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Analysis Of BPJS Drug Investment Management Using Activity-Based Cost (ABC) Method (Case Study in Ponorogo Health Office)

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ABSTRACT

Medicines are an important component in ensuring health services. The Ponorogo City Health Service is the source of drug procurement for primary health services in Ponorogo. Procurement uses limited Regional Revenue and Expenditure Budget (APBD) funds, so studying the types of medicines most needed and the funds absorbed for procurement efficiency is necessary. This research aims to analyze the efficiency of item selection and use of BPJS drug procurement funds at the Ponorogo City Health Service. Observation period January to June 2023 using the ABC method. This research is included in the mixed research method qualitative and quantitative descriptive with retrospective data collection. The ABC method is used to identify priority items based on their contribution to costs, classifying A, B, and C based on use value and investment value. The research results showed 111 BPJS medicine items in the Ponorogo City Health Service. This study has theoretical implications by identifying uneven patterns of BPJS drug use and investment between groups. The finding that group A absorbs the most investment (70.62%) but only contributes 19.82% of the total goods, while group C has the highest percentage of the total goods (63.96%) but low contribution of use and investment (9.36% and 9.09%), indicates the need to revise the resource allocation model in the BPJS program. From a managerial perspective, this study recommends optimizing budget allocation, evaluating drug procurement policies, and improving the monitoring system to ensure program efficiency and effectiveness.

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Introduction

Health efforts such as improvement, prevention, diagnosis, treatment, and recovery require medicine as an important element whose availability must be controlled. Complete types, sufficient quantities, and maintaining the quality of medicines require effective and efficient management (Mafruchati, Ismail, et al., 2023). Planning and procuring the drugs was an important starting point for determining the success of the next stage. The planning stage is an adjustment between procurement needs and existing funds for health services. (Mafruchati et al., 2024; Siddiqui et al., 2023). Procurement planning methods can be carried out using consumption, epidemiology, or a combination of consumption and epidemiology methods. A previous study conducted by (Tie et al., 2019) Used many consumption methods by calculating needs based on real consumption data. The period for ordering medicines is carried out every certain period of the year using limited Regional Revenue and Expenditure Budget (APBD) funds, so according to the local responsible pharmacist there are medicine items that cannot be provided. The author feels it is necessary to conduct a study of the most needed drug items or procurement priorities and measure the funds absorbed for efficient drug procurement needs. Cost leadership strategies in drug selection by paying attention to supply chain management can increase the effectiveness of pharmaceutical services (Mendo et al., 2023). A good Management Information System for pharmaceutical inventory management can help the process of recording stock and inventory in real time so that dead stock can be minimized. The ABC method can be a good choice of method in determining priorities by involving costs (Mohamed Shaffril et al., 2021).

Procurement evaluation can use the Activity Based Cost (ABC) analysis method. The main principle of ABC analysis is to place the types of drugs into an order, starting with the type of drug that takes up the largest budget (Cao et al., 2024). This ABC analysis method is very useful in focusing management attention on determining the most important types of goods that need to be prioritized in inventory. It is not realistic to monitor inexpensive goods with the same intensity as luxurious goods. Category A drugs are drug supplies that represent approximately 15% and no more than 20% of the total supply, but represent 70% to 80% of the total use of funds. Category B is drug inventory which represents 30% of total inventory and 20% to 80% of total funds. Category C drugs represent 10% - 15% of total inventory with 5% - 10% of total use of funds (Fatimah et al., 2022). This research aims to analyze BPJS drug procurement at the Ponorogo City Health Service using the ABC method so that we can find out the number of items and the percentage of drugs included in groups A, B, and C based on use value and estimate the funding needs that must be allocated to each group based on investment value.

A previous study conducted by (Abdolazimi et al., 2021) analyzed drug planning using the ABC method in the Kediri City Health Service pharmacy installation in 2017 concluded that planning for drug needs in the Kediri City Health Service Pharmacy Installation was not fully by the calculations. The difference with this research lies in the location, the proximity of the area means that procurement management is inefficient. (Zaki et al., 2024b) concluded that procurement planning using a combination of the ABC method, consumption method and epidemiological method is quite effective in overcoming the shortage of Covid-19 drugs and accompanying drugs. A study conducted by (Mafruchati et al., 2024) concluding that investment costs for drug groups A and B are high requires planning with a combination of EOQ, SS and ROP calculations in order to determine the smallest efficient costs.

On the other hand, according to (Djennadi et al., 2021), the combination method of ABC and VEN analysis can identify drugs with tighter inventory control and prioritizes 12 BPJS drug items in the AV category, the frequency of procurement items is higher than the EOQ method. So that the calculation of the ABC, VEN, and EOQ methods can increase efficiency in controlling the availability of AV classification

drugs for BPJS patients in IFRS. There are differences from this research which does not involve other methods such as consumption which is used at the Ponorogo City Health Service. Another study by (Moore et al., 2023) concluded that the suitability and realization of drugs in the Pharmacy Installation of the District Health Service "X" was not appropriate and had not been fully realized. Research (Mafruchati, Othman, et al., 2023). Evaluation of drug management, planning, and procurement at the Pati District Health Service, national formulary standards, is also influenced by changes in disease prevalence (Mafruchati et al., 2022).

The novelty of this research lies in the Activity Costing (ABC) method in the context of drug management at BPJS, which according to the person responsible for procurement at the regional level of the Ponorogo City Health Service. Ponorogo was chosen as the research location because this area has characteristics that can represent the challenges and dynamics of drug management in the BPJS program at the regional level. The Activity Based Costing (ABC) method has not been applied in drug management in the area. This creates a significant research gap because the application of ABC can provide a more accurate and in-depth cost analysis. Ponorogo, like many other areas in Indonesia, faces challenges in managing the health budget from the APBD, with a relatively high population dependent on BPJS services. The implication of this study was to provide new insights into the efficiency and effectiveness of drug management by adjusting the APBD budget and suggesting policy makers improve health services. The urgency of this research is very high, considering the importance of proper management of health funds to ensure the accessibility and sustainability of health services for the community, especially in the context of the BPJS program which focuses on health insurance. This research aims to conduct observations to evaluate drug procurement management at the Ponorogo City Health Service

Literature Review

Logistic Management

Logistics management is the process of planning, implementing, and controlling logistics activity processes starting from procurement, storage and distribution to meet customer needs. logistics management pharmacy includes order fulfillment, inventory control, warehousing, storage, distribution, documentation, and inspections, as well as order fulfillment, purchasing, and evaluation (Ryandono, Mawardi, et al., 2022). Logistics Management related to supply chain management which includes drug accessibility, drug quality and drug distribution systems (Zaki et al., 2024a). Qualification Suppliers are the most important problem, namely 45% of overall risk. Therefore, there is also a need for implementation integrative and comprehensive in nature in assessing risks to consistent and sustainable supply chain for pharmaceutical products (Cao et al., 2024). The high percentage of profits for pharmaceutical manufacturers carries the risk of the emergence of illegal medicinal products which have their own distribution networks (Mustamu, 2007). The drug procurement system at the city pharmacy warehouse is carried out through tenders and auctions.

Consumption Method

The consumption method is the easiest calculation method because it only requires complete and accurate consumption data from the previous period, does not require disease data and treatment standards like the morbidity method, so it is the fastest in its calculation. This method is suitable if the growth of the program and disease patterns in the area are not fluctuating and relatively constant so that the amount of medicine needed does not change much (Abdolazimi et al., 2021). The disadvantages of this method are if usage data is incomplete, there is an increased risk of drug shortages in certain cases or if there is a shortage

of drugs. This method does not include a required budget, only includes estimated needs (Cao et al., 2024). The use of consumption methods can increase drug availability, reduce the number of expired drugs, and when combined with ABC analysis can increase cost efficiency (Handayany & Basri, 2022). Research at a hospital in Konawe Regency found that expired drugs were caused by management that was not optimal, especially in the planning process which only used the consumption method, resulting in expired drugs.

Use of methods consumption can use the following planning steps, namely: evaluation steps consisting of evaluating the rationality of treatment patterns in the past period, evaluation of drug supplies in the past period, evaluation of stock data, distribution and use of drugs past period, observing damage and loss of medication. After that, the amount needed Medicines for the future period is estimated by taking into account population changes in service coverage, changes in morbidity patterns, changes in service facilities (Cao et al., 2024).

The use of the consumption method shows that when the results that there were variables that did not meet the standards, including the availability of drugs >7 days, causing 13.84% of drugs to be unserved, in addition to the value of expired drugs >2% and dead stock 5%, so it was necessary to use the ABC-VEN evaluation method (Handayany & Basri, 2022).

ABC Analysis Method

According to (Zhang et al., 2021), in determining strict and somewhat loose inventory control policies regarding the types of materials in inventory, the ABC analysis method can be used. This method describes Pareto analysis, which emphasizes that a small portion of the types of materials contained in inventory have a fairly large use value which covers more than 60% of all materials contained in inventory. The ABC analysis method is very useful in focusing management's attention on determining the types of goods that are most important and need to be prioritized in inventory. It is unrealistic to monitor inexpensive items with the same intensity as very expensive items (Nishizawa et al., 2021). A small number of items in inventory usually represents a monetary value constructed from the total materials used in the production process, while a relatively large number of items may represent a small portion of the value of the store's money used and such small amounts of goods are subject to greater value (Fauzi et al., 2024).

The advantages of ABC analysis are 1) Presents more accurate product costs and information, which directs more accurate product profitability measurements towards strategic decisions regarding selling prices, products, markets, and capital expenditures, 2) More accurate measurement of costs triggered by activities, thereby helping management increase product value and process value, 3) Makes it easy to provide information about relevant costs for decision making (Brindha, 2014).

ABC group classification is as follows 1) Group A is a group of drugs with high prices. even though it is only 20% of the total inventory, it absorbs 80% of the budget. 2) Group B Group B is a group of drugs with medium prices. represents 30% of the total inventory, but absorbs only 15% of the budget. 3) Group C is a group of drugs with low prices. Class C inventory group is represented by 50% of the total inventory and absorbs 5% of the budget (Handayany & Basri, 2022). BPJS Health patient drug control analysis using the ABC method can improve drug management to be effective, especially if the VEN method is added and compared with EOQ to reduce the stock-out value (Moore et al., 2023).

Methodology

This study used mixed method using interview in collecting data. Data was obtained through document searches in 2023. The data analysis technique used by researchers used quantitative data analysis. Apart from that, quantitative analysis is also used to find price percentages which are then used to analyze based on ABC analysis. The steps for classifying drugs in ABC analysis start from identifying all BPJS

drug products at the Ponorogo City Health Service, then looking at the use of each drug item, adding up all BPJS drug prices, after that processing using a calculation formula. For ABC analysis, the percentage of use value and the percentage of investment value are calculated. ABC Analysis Procedure 1) Calculate the amount of usage per period for each item, 2) Make a price list, 3) Multiply usage by the price of each item to determine investment, 4) Sort the investment value from largest to smallest then calculate the percentage, 5) Calculate the value cumulative, 6) Grouping items based on A, B, and C (Xiao et al., 2021).

The population of this study is all pharmaceutical preparations in the Pharmacy Warehouse of the Ponorogo City Health Service, namely in the form of tablets, caplets, syrups, ampoules, vials, and ointments. The sample from this research is BPJS drug data for 2023. The data obtained from the Ponorogo City Health Service Pharmacy Warehouse is qualitative primary data in the form of interview data with the pharmacist in charge of the Ponorogo City Health Service Pharmacy Warehouse and secondary data, namely retrospective data or can be called past data which will be processed into descriptive quantitative data. The data used is BPJS medicine data from January 2023 to December 2023 then the data is entered into a table, then analyzed based on the ABC method. Data management uses Microsoft Excel 2010.

The data was drug price ceiling e-catalog in 2023. The independent variable in this research is the analysis of drug procurement at the Ponorogo City Health Service Pharmacy Warehouse using the ABC Method. The dependent variable was the percentage of drug use value and the percentage of drug investment value. Efficiency is not only in terms of the amount ordered but also in financing. The weakness of this method did not consider the urgency of drug needs, so the combination of the ABC-VEN method can be suggested after the ABC method is considered better than the consumption method (Oetari & Widodo, 2020a). Calculation of the use value of medicines uses the formula in Table 1 and the investment value calculation in Table 2.

Table 1. Use Value Formula

No	Drug Name	Dosage Form	Price	Amount of Use	Income	percent use value	Group
1	X	Tablet	A	B	A x B	B/C x 100%	A, B, C
				C= ΣB			

Source: Data arranged by authors (2024)

The steps to find the used value are 1) Make a request list for all BPJS medicine supplies for the period January – December 2023, 2) Enter the number of requests for each item and make an average, then sort it from largest to smallest, 3) Calculate the average percentage of requests for each item from the total number of requests, 4) Calculate the cumulative percentage of each BPJS drug item request, 5) Group based on the cumulative percentage of BPJS drug requests. BPJS drug requests that have a cumulative of up to 80% are classified as A, 80% - 95% are classified as group B and 95 - 100% are classified as group C.

Table 2. Investment Value Formula

No	Drug Name	Dosage Form	Price	Amount of Use	Income	percent Investment value	Group
1	X	Tablet	A	B	A x B = D	D/E x 100%	A, B, C
					E= ΣD		

Source: (Eng et al., 2022)

The steps to find investment value are 1) Make a list of goods in a period, along with the average usage and average price of each item in the research period, 2) Calculate income from the product of the average usage per period with the average price to get the investment value, 3) Sort the investment value from largest to smallest and add up cumulatively, 4) Change the cumulative amount of each item into a cumulative percentage. This percentage is the benchmark for group determination.

Results and Discussion

Result

1. ABC Analysis of Use Value

In this analysis, they were grouped into three groups, namely drug group A with a usage value of 22 items with an item percentage of 19.82% with a total usage of 5,535,000 with a usage percentage of 69.64%. Drug group B has a usage value of 18 items with an item percentage of 16.22% with a total usage of 1,678,980 with a usage percentage of 21.10%. Drug Group C had a usage value of 71 items with an item percentage of 63.96% and a total usage of 744,968 with a total usage percentage of 9.36%. Through analysis of drug use data for January – December 2023, ABC groupings were obtained based on use value which can be seen in Table 3.

Table 3. BPJS Drug Grouping Based on ABC Analysis of Use Value

No	Drug Grup	Number of BPJS Drug Items	Percentage of BPJS Drug Items (%)	Number of BPJS Drug Use (Unit)	Drug Use Percentage of Total BPJS Drug Use (%)
1	Grup A	22	19,82	5.535.000	69,54
2	Grup B	18	16,22	1.678.980	21,10
3	Grup C	71	63,96	744.968	9,36
	TOTAL	**111**	**100 %**	**7.958.948**	**100%**

Source: Data arranged by authors (2024)

2. ABC Analysis of Investment Value

In this analysis, they are grouped into three groups, namely drug group A with an investment value of 29 items with an item percentage of 26.12% with an investment amount of Rp. 1,198,208,600 with an investment percentage of 70.62%. Drug group B has an investment value of 32 items with an item percentage of 28.82% and an investment amount of IDR 344,294,400 with an investment percentage of 20.29%. Drug group C has an investment value of 50 items with an item percentage of 28.82% an investment amount of IDR 154,185,564 with an investment percentage of 9.09%. Through analysis of drug use data during January – December 2023, ABC groupings were obtained based on investment value which can be seen in Table 4

Table 4. BPJS Drug Grouping Based on ABC Analysis of Investment Value

No	Drug Grup	Number of BPJS Drug Items	Percentage of BPJS Drug Items (%)	Investment Amount (Rp)	Drug Use Percentage of Total BPJS Drug Investment (%)
1	Grup A	29	26,12	1.198.208.600	70,62
2	Grup B	32	28,82	344.294.400	20,29

3	Grup C	50	45,06	154.185.564	9,09
	TOTAL	**111**	**100 %**	**1.696.688.564**	**100%**

Source: Data arranged by authors (2024)

3. ABC Analysis of Previous Research

When compared to other studies using BPJS drug variables and the ABC method, the results of the analysis using the ABC method obtained group A with the highest usage, namely 68.54% where the usage consisted of 21 types of drugs (14%). Group B has moderate usage, namely 21.30% of the total usage consisting of 24 types of drug items (16%), and group C usage was 10.16% of the total usage. Group C used 105 types of drug items (70%). The investment value shows that group A has 11.33% (17 items) types of drugs with an investment absorption of 68.62%. Group B has 22.67% (34 items) types of drugs with an investment absorption of 21.30%, while Group C has 66% (99 items) types of drugs with an investment absorption of only 10.08%.

However, in a study conducted by (Capritasari & Kurniawati, 2021), different results were obtained, namely conflicting results between investment value and usage value in the results of the ABC analysis of usage value, it was found that there were 23 types of drugs included in group A as many as 23 (17.42%) types of drugs with a total usage of 24,980 (66.68%). The drugs included in group B were 35 (26.52%) types of drugs with a total usage of 8,565 (23.02%). While drugs included in group C were 74 (56.06%) types of drugs, with a total usage of 3,769 (10.12%) of the total drug usage.

Different results were given in the other study, showing that Group A had an investment value of 75% with a total of 13% items, Group B had a usage value of 20% with a total of 27% items and Group C was 5% investment value with 60% of the number of items (Darmawan et al., 2021) Similar research resulted in Group A having a usage value of 74.98% with a percentage of drug items of 13.76%, Group B having a usage value of 15.02% on drug items of 14.95%, and Group C having a usage value of 10% with a total of 71.29% of the total items. The difference in these results depends on the references used by each researcher, although the percentage difference is not too significant. Without ABC analysis, it will be difficult to manage all BPJS drugs with the same priority, which can result in overall ineffectiveness.

Discussion

Based on the results of interviews with the Pharmacist in the Ponorogo City Health Service Pharmacy Warehouse the Ponorogo City Health Service Pharmacy Warehouse has 111 BPJS medicine items consisting of Tablets, Capsules, Ampoules, Vials, Syrup, and Tubes. Of the large number of drugs, procurement management is carried out once a year in March – July using the consumption method based on previous drug procurement data. Procurement at the Ponorogo City Health Service Pharmacy Warehouse carries out online procurement using e-catalog / e-purchasing. Public and drug management guidelines Health supplies by the Ministry of Health explains to determine the amount of medicine needed based on the consumption method, you need to pay attention to several data such as drug list, stock initial, receipt, disbursement, remaining stock, missing or expired drugs, drug shortages, average annual usage, waiting time, safety stock and development patterns visit. Based on direct observation, the Ponorogo City Health Service uses a consumption method with needs calculations based on real consumption data for the previous period. The ordering period is carried out every 18 months using APBD (Regional Revenue and Expenditure Budget) funds.

Using the ABC method can easily help determine procurement priorities. The ABC method divides items into three categories (A, B, and C) based on their value in terms of expenditure or impact on operations, making the analysis easier to understand. By identifying the most valuable category A items, resources can be allocated more efficiently and less attention paid to less crucial items (categories B and C). Compared to the EOQ (Economic Order Quantity) method, which also determines priorities, it helps determine the optimal order quantity but does not help in determining the priority of which items should be procured first, while the ABC method categorizes items to facilitate priority focus (Fauzi et al., 2024). Another method that can be used is the FSN (Fast, Slow, Non-moving) method which groups based on the speed of movement of goods in inventory, but does not take into account monetary value, so it is less effective in the context of procurement priorities compared to ABC (Hardinata & Hardinata, 2024). For the Consumption, Morbidity/epidemiology methods and the combination method do not provide priority focus at all. The results of data processing, it can be seen that the category A drug group has the fewest types of items, ranging from 19.82% - to 26.12%, but its use in units has a high level of use, namely 69.54%, which means that category A items must be procured. always available to ensure the fulfillment of BPJS drug services.

From a budget perspective, funds absorb the largest funding requirements, so procurement needs to be calculated carefully, and strict monitoring and supervision are carried out, so as not to be wasteful and minimize losses due to damage or loss. Category B group has around 16.22% - 28.82% of item types with usage in units at a medium level of 21.10%. Category B drug sorter method can be used as an alternative to BPJS drugs which can be a temporary replacement if there is a shortage of BPJS Category A drugs. The budget absorbed for procurement of category B is 20.29% of the total investment, so the procurement is classified as medium interest. Strict supervision is not required, but its existence requires monitoring and reporting. Category C group has the largest type of item out of all total items, namely reaching 63.96% but with a low usage rate of 9.36%, therefore procurement of category C is the last priority. The budget spent on procurement for this category is 9.09%, which is very small and easy to manage. Monitoring category C drugs is easier and only requires reporting of use. This can be the basis for further research on the efficiency of resource allocation in the BPJS program.

The difference in the number of items between groups A, B, and C corresponds to the relative value of fund absorption. The distribution pattern and utilization of BPJS drugs in Ponorogo Regency are influenced by the regional economy of the community who often utilize health services at health centers, so the availability of drugs is important in addition to government regulations on the BPJS program. From each category A, B, and C for BPJS drugs, the procurement of category C drugs can be prioritized where the budget is absorbed the least and provides a lot of drug stock, it will be different in the business sector that prioritizes profit, so category A is ordered first.

Table 5. Benefits and weaknesses of implementing the ABC method in drug administer

Aspect	Benefit	Potential	Weakness
Priority Classification	Helps focus on the most important drugs (category A) and maximize resource allocation (Mafruchati et al., 2024)	Reduce the risk of stockouts on critical medications (Eng et al., 2022)	Inadequate to handle drugs with unstable demand patterns (Ryandono, Kusuma, et al., 2022)

Cost Efficiency	Reduce waste and unnecessary expenses (Wardhana & Ratnasari, 2022)	Optimizing hospital budget for drug needs (Loestefani et al., 2022)	Requires accurate data and regular analysis (Qosim et al., 2023)
Stock Control	Simplify stock management by separating categories A, B, and C (Riduwan & Wardhana, 2022)	Ensuring stock availability for essential medicines (Fan et al., 2023)	Does not take into account factors other than use value, such as risks or special needs (Almahdy et al., 2021)
Implementation	Easy to understand by logistics staff and management (Pratiwi et al., 2022)	Can be integrated with hospital information systems (Mendo et al., 2023)	The initial process of data collection requires significant time and resources (Santoso & Kusuma, 2023)
Decision-making	Helping management to make decisions based on facts and data (Ryandono et al., 2019)	Improve overall supply chain efficiency (Yudha et al., 2024)	Can be too rigid and less responsive to sudden changes in the field (Iman et al., 2022)

Source: Data arranged by authors (2024)

The data collection of this study was only for 6 months, considering that it can provide a picture of procurement at the City Health Office whose submission is given every 1 year, with drug delivery every 6 months. This study has not seen the disease patterns that appear in each period. It would be better if the disease pattern is also considered in procurement. BPJS management needs to consider budget redistribution to improve efficiency. For example, although group A absorbs large investments, it is necessary to evaluate whether the increase in investment is comparable to the benefits obtained.

For group C, although the percentage of the number of goods is high, low usage and investment indicate potential for optimization. Management can consider strategies to improve drug utilization in this group, such as education for patients or medical personnel. ABC method can provide valuable insights into BPJS drug management, the results are highly dependent on the context and data used. Challenges faced in compliance and interpretation of results must be considered to ensure effectiveness and efficiency in drug procurement. Continuing research by considering external factors and delving deeper into disease pattern analysis can improve the relevance and accuracy of the results obtained.

Conclusion

Based on the result, it can be concluded that control of BPJS drug supplies in the Ponorogo City Health Service Pharmacy Warehouse has not been implemented optimally, because procurement priorities have not been implemented and ABC Evaluation has never been carried out in the application of consumption methods. For stakeholders in making decisions on BPJS drug procurement, the ABC method is quite helpful in making cost-efficient decisions. However, for a more perfect approach, a combination of proposed methods can be applied, such as the ABC-VEN method which looks at the level of drug vitality, the ABC method combined with the Consumption method, or the ABC method combined with the

epidemiology method. Further research is needed to understand the factors that cause significant differences in use and investment across drug groups. For example, whether these differences are due to pricing policies, drug availability, or patient preferences.

Author's Contribution

All authors have contributed to the final manuscript. The contributions of each author are as follows, Cin was responsible for collecting data, compiling the manuscript, and compiling figures, compiling the main conceptual ideas. Ind processed the data calculations as second author, Lin and Nor provided excellent guidance and critical revisions of the article. All authors discussed the results and contributed to the final manuscript.

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Declaration of Competing Interest

No potential conflict of interest.

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