

## Analysis of Commercial Enteral Formula (CEF) and Hospital Enteral Formula (HEF) usage on cost budget and patient food acceptance

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### ABSTRACT

The high cost of commercial enteral formulas (CEF) and the need for hospital budget efficiency, especially for patients funded by BPJS, are major concerns in nutritional services. Additionally, patient acceptance of enteral formulas is an important indicator of the success of hospital nutrition services. Therefore, hospital enteral formulas (HEF) are designed to meet patients' nutritional needs at a more affordable cost without compromising quality. The aim of this study is to analyze cost efficiency and patient acceptance of food intake when using CEF compared to HEF, as well as to develop recommendations for a more effective and efficient enteral food procurement strategy at RSUD Muhammad Sani Karimun. This study employs a qualitative approach with a case study design. The study informants include key informants, namely six patients on an enteral formula diet and nutrition kitchen staff (Pranata Jamuan), as well as supporting informants, namely the Head of Non-Medical Support Services at RSUD Muhammad Sani. Informants were selected using purposive sampling. Primary data were obtained through observations and interviews, while secondary data were collected through document analysis. The problem identification process used the fishbone method. The study results indicate that HEF is 51.64% - 52.64% more cost-efficient than CEF. Patient acceptance of HEF is relatively high, particularly in terms of taste and texture, while factors such as hygiene and lower costs are the main advantages of HEF. HEF is a more efficient alternative that still meets patients' nutritional needs. The use of HEF is recommended to optimize hospital budgets without compromising the quality of patients' nutritional intake.

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#### Kata kunci:

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### ABSTRAK

Tingginya biaya formula enteral komersial (FEK) serta kebutuhan untuk efisiensi anggaran rumah sakit, khususnya bagi pasien dengan pendanaan BPJS, menjadi perhatian utama dalam pelayanan gizi. Selain itu, daya terima makanan pasien terhadap formula enteral juga menjadi indikator penting dalam keberhasilan pelayanan gizi rumah sakit. Oleh karena itu, formula enteral rumah sakit (FERS) dirancang untuk memenuhi kebutuhan nutrisi pasien dengan biaya yang lebih terjangkau tanpa mengorbankan kualitas. Tujuan dari penelitian ini adalah menganalisis efisiensi biaya dan daya terima makan pasien terhadap penggunaan FEK dengan FERS, serta menyusun rekomendasi strategi pengadaan makanan enteral yang lebih efektif dan efisien di RSUD Muhammad Sani Karimun. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus. Informan pada penelitian ini terdiri dari informan kunci yaitu pasien dengan diet formula enteral sebanyak 6 orang dan petugas dapur gizi (Pranata Jamuan) serta informan pendukung yaitu Kepala Seksi Penunjang Non Medis RSUD Muhammad Sani. Teknis pengambilan informan secara purposive sampling. Data yang digunakan adalah data primer yang diperoleh melalui observasi dan wawancara. Data sekunder diperoleh melalui pengumpulan dokumen.

Penentuan masalah menggunakan metode fishbone. Hasil penelitian menunjukkan bahwa, FERS lebih efisien secara biaya dibandingkan FEK hingga 51,64% - 52,64%, tingkat daya terima pasien terhadap FERS cukup tinggi, terutama dalam hal rasa dan tekstur, faktor-faktor seperti higienitas dan biaya yang lebih rendah menjadi keunggulan utama FERS. FERS merupakan alternatif yang lebih efisien dan tetap memenuhi kebutuhan nutrisi pasien. Penggunaan FERS direkomendasikan untuk mengoptimalkan anggaran rumah sakit tanpa mengorbankan kualitas asupan gizi pasien.

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## INTRODUCTION

One of the healthcare services provided by hospitals is nutrition services. Hospital nutrition services are tailored to the condition of patients based on clinical status, nutritional status, and metabolic status. These services include outpatient and inpatient nutrition services, food provision, as well as research and development in nutrition (Kemenkes, 2013). The high prevalence of malnutrition in hospitals has increased the focus on nutrition management. Improved nutrition management has been shown to reduce malnutrition rates to 38% in 1988. However, progress has been slow, with research in 1995 indicating that 50% of hospitalized patients experienced varying degrees of malnutrition, and 25-30% of patients faced worsening malnutrition during their treatment (Purnomo et al., 2018). Enteral formulas are recommended as dietary therapy for critically ill patients over parenteral formulas, provided the gastrointestinal tract remains functional (Mauliyah & Sinambela, 2019).

Food plays a fundamental role in religious, cultural, and ethical traditions. We often prioritize medication or other medical interventions while neglecting nutritional therapy (Hartono, 2006). Nutrition is a critical determinant in improving human quality of life (Harjatmo, 2024). The provision of nutritional therapy in hospital services often encounters challenges, one of which is the acceptance of dietary meals. Diets may not be effectively implemented due to additional foods brought by patients' families, which are not part of the hospital-prescribed diet, often citing patient preference as the reason (Uyami et al., 2019). This factor influences the success of nutrition services, where patient acceptance of  $\geq 80\%$  means food waste should not exceed  $\leq 20\%$ , in accordance with Ministry of Health Decree No. 129/Menkes/SK/II/2008 concerning Minimum Hospital Service Standards, which states that uneaten food should not exceed 20% (Sari & Balgis, 2017).

Based on the recommended dietary allowances, the nutritional and energy requirements decrease with age (Kemenkes RI, 2019). When determining the type of diet to be provided to hospitalized patients, it is essential to assess the patients' physical condition, which includes blood pressure, respiration, pulse, and temperature (Ibrahim et al., 2012). Consequently, food provision varies in form and type. Enteral nutrition can be administered either as a bolus or via infusion using an enteral pump (Harti, 2023). Enteral formulas are categorized into two types: commercial enteral formula (CEF) and hospital enteral formula (HEF). However, the high cost of CEF and the prevalence of patients covered by BPJS health insurance necessitate innovation in providing adequate, hygienic, and cost-efficient enteral nutrition by developing HEF (Elenia et al., 2020).

Budget efficiency has become increasingly important in Indonesia, particularly in the context of healthcare services funded by BPJS. The National Health Insurance System (JKN), managed by BPJS Kesehatan, faces significant pressure due to the growing number of participants and the increasing demand for healthcare services. One area requiring attention is the management of hospital nutrition, especially regarding the utilization of enteral formulas. The high cost of commercial enteral formulas (CEF) poses a significant challenge, particularly for patients with limited financial resources. Therefore, innovation in developing hospital-based enteral formulas (HEF) that are efficient, safe, and of high quality represents a strategic step to reduce BPJS's financial burden without compromising service quality.

In global literature, budget efficiency in the health sector has been a primary focus in many countries with universal health insurance systems. For instance, research in the United Kingdom on the National Health Service (NHS) revealed that developing local solutions, such as specialized nutritional formulas based on local raw materials, could reduce procurement costs by up to 30% without compromising the quality of care. This is relevant to Indonesia's efforts to develop HBEF based on local materials as a more affordable alternative to CEF.

Research by Putriningtyas et al. (2023) showed that 18 respondents (75%) liked the product's color, 13 respondents (54.2%) liked the taste, 21 respondents (87.5%) liked the aroma, and 16 respondents (66.7%) liked the texture of the developed enteral formula (Putriningtyas et al., 2023). Research by Lestari et al. (2019) indicated that the nutritional content aligns with Indonesia's general composition standards, the microbiological tests and shelf life are within safe limits according to SNI, and over 80% of sensory panelists favored powdered HEF based on organoleptic tests. Additionally, the material cost was cheaper than commercial enteral formulas (Lestari et al., 2019). Ariani et al. (2013) explained that using local food ingredients in HEF can improve and enhance body weight, but selecting and using local food ingredients must align with the nutritional content required in hospital enteral formulas (Ariani et al., 2013). Hawa and Murbawani (2015) illustrated that certain local food ingredients in enteral formulas can positively impact specific disease diagnoses, as evidenced by clinical and biochemical examinations (Hawa & Murbawani, 2015).

The importance of efficient nutrition management, in terms of cost and patient acceptance, must be emphasized in nutrition services. Commercial enteral formulas (CEF) offer convenience and hygiene advantages but are expensive, particularly for patients relying on BPJS coverage. On the other hand, hospital enteral formulas (HEF) provide a more cost-effective solution without compromising nutritional quality. This study aims to analyze the cost efficiency and

patient acceptance of HEF compared to CEF as an innovative effort in nutrition services at RSUD Muhammad Sani Karimun.

## METHOD

### Research design

This study employs a qualitative approach with a case study design to compare the cost efficiency and patient acceptance of commercial enteral formulas (CEF) and hospital enteral formulas (HEF) at RSUD Muhammad Sani Karimun in 2024. The research follows an observational case study approach, allowing for an in-depth exploration of this phenomenon within a real-world hospital setting. This design provides comprehensive insights into contextual factors, including hospital policies, patient experiences, and the perspectives of nutrition staff.

### Research Location and Participants/Informant

The research was conducted at Muhammad Sani Hospital in Karimun Regency, Riau Islands Province. Informants were selected through purposive sampling to ensure the collection of relevant and specific data. The key informants consisted of six inpatients receiving enteral formulas and hospital nutrition kitchen staff, while the supporting informant was the Head of Non-Medical Support at Muhammad Sani Hospital. Informants were collected by purposive sampling. The selection of informants was based on inclusion and exclusion criteria. The inclusion criteria were: (1) inpatients at Muhammad Sani Hospital who received enteral formulas (CEF or HEF) during the study period, (2) nutrition kitchen staff directly involved in enteral formula provision, and (3) the Head of Non-Medical Support Division, who played a role in budgeting and managing enteral formula operations. The exclusion criteria included (1) patients unwilling to participate in interviews or observations, (2) nutrition kitchen staff who were not on duty during the study period, and (3) informants unable to provide information relevant to the study's focus.

The study involved six inpatients as key informants, several staff members and officials from the nutrition unit and hospital administration. The number of informants was determined based on the principle of data saturation, where no new information is found in data collection.

### Data Collection

Primary data were obtained through direct observation and interviews with the informants. Secondary data were sourced from hospital documents, including budget reports, hospital profiles, and nutrition unit activity logs. The study utilized fishbone diagrams to identify root causes.

### Data Validity

Data validity was ensured through triangulation, including source triangulation and method triangulation. Source triangulation involved verifying information from both key informants and supporting informants. Method triangulation was conducted using multiple approaches, including in-depth interviews, observations, and document analysis. Data triangulation was further reinforced through

cross-checking the information obtained from different informants.

### Data analysis

The collected data were analyzed using a thematic qualitative approach. A fishbone diagram was employed to systematically identify the root causes of the issues related to the cost efficiency and acceptance of enteral formulas. The findings were then further refined using the USG prioritization method to determine actionable interventions.

## RESULTS OF STUDY

This study was conducted at RSUD Muhammad Sani Karimun, a type-C hospital offering various specialized services, including inpatient nutrition services. These services encompass meal provision and the administration of enteral formulas for patients with specific needs (PLIP RSUD Muhammad Sani, 2023). RSUD Muhammad Sani Karimun offers a nutrition program that includes the use of commercial enteral formulas (CEF) and hospital enteral formulas (HEF). While CEF provides convenience in preparation and sanitation, it is costly. In contrast, HEF has been developed as a more economical alternative, utilizing local ingredients and modifications tailored to patient needs.

Based on observations and interviews with the Head of the Non-Medical Support Division, the Head of Support Services, the Procurement Officer, the Technical Activity Officer, and nutrition staff, some aspects of hospital nutrition services remain suboptimal. These include the patient food service system and nutritional care delivery. Interviews with the Head of the Non-Medical Support Division and the Head of Support Services revealed:

*"Several service indicators still need to be evaluated and improved in hospital nutrition services, particularly regarding the high expenditure on commercial enteral formulas."*

Further interviews with the Procurement Officer and the Technical Activity Officer highlighted:

*"There is a need for budget efficiency in food procurement, particularly for milk or commercial enteral formulas."*

Since early 2024, the Head of the Nutrition Installation has introduced modifications to liquid meals/enteral formulas by preparing and producing them internally in the hospital's nutrition kitchen. This initiative was motivated by the high budget allocation for commercial enteral formulas and aims to enhance the nutrition installation's capacity to deliver nutrition services. It also seeks to improve the competency of nutrition staff in processing modified meals without compromising the nutritional content required by patients, using local food ingredients.

Despite the efforts, challenges remain in the implementation of HEF in dietary therapy. Observations and interviews revealed that the primary challenges are related to the routine procurement of HEF rather than patient acceptance. Routine procurement has been hindered by inconsistencies among nutrition staff in administering HEF for dietary therapy. There is still a preference for CEF over HEF in some cases. Additionally, nutrition staff have not fully adhered to HEF usage guidelines, which stipulate that HEF must be provided to patients on liquid diets between 5:30 AM and 7:00 PM. Observations showed instances where

nutrition staff discreetly administered CEF outside permitted hours, as CEF is only allowed after 7:00 PM.

The combination of HEF and CEF usage is influenced by the fact that nutrition staff work in only two shifts per day, with the last shift ending at 7:00 PM. Moreover, the hospital lacks proper food storage equipment to maintain the temperature stability of HEF in inpatient pantries or patient rooms for those requiring dietary therapy after 7:00 PM.

Regarding HEF acceptance, observations and interviews found no complaints from patients or their families. The taste of HEF was generally well-received. Patient families expressed strong support for HEF, stating:

*"If patients need enteral formula therapy at home post-discharge, the cost can be significant. Patients might require up to six servings daily, with each serving consuming one sachet of milk/CEF. Thus, hospital-provided information about preparing HEF at home serves as a cost-saving alternative."*

Patients receiving enteral diet therapy who could orally sample the formulas compared CEF and HEF, stating:

*"CEF tastes sweeter, but HEF is also palatable, resembling milk. However, the color differs slightly—HEF has a white-to-*

*baby-pink hue, whereas CEF is pure white. CEF smells like commercial milk, while HEF has a sweet porridge or milkshake aroma. The texture is similar for both."*

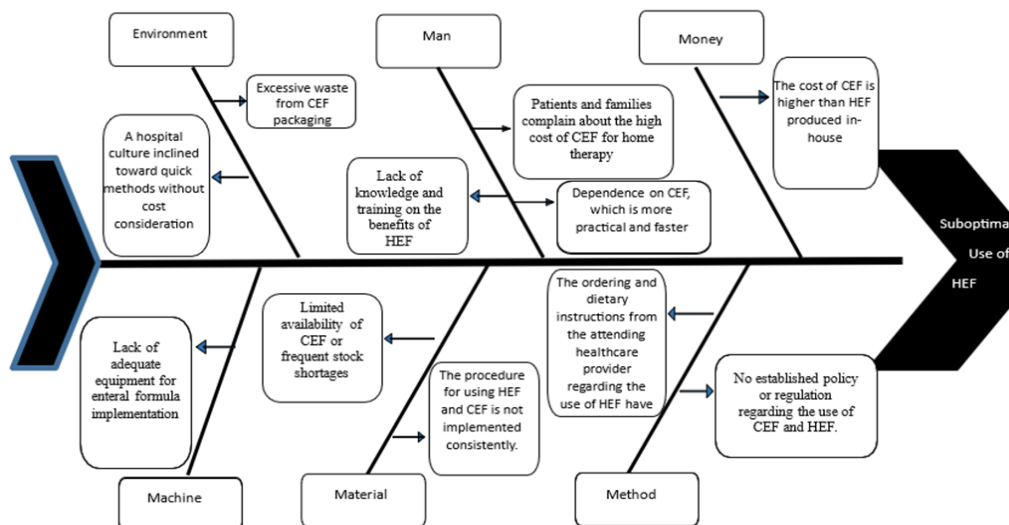
Based on the explanation above, it can be concluded that issues still persist regarding the suboptimal use of hospital enteral formulas for patients on liquid diet therapy and those with NGT (nasogastric tube) in the inpatient ward of RSUD Muhammad Sani. Challenges in Utilisation of Hospital Enteral Formula (HEF) at Muhammad Sani Hospital are presented in table 1.

**Fishbone Analysis**

The challenges in the Nutrition Installation's services were analyzed using the Fishbone Analysis method to identify the root causes of these problems. The figure 1 illustrates the primary issues and contributing factors. From the fishbone analysis, the causes and alternative solutions for the use of hospital enteral formula (HEF) for patients on liquid diet therapy and those with NGT in the inpatient unit of RSUD Muhammad Sani can be identified.

**Table 1**  
**Challenges in the Utilization of Hospital Enteral Formulas (FERS) at RSUD Muhammad Sani**

Challenges	Issue	Description
Logistical Issues	Availability and Storage	FERS requires specialized storage to maintain temperature stability, especially for patients needing enteral formulas after 7:00 PM. Currently, adequate storage facilities are unavailable.
	Routine Procurement	Procurement of HEF lacks continuity due to reliance on local raw materials and some staff preferences for commercial enteral formulas (CEF).
Staff Preferences	Limited Operational Hours	Nutrition staff work only two shifts, up to 7:00 PM, making it difficult to provide liquid diets beyond these hours.
	Policy Compliance	Some nutrition staff provide CEF at unauthorized times due to convenience.
Culture and Policy	Competence and Knowledge	There is insufficient training and understanding of HEF benefits among nutrition staff. Some staff prefer CEF as it is simpler to prepare.
	Established Habits	The work culture favors quick methods without considering cost efficiency, leading to a preference for CEF
Patient and Family Challenges	Lack of Formal Policies	Hospital management has no binding policy to ensure consistent use of HEF in patient diet therapy.
	Cost Efficiency	While HEF is more economical, patients and families require education on its preparation and benefits to ensure therapy continuity at home.
	Acceptance	Patients and families generally accept HEF but often compare its taste to CEF, which is perceived as more palatable.



**Figure 1. Fishbone Analysis of the Suboptimal Use of Hospital Enteral Formula**

**Table 2. Alternative Solutions**

No	Component	Causes	Solution
1.	Man	<ul style="list-style-type: none"> <li>Lack of knowledge and training on the benefits of HEF.</li> <li>Patients and families complain about the high cost of CEF for home therapy</li> </ul>	<ul style="list-style-type: none"> <li>Enhance knowledge of CEF and HEF among healthcare providers (HCP) and improve nutrition staff competence in HEF preparation.</li> <li>Modify enteral formulas using HEF and educate patients and families on recipes and preparation methods for home use</li> </ul>
2.	Method	No established policy or regulation regarding the use of CEF and HEF.	Develop management policies (Director-level) on HEF usage for inpatient dietary therapy at RSUD Muhammad Sani.
3.	Money	The cost of CEF is higher than HEF produced in-house	Implement HEF usage to reduce the procurement cost of CEF in patient food supply
4.	Material	Limited availability of CEF or frequent stock shortages	Combine the use of CEF with HEF
5.	Machine	Lack of adequate equipment for enteral formula implementation	Provide HEF storage equipment to maintain temperature stability for evening use (when nutrition staff are off duty), ensuring HEF can be used during all patient feeding times
6.	Environment	Excessive waste from CEF packaging and a hospital culture inclined toward quick methods without cost consideration.	Reduce CEF usage and raise awareness of the importance of HEF for the hospital, the environment, and overall staff outcomes.

## DISCUSSION

The research findings indicate that the implementation of Hospital Enteral Formula (HEF) as a more economical and efficient alternative compared to Commercial Enteral Formula (CEF) at RSUD Muhammad Sani. Qualitative findings show that the lack of training and knowledge among nutrition staff about FERS, the continued dominance of CEF due to its practicality, and non-compliance with HEF recipe standards result in material wastage. Additionally, there is a lack of institutional policies supporting HEF implementation, which requires supervision to enhance consistency. Based on procurement reports from 2022-2024, the implementation of HEF can significantly reduce the budget by 51.64% - 52.64%. In other words, the use of local ingredients in HEF can reduce costs compared to CEF, as the application of Hospital Enteral Formula (HEF) using local ingredients reflects the principle of resource efficiency. According to the theory of resource efficiency, optimizing the use of affordable local ingredients can minimize waste and expenses, as evidenced by budget savings of up to 52.64%. The limited working shifts and the lack of supporting equipment for storing HEF in inpatient pantries also hinder the continuous application of HEF. The use of CEF generates more waste compared to HEF, which increases hospital waste disposal costs. Based on patient food acceptance, HEF shows good tolerance, with no complaints such as diarrhea or vomiting. HEF allows for ingredient modifications to meet the nutritional needs of patients. This approach considers factors such as taste, aroma, and texture, which, in this study, are comparable to Commercial Enteral Formulas (CEF), demonstrating that HEF is acceptable to patients both in terms of organoleptic properties and clinical outcomes. HEF can serve as a viable alternative to enteral formulas for patients, offering both cost efficiency and nutritional support. However, its successful implementation requires support in the form of training, policies, and adequate facilities.

Several related studies on enteral feeding in various contexts, both in patients and rats, with different formula modifications, show that regarding enteral feeding, Purnomo et al. (2007) found that 68.25% of enteral nutrition administration by families did not follow procedures, while the administration by nurses was mostly compliant. This highlights the importance of education regarding proper procedures. For enteral formula modifications, Putriningtyas

et al. (2023) developed a formula with ingredients such as whey protein and skim milk, which were well accepted in terms of color, taste, aroma, and texture. Lestari et al. (2019) showed that ready-to-mix hospital formulas are more affordable and safer than commercial formulas. This formula was preferred by more than 80% of panelists based on organoleptic tests.

The effect of local ingredients in enteral formulas, as studied by Ariani et al. (2013), demonstrated that local food ingredients in enteral food could increase hemoglobin and iron levels in malnourished rats. Meanwhile, Hawa and Murbawani (2015) showed that pumpkin was an antidiabetic ingredient for diabetic rats, although it did not significantly lower postprandial blood glucose levels (Hawa & Murbawani, 2015). Therefore, it can be concluded that modifying enteral formulas with local ingredients can improve nutritional value, reduce costs, and provide health benefits under certain conditions.

This study identifies practical implications of the findings for hospital policy as follows: The lack of institutional policies is a major obstacle; hospitals need to establish policies mandating the implementation of HEF, accompanied by strict oversight to ensure adherence to standardized recipes. Training for nutrition staff and healthcare professionals on the procedures and benefits of HEF is essential to enhance their knowledge and skills. The more efficient waste management of HEF compared to CEF supports environmentally friendly policies and reduces waste disposal costs. Additionally, providing adequate storage and management equipment in inpatient pantries is crucial to ensure the sustainability of HEF implementation.

Recommendations for future research on HEF implementation include investigating the long-term effects of HEF, optimizing HEF recipes, and conducting broader-scale comparisons, such as comparative studies involving a larger sample of hospitals, including private hospitals and remote areas, to evaluate the feasibility of FERS implementation in various contexts. Additionally, cost-environmental analyses of HEF implementation should be explored.

**Table 2.**  
**Plan of Action (POA) for Optimizing the Use of HEF for Patients on Liquid Diet Therapy and Patients with NGT in the Inpatient Unit of RSUD Muhammad Sani Karimun**

NO	Components	Activities	Goals	Target	Time	Funding	Location	Implementers	Method	Indicators
1.	<b>MAN</b>	<ul style="list-style-type: none"> <li>Provide specialized training on enteral formulas (CEF and HEF) to nutrition staff and PPA.</li> <li>Educate patients and families on the recipes and preparation of HEF at home.</li> </ul>	<ul style="list-style-type: none"> <li>To enhance the knowledge of PPA and improve the competency of nutrition staff in preparing HEF.</li> <li>To increase patients' and families' understanding of HEF preparation so they can continue HEF therapy at home.</li> </ul>	<ul style="list-style-type: none"> <li>Nutrition Staff, Dietitians, and other PPA.</li> <li>Patients and families.</li> </ul>	Adjusted  Adjusted	BLUD RSUD Muhammad Sani  -	RSUD M.Sani  RSUD M.Sani	Head of Nutrition Installation  Ward Dietitians	Lectures, Discussions, Q&A, Practice Lectures and Q&A	Availability of competent and skilled nutrition staff Patients and families able to continue HEF therapy at home for those requiring ongoing HEF therapy
2.	<b>METHOD</b>	Proposal of a policy brief to management (Director).	To establish binding policies or regulations for all PPA and nutrition units in administering diet therapy using HEF.	Director	Adjusted	-	RSUD M.Sani	Head of Nutrition Installation	Discussions and document submissions	Issuance of Policy Letter or Regulation for the use of HEF at RSUD M. Sani.
3.	<b>MONEY</b>	Proposing budget allocations and reporting on cost comparisons for the procurement of liquid food using CEF and HEF.	To optimize budget efficiency for patient meal expenses (especially for CEF).	Director	Adjusted	BLUD RSUD Muhammad Sani	RSUD M.Sani	Head of Nutrition Installation	Discussions and document submissions	Availability of funds for patient meal provisions
4.	<b>MATERIAL</b>	Procuring HEF as a combination in the administration of liquid diet therapy for patients	To modify patient diets by utilizing local food resources, reducing costs effectively.	PPBJ, Warehouse Supervisor, and Nutrition Staff	Adjusted	BLUD RSUD Muhammad Sani	RSUD M.Sani	Head of Nutrition Installation	Submission of recipe formularies and SOPs	Availability of HEF in nutritional therapy
5.	<b>ENVIRONMENT</b>	Disseminating policies on the use of HEF for diet therapy	Ensure all PPA and nutrition unit staff adhere to policies or regulations on the use of HEF.	PPA and Nutrition Unit.	Adjusted	BLUD RSUD Muhammad Sani	RSUD M.Sani	Head of Nutrition Installation	Discussions and Q&A	Implementation of HEF use in accordance with policies and SOPs
6.	<b>MACHINE</b>	Procuring storage and processing equipment for HEF implementation	To apply HEF during all patient meal times as per the predetermined diet therapy	Management, PPBJ, and PPTK	Adjusted	BLUD RSUD Muhammad Sani	RSUD M.Sani	Head of Nutrition Installation	Submission of equipment request documents	Availability of equipment to support HEF procurement

## CONCLUSIONS AND RECOMMENDATION

Based on the research findings, it can be concluded that there are several important indicators supporting the use of both Hospital Enteral Formula (HEF) and Commercial Enteral Formula (CEF) in providing nutrition therapy to patients in hospitals. The use of HEF has several advantages over CEF, with HEF proving to be more economical and efficient, with cost savings of 51.63% - 52.64%. HEF also provides flexibility in adjusting patient nutritional needs without compromising food quality and safety. In terms of food acceptance, both HEF and CEF are equally well-received based on taste tests, aroma, texture, and other factors, though clinical factors and eating habits influence patient acceptance.

HEF also allows modification and adjustment of nutritional composition based on specific patient needs, such as lactose-free or high-protein formulas. On the other hand, CEF excels in hygiene standards and shelf life but is hindered by higher costs compared to HEF, especially for patients with BPJS funding. Furthermore, the importance of nutritional care through the use of enteral formulas, both HEF and CEF, significantly impacts improving patient nutritional status, accelerating recovery, and reducing the risk of malnutrition. Based on these indicators, HEF can be a more economical and flexible alternative in dietary therapy services. This also requires sufficient policy and facility support for its implementation.

It can be concluded that the scientific contribution of this study to the development of nutritional services in hospitals is highly significant, including cost efficiency, nutritional flexibility, improved nutrition care, practical recommendations for hospitals, and the provision of policy and facility support to maximize the implementation of HEF.

Recommendations from this research include the development of formulas tailored to patient conditions to improve cost efficiency and acceptance. Hospitals are encouraged to establish policies regarding HEF use, engage in multidisciplinary collaboration among nutrition teams, doctors, and other healthcare professionals to choose the appropriate formula, and provide training for kitchen staff and medical personnel. Additionally, testing the development of HEF based on local ingredients is recommended to increase competitiveness over CEF (Commercial Enteral Formula), as well as efficient budget management with HEF allocation for specific cases and CEF for special conditions..

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