Penentuan Kebijakan yang Berkaitan dengan Obat-Obatan," Working Paper of Dexa Medica Group, 2016.
25. S. D. Khoiriyah and K. Lestari, "Review Artikel: Kajian Farmakoekonomi yang Mendasari Pemilihan Pengobatan di Indonesia," Farmaka, vol. 16, no. 3, 2018.

DOI: https://doi.org/10.24843/JPSA.2025.v07.i01.p05