Analysis of Health Expenditure on Rice Expenditure: A Case Study of Vulnerable Poor Households on Sulawesi Island

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ABSTRACT

Poverty reduction under the Sustainable Development Goals remains constrained by the persistence of vulnerable poor households, particularly in Sulawesi, where limited income and rising health expenditures increase the risk of falling into poverty despite being above the poverty line. This study aims to determine the income of vulnerable low-income households on Sulawesi Island using SUSENAS 2023 data and to analyze the ratio of health expenditure to rice expenditure. It is descriptive quantitative research using SUSENAS 2023 secondary data. The research population is 47,478 households, focusing on a sample of 9,223 vulnerable low-income households defined by expenditure of 1.0-1.5 times the provincial poverty line. Results show 9,223 vulnerable low-income households spread across six provinces. Central Sulawesi has the highest vulnerability threshold, while West Sulawesi has the lowest, reflecting regional price differences. Living costs increase economic vulnerability. The proportion of non-prescription health expenditure is highest in Central and Southeast Sulawesi, where it exceeds rice expenditure. Purchasing non-prescription drugs is common due to easier access and lower cost, despite risks of irrational use. Government social assistance for low-income households includes direct cash transfers, national health insurance, and food aid.

***Keywords**: Food Expenditure, Health Expenditure, Vulnerable Low-Income Households, Vulnerable Poor Households.*

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INTRODUCTION

The United Nations promotes Sustainable Development through the SDGs, which include goals on poverty eradication and health, and Indonesia, as a UN member, is committed to their achievement (Fonseca et al., 2020). Poverty is closely linked to vulnerability, as high poverty rates tend to increase the number of vulnerable poor, whose lives are marked by deprivation (Morduch, 1994; Syawie, 2011). The vulnerable poor typically have incomes slightly above the poverty line and experience limited access to adequate living conditions, education, and health services (Dariwardani, 2014; Kusuma & Wulansari, 2019; Suhaimi, 2025). Meanwhile, poverty itself reflects the inability to meet basic food and non-food needs, as defined by BPS through region-specific poverty lines shaped by price differences and consumption patterns (Khomsan et al., 2015; Kamagi et al., 2024). Households with many dependents are particularly vulnerable during economic shocks if income growth does not keep pace (Haskins, 2001; Hanum, 2018; Purwanto & Taftazani, 2018; Aini & Indrawati, 2022). Although Indonesia's poverty rate declined from 9.54% in 2022 to 9.03% in 2024, attention remains necessary for those classified as vulnerable poor, defined as individuals with per capita expenditure between 1.0 and 1.5 times the poverty line, to prevent them from falling into poverty through targeted policies (Habimana et al., 2021).

Sulawesi records relatively high poverty, with 66.67% of its provinces exceeding the national poverty rate, making it a relevant context for examining structural poverty rather

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than geographically driven poverty as in Papua. High poverty levels are typically accompanied by a large vulnerable poor population, highlighting the need for preventive policies based on accurate information about the determinants of poverty vulnerability, including household social, economic, and demographic characteristics.

Empirical evidence indicates that household vulnerability to poverty is shaped by several key factors. The age of the household head and the number of dependents significantly increase economic pressure, reducing households' capacity to meet basic needs and withstand economic shocks (Doti et al., 2021; Yulpratiwi et al., 2024). Low educational attainment further heightens vulnerability by limiting access to stable employment and income opportunities (Panduwinata et al., 2025). Residential location also matters, as rural households face higher vulnerability due to restricted access to jobs, public services, and economic infrastructure (Saputra, 2021). In addition, limited asset ownership weakens households' economic resilience, increasing the likelihood of falling into poverty when exposed to risks or shocks.

The expenditure of vulnerable poor households consists of food and non-food expenditure; non-food expenditure includes health, and location of residence/area, whether rural or urban (Mpuuga et al., 2025). According to Eze and Iheonu (2025) poor and vulnerable people are at risk of large financial expenditures when they fall ill. Most of Indonesia's population does not have guaranteed health services, so attention for them needs to be focused. This research refers to Engel's Law and household vulnerability theory, focusing on the link between food consumption priority and the risk of economic shock due to health expenditure or costs.

The National Socio-Economic Survey (*Survei Sosial Ekonomi Nasional*/SUSENAS) groups 16 household health expenditures. This research specifically analyzes modern non-prescription medicine expenditure because it is the most in demand; SUSENAS 2023 data shows 35,209 households had done so. The research objectives are to determine the number of vulnerable poor population in Sulawesi based on SUSENAS 2023 and the income of vulnerable poor households, and to determine the proportion of health expenditure to rice expenditure among vulnerable poor households in Sulawesi. This research provides input for regional and central governments to reduce the risk of vulnerable poor households falling into poverty.

LITERATURE REVIEW

Budget Constraint Theory

Budget constraint theory posits that households face limited financial resources that must be allocated across competing needs such as food, health, clothing, and education, so total expenditure cannot exceed available income. Under these conditions, an increase in spending on one category inevitably reduces the resources available for other needs due to trade-offs inherent in household decision-making. For vulnerable poor households whose income is only slightly above the poverty line, unexpected health expenditures can significantly constrain household budgets. Higher spending on health services, including inpatient care, outpatient treatment, medicines, and informal costs, often forces households to reduce spending on essential items like food, particularly staple foods such as rice, which can directly affect nutritional intake and household welfare (Nadjib & Pujiyanto, 2002; Mayasari et al., 2018). The theory thus provides a framework for understanding how limited income and competing priorities amplify the financial vulnerability of low-income households when facing health shocks.

Extending this framework, the soft budget constraint concept introduced by Kornai (1986) highlights how institutions or entities under continuous financial support can lose fiscal discipline. Maskin and Xu (2024) note that soft budget constraints arise from political intervention and weak institutional structures, while Robinson and Torvik (2009) emphasize political economy as a key driver. Zhu et al. (2019) empirically apply this concept to resource allocation in China, illustrating the tension between economic efficiency and political motives in financial management. For vulnerable poor households, this lens underscores how structural economic limitations, combined with

reliance on limited informal or governmental support, exacerbate the trade-offs between health spending and other basic consumption. As a result, budget constraints not only govern household decision-making but also shape the broader risk of poverty and food insecurity, reinforcing the vulnerability of low-income populations.

Household Expenditure

Household consumption expenditure refers to spending by households to purchase various goods and services needed to meet daily living requirements within a certain period (Haribowo et al., 2022). The level and structure of household consumption are shaped by several socio-economic factors, particularly income, employment experience, and the number of dependents (Prilmayanti & Kausar, 2025). Higher income and more stable work experience generally enable households to allocate more resources to both food and non-food needs, while a larger family size increases consumption pressure. These characteristics determine not only the volume of expenditure but also its composition, including the share devoted to essential items such as food, education, and health services. In developing countries like Indonesia, household consumption patterns are closely linked to vulnerability, as limited income and high dependency ratios restrict the ability to smooth consumption when facing economic or health shocks.

Health expenditure constitutes a crucial component of total household consumption, particularly in contexts where out-of-pocket payments dominate the financing of healthcare. Such expenditures include inpatient and outpatient services, medicines, and various informal costs. Wuryandari (2015) demonstrates that socio-economic factors, such as household size, age of the household head, and residential location, significantly affect the proportion of health spending, with larger households and urban residents bearing relatively higher shares. Similarly, Azzani et al. (2019) find that economic status, settlement characteristics, and family size and structure strongly influence health expenditure. Preventive health spending for children is shaped by the education of the household head, and low-income households tend to face a regressive health-expenditure burden, indicating persistent inequality in access to preventive health services between poorer and better-off groups.

Vulnerable Poor Households

The concept of vulnerable poor households refers to groups whose expenditure levels are slightly above the poverty line but who face a high probability of falling into poverty when exposed to economic shocks such as price increases, illness, or job loss. Rahman (2018) emphasizes that vulnerability is not only determined by current poverty status but also by the likelihood of becoming poor in the future. This perspective is reinforced by Adnyani and Sugiharti (2019), who define vulnerable poor households as those positioned just above the poverty threshold yet highly susceptible to descending into poverty in the following period. Statistical approaches such as the Vulnerable Expected Poverty (VEP) method are widely used to estimate this risk and to support the formulation of preventive poverty policies. Identifying vulnerability at an early stage is crucial, as it enables policymakers to design interventions before households actually fall into chronic poverty.

Empirical evidence indicates that socio-demographic and economic characteristics play a significant role in determining household vulnerability. Adnyani and Sugiharti (2019) find that the age of the household head, family size, education level, ownership of savings and land, and residential location significantly influence the risk of poverty. Health shocks further intensify this vulnerability, as Nadjib and Pujiyanto (2002) show that health expenditures often force households to reallocate spending from food to non-food needs, thereby weakening food security. Moreover, Mayasari et al. (2018) demonstrate that socio-economic characteristics strongly affect the food consumption patterns of poor households, indicating that limited income and high dependency ratios constrain dietary adequacy. These findings collectively suggest that vulnerable poor households face compounded risks arising from both structural socio-economic conditions and unexpected shocks.

RESEARCH METHODS

The type of research is descriptive quantitative, focusing on collecting numerical data to understand a specific phenomenon, or descriptive-explanatory. It uses secondary data, taken from SUSENAS 2023. Descriptive analysis is used to provide an overview of modern non-prescription medicine expenditure. The research location is Sulawesi Island, consisting of six provinces: North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Gorontalo, and West Sulawesi.

This research uses SUSENAS, which contains detailed information on household expenditure, both for food and non-food needs, including 16 categories of health expenditure. The number of respondent households in Sulawesi Island is 47,478, covering all economic groups from the lowest to the highest level. From this number, 35,209 households (equivalent to 74.16 percent) were recorded as having purchased modern non-prescription medicine. The main focus of this research is household expenditure on modern non-prescription medicines as a form of health expenditure. However, vulnerable poor households are the object of research.

Determination of the vulnerable poor household category in this research is done by multiplying each province's poverty line by between 1.0 and 1.5 times the poverty line. Based on this criterion, 9,223 vulnerable poor households were identified, and this research will focus on those households. Data analysis is carried out using descriptive statistical analysis techniques to describe the distribution of the proportion of health expenditure to rice expenditure of vulnerable poor households. Furthermore, households that have purchased modern non-prescription medicine and also consume rice are grouped.

RESULTS

Table 1 shows households classified as vulnerable poor with different incomes, and all provinces in Sulawesi Island have household groups vulnerable to falling into the abyss of poverty if not supported by social safety nets. Government attention is expected in policies favoring vulnerable poor households.

Table 1. Vulnerable Poor Households in Sulawesi

Province	Number of Vulnerable Poor Households	Vulnerable Poor Income (IDR)
North Sulawesi	1,573	490,719 - 736,078
Central Sulawesi	1,906	600,878 - 901,308
South Sulawesi	2,784	459,226 - 688,639
Southeast Sulawesi	1,794	462,715 - 694,072
Gorontalo	637	473,006 - 709,509
West Sulawesi	775	454,879 - 682,318
Total	9,223	

Based on Table 1, the number of vulnerable poor households in Sulawesi Island is 9,223 households; not entirely poor but at high risk of experiencing poverty. Of the total, the province with the highest number of vulnerable poor households is South Sulawesi, with 2,784 households, or about 29 % of the total sample, followed by Central Sulawesi with 1,906 households and Southeast Sulawesi with 1,794 vulnerable poor households. Meanwhile, the province with the fewest vulnerable poor households is Gorontalo, with 637 households, and West Sulawesi, with 775 households.

The determination of vulnerable poor households is based on an expenditure threshold slightly above the poverty line. Table 1 shows that Central Sulawesi Province has the highest vulnerable poor threshold, IDR 600,878 - IDR 901,308, indicating that the minimum cost of living is relatively high compared to West Sulawesi (IDR 454,879 - IDR 682,318) and South Sulawesi (IDR 459,226 - IDR 688,639), even though South Sulawesi is a relatively advanced province with stable economic growth of 5.18 percent and a low poverty percentage of 7.77 percent in 2024, yet many households are still vulnerable to falling into poverty. Southeast Sulawesi has a vulnerable poor household income range from IDR 462,715 to IDR 694,072, showing economic conditions nearly equivalent to

South Sulawesi. Meanwhile, Gorontalo: Vulnerable poor households with income between IDR 473,006 - IDR 709,509 per month, this value is slightly higher than in Southeast Sulawesi and South Sulawesi.

The expenditure of vulnerable poor households consists of food and non-food; most expenditure is allocated for food, for example, rice, cooking oil, eggs, vegetables, and so on. With low income, vulnerable poor households consume food in limited quantity and quality. Furthermore, these households consume cheaper local food available in gardens. BPS notes that food expenditure for vulnerable poor households ranges from 60 percent to 70 percent, while non-food expenditure ranges from 30 percent to 40 percent.

There are 16 types of annual health expenditure: Family planning costs, immunization costs, pregnancy check-up costs, government hospital health expenditure, private hospital health expenditure, community health center health expenditure, doctor's practice health expenditure, health worker practice health expenditure, traditional medicine expenditure, traditional birth attendant expenditure, pharmacy medicine expenditure, traditional medicine expenditure, modern non-prescription medicine expenditure, health test costs, and other health maintenance costs. The research results show that 7,086 or 76.94 percent of households bought modern non-prescription medicine because there was no cost to see a doctor, and the illness suffered was common. This shows that despite limited income, vulnerable poor households still have to bear relatively large health costs, potentially disrupting allocation for basic needs like rice. Social protection policies are still needed to slow the rate of latent poverty.

In the context of vulnerable poor households, a high proportion of health expenditure can be an indicator of economic instability. Unexpected expenditure due to illness or medical needs often forces households to reduce allocation for staple food consumption, such as rice, impacting family nutrition quality. Conversely, if the proportion of rice expenditure is very large compared to health, this could reflect a subsistence consumption pattern that pays less attention to health service access, thus increasing long-term vulnerability risk.

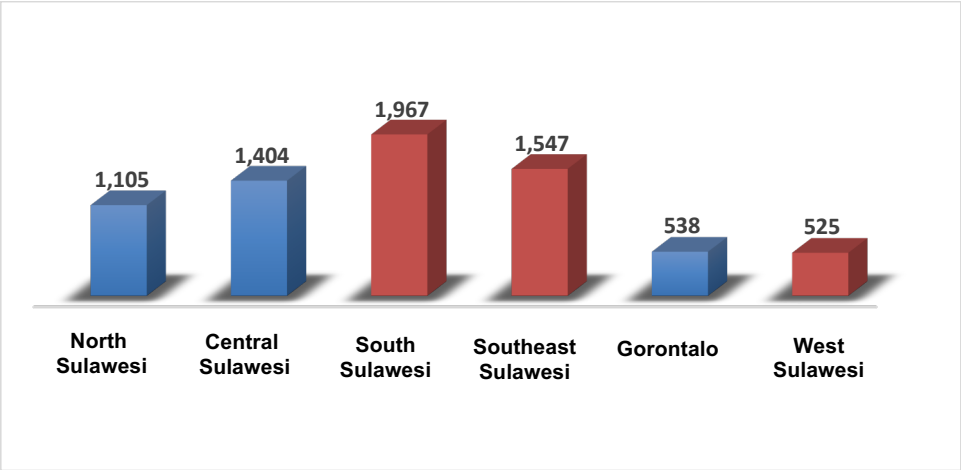

Figure 1. Number of Vulnerable Poor Households that have Ever Purchased Non-Perception Medicine

Figure 1 shows the number of vulnerable poor households by province in Sulawesi Island that have ever purchased modern non-prescription medicine. Two provinces have a higher demand for modern non-prescription medicine compared to others: Southeast Sulawesi Province, with 1,547 households, and South Sulawesi, with 1,967 households, prefer to buy modern medicine without consulting a doctor or medical personnel. However, some also buy medicine without a prescription due to minor illness, and medicine can be bought without a prescription at affordable prices. The government provides free medication assistance to low-income families as part of its concern for health. The free assistance program aims to provide health assistance for underprivileged

families to receive treatment without cost; assistance is given to sufferers of chronic, infectious diseases, or diseases requiring routine treatment. Essential medicine assistance programs are given for certain diseases like TB, hypertension, and infectious diseases.

Treatment is also provided for children and pregnant mothers through the Family Hope Program (*Program Keluarga Harapan*/PKH) program. A lack of information on how to access free medicine assistance or procedures to obtain free medicine requires socialization so that low-income households are aware of free treatment options. The Indonesian Ministry of Health and BPS state that the use of generic medicine and over-the-counter medicine without initial examination by medical personnel risks taking medicine at incorrect dosages; in the short term, it seems rational, but this is dangerous and can cause greater health disorders and higher treatment costs in the future. Purchasing medicine without a prescription is a form of coping strategy in facing financial limitations. Medicine that can be bought without a prescription is called OTC (Over-the-Counter) medicine; this type of medicine is usually easily obtained at pharmacies or drugstores without a medical personnel recommendation.

Generally, vulnerable poor households do not have strong assets or finances; when a family member falls ill and requires treatment costs or medicine purchase, the household diverts expenditure from other sources, for example, food expenditure, especially rice, because the rice portion can be reduced. Based on SUSENAS data, the highest food expenditure for poor and vulnerable households is rice. When health expenditure increases, rice expenditure is reduced, so rice consumption decreases. For households that continuously reduce rice consumption to pay for medicine or treatment, it will be difficult to escape poverty; vulnerable poor households are at risk of falling into poverty.

Table 2. Proportion of Health Expenditure to Rice

Province	Number of Samples (N)	Minimum	Maximum	Mean
North Sulawesi	1.105	0.00013	0.90217	0.01189
Central Sulawesi	1.404	0.00029	1.18693	0.02022
South Sulawesi	1.967	0.00014	0.55	0.0133
Southeast Sulawesi	1.547	0.00012	1.00	0.0124
Gorontalo	538	0.00026	0.1385	0.0080
West Sulawesi	525	0.00013	0.84	0.0108

Table 2 shows the proportion of vulnerable poor households' expenditure for health compared to rice. The proportion serves as an indicator to determine the magnitude of health cost pressure on the ability of vulnerable poor households to meet their basic need, namely rice. The table also reflects a large share of the total expenditure of vulnerable poor households that must bear out-of-pocket costs beyond government health insurance programs.

On average, the proportion of health expenditure to rice (Table 2) shows that vulnerable poor households in Central Sulawesi allocate health expenditure at 2.02 percent. Meanwhile, for Central Sulawesi and Southeast Sulawesi, the proportion value is above 1.2; this figure indicates that health expenditure in these two regions can exceed rice expenditure, though for some households, this figure is not the average.

Vulnerable poor households in West Sulawesi have 525 respondent households who have purchased medicine without a prescription; the average proportion value is 0.0108 or 1.08 percent; on average, households allocate 1.08 percent of rice expenditure for health needs. For North Sulawesi, the number of vulnerable poor households that have purchased medicine without a prescription is 1,105 households; the average proportion is 0.01189 or 1.19 percent; this data shows that 1.19 percent of vulnerable poor household' rice expenditure is used for health; the maximum value shows there are households with a very high health burden. Meanwhile, the lowest proportion is in Gorontalo, at only 0.0080 or 0.8 percent, indicating that few vulnerable poor households in Gorontalo have purchased medicine without a prescription. Purchasing medicine without a prescription is the choice of many vulnerable, poor households due to easier access and relatively more affordable costs, despite the risk of irrational medicine use. Purchasing medicine without

a prescription by vulnerable poor households is a form of coping strategy in facing financial limitations.

DISCUSSION

This study draws on Engel's Law, which states that low-income households allocate a larger share of expenditure to food, particularly staple foods such as rice, making them highly vulnerable to macroeconomic shocks and poverty traps (Calvo & Dercon, 2013). The results show that households in Sulawesi spend only slightly above the poverty line and are therefore highly sensitive to price increases, income loss, and health shocks (Gallardo, 2018), with provincial disparities indicating that economic growth alone does not reduce vulnerability without equitable distribution and adequate social protection, consistent with evidence that near-poor households remain highly exposed yet insufficiently covered by assistance programs (Rahman, 2018; Rahmawati et al., 2023).

The study finds that vulnerable poor households allocate 60–70% of total expenditure to food, mainly rice, consistent with Engel's Law, leaving very limited fiscal space so that rising non-food costs, especially health, directly reduce basic consumption (Syafiudin & Wongkaren, 2020). Health spending further heightens vulnerability, as 76.94% of these households purchase modern medicine without a prescription due to limited access to formal care and cost constraints, a short-term coping strategy that risks improper treatment and higher long-term health costs (Situmeang & Hidayat, 2018).

Previous research shows that public health plays an important role in household economic conditions. As stated by Hasan et al. (2022), public health is a very important resource for a nation's growth and survival. Furthermore, Muanas and Prakoso (2022) emphasize that household expenditure needs to be managed regularly and systematically so that fund use is on target. Additionally, Wardana and Firmansyah (2025) emphasize the importance of evaluating financial expenditure and resource allocation to ensure efficient fund use in households and organizations. This finding supports empirical evidence that unprotected health expenditure can pressure consumption of basic needs, such as rice, among vulnerable poor households in Sulawesi, thereby increasing the risk of falling into poverty due to high health costs.

The proportion of health expenditure to rice expenditure provides a concrete picture of health cost pressure on meeting basic needs. The highest average proportion is found in Central Sulawesi, while the maximum value in some provinces even shows that health expenditure can exceed rice expenditure for certain households. This condition indicates the existence of catastrophic health expenditure for some vulnerable poor households, where health costs force households to sacrifice consumption of staple food. This finding aligns with research in Indonesia showing that out-of-pocket health expenditure is one of the main factors driving households into poverty (O'Donnell, 2024).

This research confirms a substitution relationship between health expenditure and consumption of staple food, especially rice, among vulnerable poor households facing health shocks. When a household member experiences a health disorder requiring medicine or medical services, part of the household expenditure is diverted to cover health costs, thus reducing the portion of food consumption, such as rice. This pattern is consistent with empirical evidence in developing countries showing that out-of-pocket health expenditure has a crowding-out effect on expenditure for other basic needs, including food and education (Houeninvo et al., 2023). Global health reviews also show that health shocks increase the proportion of household spending for medical services, while expenditure for food and education decreases as a form of consumption adjustment in facing financial pressure due to high health costs (Datta et al., 2018; Kolukuluri, 2023).

Evidence from Indonesia shows that households without health insurance experience greater declines in food and non-food consumption after health shocks, while those with social insurance are better able to maintain basic food intake, although other expenditures remain constrained (Umaroh & Listiono, 2023). Similar patterns are found across low- and middle-income countries, where rising health costs reduce non-medical and food consumption in the absence of adequate financial protection (Qiu & Zhang, 2024).

Households affected by non-communicable diseases allocate a larger share of spending to health and less to food, particularly among the near-poor, indicating a trade-off between healthcare and nutrition (Odunyemi et al., 2024; Islam et al., 2025). Over time, reduced staple food intake can undermine nutrition and labor productivity, potentially creating a poverty trap as high medical expenses lower income and limit access to proper care (Ding, 2022). Consequently, low-income households often rely on self-medication rather than formal health services due to cost constraints (Haridoss et al., 2025; Utomo et al., 2025).

CONCLUSION

According to SUSENAS 2023 data, the number of vulnerable poor households in Sulawesi Island reaches 9,223 households that have purchased modern non-prescription medicine. Determination of vulnerable poor households is based on expenditure relative to the poverty line (1.0–1.5 times the poverty line in each province). Central Sulawesi, South Sulawesi, and Southeast Sulawesi provinces have more vulnerable poor households compared to other provinces. Meanwhile, the highest proportion of health expenditure to rice is found in Central Sulawesi and Southeast Sulawesi. Inability to finance treatment causes vulnerable poor households to choose to purchase medicine without a doctor's prescription. Therefore, health assistance is greatly needed, because expenditure costs for medicine have reduced the proportion of household expenditure for purchasing rice.

Health assistance policies for vulnerable poor households need to be designed to be on target. The government should conduct socialization and education regarding health and medicine literacy to the community, especially about the dangers of consuming medicine without a doctor's prescription. Furthermore, access to affordable basic health services must be expanded, especially in rural areas and regions with high concentrations of the poor population. This study is limited by the use of cross-sectional SUSENAS 2023 data, which does not capture dynamic changes in household vulnerability over time. In addition, health expenditure is based on self-reported data and does not account for illness severity or health outcomes. Future studies should employ longitudinal data and include health status and access to health insurance to better explain transitions from vulnerability to poverty.

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