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Original Research

The Association between Distribution Timeliness and Plate Waste of High Energy High Protein Diet in Hospital

Hubungan Ketepatan Waktu Distribusi dan Sisa Makanan Pasien Diet Tinggi Energi Tinggi Protein di Rumah Sakit

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Abstract: Plate waste in hospital settings is a critical indicator of food service quality, particulary for patiens on high-energy, high-protein (HEHP) diets. Excessive plate waste undermines dietary objectives and patient recovery. This study assessed the relationship between portion size accuracy and a meal service timeliness with plate waste among patient on HEHP diets in a hospital. A cross-sectional study was conducted at Wates Regional Hospital, involving 56 meals assessed in August 2023. Data on portion size accuracy, meal service timeliness, and plate waste were analyzed using Independen t-test and Chi-Ssquare test. Accurate portion sizes were observed for animal-based and plant-based protein but were inconsistent for staple foods and vegetables. Average plate waste ≥20% was found in most food categories except for animal protein (<20%). There was no significant correlation between portion size accuracy and plate waste. However, meal service timeliness was significantly associated with plate waste for staple foods (p = 0.008), animal protein (p<0.001) and supplementary foods (p = 0.005). Timely meal delivery significantly reduced plate waste for staple food and protein-rich items, emphasizing the importance of optimizing food distribution practices in hospitals.

Keyword : Meal Timeliness, Plate waste, High Energy-Protein Diet, Hospital Nutrition

1. INTRODUCTION

Nutritional services in hospitals encompass outpatient nutritional care, inpatient nutritional care, research and development, and food service management (1). However, issues persist in hospital food service management, particularly regarding patient plate waste, which often exceeds 20%. According to the hospital nutrition service standards established by the Ministry of Health, Republic of Indonesia, acceptable plate waste should be ≤20%(2).

Patients on high-energy, high-protein (HEHP) diets frequently leave significant amounts of food uneaten. HEHP diets are typically prescribed for patients with conditions such as burns, cancer, surgical recovery, malnutrition, fever, lactation, pregnancy, and other catabolic conditions related to their illnesses(3). Instances of plate waste exceeding the standards set by the Ministry of Health have been reported in several hospitals for patients on HEHP diets. For example, in Dr. Saiful Anwar

Regional Hospital, Malang, patient plate waste for HEHP diets was recorded at 25.03%(4). Similarly, at the Muhammadiyah University Hospital, Malang, patients on a 1,900 kcal HEHP diet left an average of 57% of their meals uneaten across three main meals (5). The portion size of hospital meals should align with the portion standards established by the hospital. A portion size is considered accurate when the percentage of the comparison between the portion served and the standard portion falls within the range of 90–110%(6). Inaccurate portion sizes can result from staff relying on estimation when serving meals(7). For pulmonary tuberculosis patients on high-energy, high-protein (HEHP) diets, inaccurate portion sizes may lead to meals that fail to meet the dietary nutrient standards, potentially prolonging recovery and reducing nutritional status(8).

Minimizing patient plate waste requires attention to several factors, including portion size accuracy, timeliness of meal service, and food organoleptic quality. Ensuring accurate portion sizes is particularly important, as portion size directly impacts patients' nutrient intake(9). Larger portion sizes provide greater nutritional intake, while smaller portions result in reduced nutrient consumption(10). Another factor influencing patient plate waste is the timeliness of meal service. According to the Ministry of Health (2), the standard for meal service timeliness is ≥90%. However, this standard was not met at Wates Regional Hospital during the evening meal service, where only 89.83% of meals were served on time(11). Ensuring timely meal service reduces the likelihood of patients consuming food from outside the hospital due to hunger (12). This study aims to examine the relationship between portion size accuracy and meal service timeliness with plate waste among patients on high-energy, high-protein (HEHP) diets in hospitals.

2. METHODS

This study utilized an analytical observational design with a cross-sectional approach, conducted at Wates Regional Hospital (RSUD Wates) in August 2023. The sample consisted of 56 respondents meal that receiving high-energy, high-protein (HEHP) rice-based diets during evening meals, selected through total sampling over three cycles-rotation of a 10+1 menu. Data collected included respondent characteristics, portion size (measured by weighing), evening meal service timeliness (observed directly) and plate waste (assessed using the Comstock method). The tools and procedures used for portion size measurement, specifically digital scales with a precision of ±1 gram were utilized for weighing food items, and all measurements were conducted by trained enumerators following a standardized protocol. Data were analyzed using the Independent t-test and Chi-Square test. Ethical approval for the study was obtained from the Wates Regional Hospital Health Research Ethics Committee (No. KEPK/152/RS/VII/2023). All participants provided informed consent prior to data collection, and strict confidentiality protocols were observed to protect patient information. The meal sample inclusion criteria were: 1. Patients receiving HEHP diets; 2. Evening meals prepared by the Nutrition Installation of hospital; 3. Adult patients aged over 18 years; 4. Regular meals in standard form; 5. Meals provided through oral

feeding. Exclusion criteria included: 1. Patients receiving modified diets in combination with other dietary regimens; 2. Patients who were fasting; 3. Patients in isolation wards; 4. Meals not consumed by patients.

3. RESULTS

The HEHP (high-energy, high-protein) diet standards at Wates Regional Hospital (RSUD Wates) are categorized into filtered, porridge, steamed, and rice-based options. This study focused on patients receiving evening meals consisting of rice-based HEHP diets. Meals were provided three times a day as main meals (breakfast, lunch, and dinner) with two snacks (at 10:00 AM and 3:00 PM). The respondents were predominantly aged 19–29 years (41.1%) and 30–49 years (41.1%). The majority were female (85.7%). A significant proportion of respondents received menu cycle IX (14.3%), and many were postpartum patients (42.8%).

Table 1. Characteristic of Subjects

Characteristic of Subjects (n = 56)	n	(%)
Age (Years Old)		
19 – 29	23	41,1
30 – 49	23	41,1
50 – 64	8	14,3
65 – 80 tahun	2	3,6
Sex		
Laki-laki	8	14,3
Perempuan	48	85,7
Menu Cycle Day		
I	5	8,9
II	7	12,5
III	4	7,1
IV	6	10,7
V	5	8,9
VI	5	8,9
VII	5	8,9
VIII	6	10,7
IX	8	14,3
X	4	7,1
X+I	1	1,8
Diagnosis		
Pregnancy	10	17,9
Post partus	24	42,8
Post kuretase	2	3,6
Adenomiosis chocolate cyst	1	1,8
AUB, Anemia	2	3,6
Post op TVH	1	1,8
Retensi IUD, Anemia	1	1,8
Cancer serviks, Anemia	1	1,8
Obs febris, vomitus profuse with moderate dehydration	1	1,8
Efusi pleura susp pulmonary tumor	1	1,8
Bilateral kidney stones	1	1,8
Right ureteral stone	2	3,6
Mild head injury	2	3,6
Skull defect	1	1,8
Bone fracture	6	10,7

The HEHP rice diet portions are standardized as follows: for breakfast, 1/3 cup rice (200 g), one piece of meat (50 g), one piece of tempeh (35 g), one cup of vegetables (100 g). Morning snack: one piece of cake (50 g). For lunch, 1/3 cup rice (200 g), one piece of fish (50 g), one egg (50 g), one cup of vegetables (100 g), one piece of fruit (100 g). Afternoon snack : one piece of fruit (50 g). For dinner : 1/3 cup rice (200 g), one egg (50 g), one piece of tempeh (35 g), one piece of tofu (50 g), one serving of fruit (50 g). Portion sizes accuracy involves comparing the real weight (in grams) of the food served to the standardized portion size. This is expressed as a percentage of the actual weight relative to the standart portion size. The formula to calculate portion accuracy is : Portion Accuracy (%) =(actual weight of food in grams / standar portion size in grams) x 100. Portion sizes are considered accurate if the ratio falls within the range of 90–110%. Conversely, portion sizes are deemed inaccurate if the ratio is <90% or >110%. Animal-based and plant-based protein dishes tended to have accurate portion sizes, whereas staple foods and supplementary foods were more likely to be inaccurate. Vegetable portions were the least accurate compared to other food types.

The relationship between portion size accuracy and plate waste was analyzed using the Independent Sample T-Test. Table 2 shows that there was no significant relationship between portion size accuracy and plate waste for staple foods (p = 0.985), animal-based protein (p = 0.991), plant-based protein (p = 0.422), vegetables (p = 0.941), or supplementary foods (p = 0.892).

Table 3. Association between Portion Size and Patient`s Plate Waste

Portion Size	**Plate Waste (n = 56)**		***p value***
	≥ 20%	**<20%**	
Staple food			0,985
Mean ± SD	74,0 ± 12,4	69,2 ± 12,5	
Animal-based side dishes			0,991
Mean ± SD	104 ± 30,9	92,8 ± 26,9	
Plant-based side dishes			0,422
Mean ± SD	96,1 ± 26,4	103,1 ± 20,3	
Vegetables			0,941
Mean ± SD	50,5 ± 15,3	44,3 ± 16,2	
Additional side dishes (n = 46)			0,892
Mean ± SD	95,0 ± 34,7	93,0 ± 31,7	

SD : Standar Deviation

Evening meals included additional diverse items, varying daily, such as tofu cakes, stir-fried tempeh, sautéed bean sprouts and small tofu puffs, fried tempeh, potato fritters, tempeh mendoan, sautéed yellow tofu with long beans, vegetable fritters, tempeh steak, or tofu puffs with green beans. The hospital's patient meal schedule is structured as follows; breakfast : 6.30-7.30 AM, Morning snack : 9.30-10.00 AM, Lunch : 11.30-12.30 PM, Afternoon snack : 2.30-3.00 PM, Dinner : 4.30-5.30 PM. The timeliness of meal service at RSUD Wates was generally accurate, with 55.4% of meals served within the established timeframe. According to observations, meal service was considered inaccurate when meals were served before 4:30 PM. The relationship between the timeliness of meal service and plate waste was analyzed using the Chi-Square test. As shown in Table 3, the accuracy of meal service timing was significantly associated with plate waste for staple foods (p = 0.008), animal-based protein (p = 0.000), and

supplementary foods (p = 0.005). However, there was no significant relationship between meal service timing and plate waste for plant-based protein (p = 0.214) and vegetables (p = 0.977).

Table 3. Association of Accuracy of Meal Timing and Patient`s Plate Waste

Accuracy of meal timing	Plate Waste (n = 56)				*p value*
	≥20%		<20%		
	n	%	n	%	
Staple food					0,008
Inaccuracy	17	62,9	8	27,6	
Accuracy	10	37,1	21	72,4	
Animal-based side dishes					<0,001
Inaccuracy	12	85,7	13	31,0	
Accuracy	2	14,3	29	69,0	
Plant-based side dishes					0,214
Inaccuracy	13	54,2	12	37,5	
Accuracy	11	45,8	20	62,5	
Vegetables					0, 977
Inaccuracy	13	44,8	12	44,4	
Accuracy	16	55,2	15	55,6	
Additional side dishes (n=46)					0,005
Inaccuracy	12	70,6	8	27,6	
Accuracy	5	29,4	21	72,4	

4. DISCUSSION

Healthcare facilities play a critical role in providing collective meals, yet plate waste remains a significant issue. Previous studies have estimated that patients may waste between 1.5 to 2.1 kg of food per 3-day food cycle. Notably, after a four-month period following the measurement of food waste, there was no substantial change observed in patients' food waste practices(13). The distribution of daily energy and protein intake in hospital settings typically follows a pattern of 20-30% at breakfast, 10-20% at lunch, 40-60% at the evening meal, and 10% overnight. However, limited research has examined the effect of increasing the amount of protein and energy in meals on the percentage of food waste. Some studies suggest that if protein-enhanced food consumption leads to food waste percentages lower than or equal to 24%, foodservice providers may be able to more accurately meet the needs of their patient cohort(14,15).

A high-energy, high-protein diet refers to a dietary regimen rich in both energy and protein, primarily designed for patients who require increased intake to support tissue repair, promote healing of surgical incisions, restore lung function, and improve overall physical condition(16). Different levels of high-energy recovery are provided based on the individual needs of the patients, with a focus on greater energy intake. Such diets are commonly used during the recovery phase following trauma, surgery, burns, wounds, infections, or in individuals with hypermetabolism or other chronic conditions that increase energy requirements(17). The foods consumed within these diets depend on the energy content of the nutrients they provide, with careful consideration of key aspects of healthy high-energy and high-protein nutrition. At Wates Hospital,

portioning is carried out by the cook and service staff. The staple food, rice, is portioned using a flower-shaped mold, while vegetables are portioned using a serving spoon. However, the portioning tools have not been standardized, which could lead to discrepancies in portion sizes, resulting in deviations from the standard HEHP (high-energy, high-protein) diet portions.

The results of the study revealed that portion size was not significantly associated with food waste. Even when portions were accurately provided, some respondents still left more than 20% of their food uneaten. Similar findings were observed at RSUD Bahteramas, which could be attributed to the varied tastes and preferences of the respondents(18). Furthermore, individual perceptions of portion size can also influence food waste. Respondents who believe that the portion size is appropriate for them are more likely to finish their meal, even if the portion does not strictly adhere to the standard. This was also observed at the General Hospital of Banjar City, where respondents stated that the portions provided were suitable for their needs. However, a significant amount of food waste was still observed, with an average food wastage percentage of 64% (19). Respondents left food uneaten for various reasons. These reasons included the food provided not aligning with the respondents' usual portion sizes, respondents feeling full due to consuming food from outside the hospital, and respondents experiencing digestive issues such as nausea, vomiting, lack of appetite, or fever(20). Food waste is a growing challenge, with reports indicating that the NHS in England alone incurs an annual cost of £43 million due to food waste, with eight million meals wasted each year(21). In hospitals across Australia, data indicates a significant cost associated with remaining plate waste, with an average annual cost for 250-bed hospitals(22). Food waste in hospitals, much like other large-scale food service industries, is influenced by various operational issues. These include budget constraints, using food to recruit and retain staff, menu fatigue, lack of food variety, variation in meal quality, patients choosing their own food but leaving it uneaten, and the fact that patients do not need to pay for the food they consume (23).

The varying distances between wards at RSUD Wates resulted in different times for food delivery. Each service staff member is responsible for delivering meals to two to three wards. The food distribution is carried out using food trolleys, which do not have food warmers, potentially causing the food temperature to decrease during transport to the wards.The study found that meal service timing was not significantly associated with food waste for plant-based protein and vegetables. This finding is consistent with research conducted at RSUD Arosuka Solok(24). Even when meal service timing was accurate, respondents still left food uneaten. A similar situation was observed at the General Hospital of Banjar City. The meals were distributed on time; however, patients receiving the HEHP diet in the maternity ward still left a significant amount of food uneaten, with an average food waste percentage of 62.4% (25). The timing of meal service was found to be significantly associated with food waste for staple foods, animal-based protein, and supplementary foods. Similar results were observed in a study conducted at RSUD Wates in 2017, where meal service timing was linked to food waste for staple foods and animal-based protein (11). In hospitals with established

foodservice systems, patient food consumption may fall short, leading to malnutrition. Monitoring food waste, through visual observation and weighing methods, can help identify factors contributing to dietary waste. However, it is important to acknowledge that waste weighing may not always accurately reflect the patient's level of fullness. Therefore, the use of valid and reliable weighing interventions is advised (26).

Nutrition management of inpatients in hospital settings often involves the promotion of high-protein, high-energy diets. The definition of "high protein" varies, with terms such as "adequate," "increased above RDA," "standard," and "usual" used to describe the desired protein intake. These diets are typically characterized by a variety of protein sources, as well as low fiber, lactose, and allergen content, making them suitable for oral consumption in a hospital environment (27). Optimizing the nutritional intake of hospitalized patients is a targeted and individualized strategy that is tailored to the specific health needs of the patient. The quality and quantity of food and nutrients consumed play a significant role in stimulating the body's defense and repair mechanisms. The patient's nutritional status is a major determinant of their recovery rate (28,29). There is evidence to suggest that adequately meeting the energy and protein requirements of hospitalized patients is associated with favorable health outcomes, such as decreased mortality, enhanced immune function, reduced hospitalization duration, lower medication expenses, decreased likelihood of readmission, improved quality of life, slowed disease progression, reduced risk of complications and safety incidents, and improved mobility (30). This study reinforces the importance of timely meal service in reducing plate waste among hospitalized patients, particularly for staple foods and protein-rich items. Timeliness ensures that meals are served at optimal temperatures and when patients are likely to consume them, aligning with prior findings in hospital food service management. Although portion size accuracy did not show a significant correlation with plate waste, this does not diminish its importance in achieving dietary objectives. Discrepancies in portion sizes, particularly for vegetables and supplementary foods, may stem from the lack of standardized portioning tools used by hospital staff. Addressing this gap through training and standardized equipment could improve consistency in portion sizes. The study highlight several actionable recommendations for hospital foodservice management : 1. For meal delivery systems, invest in insulated food trolleys to maintain optimal food temperature during delivery; 2. For staff training could plan regular workshop for kitchen and service staff on portioning and timeliness; and 3. For patient engagement, implement feedback mechanisms to understand patient preferences and tailor meals accordingly.

5. CONCLUSION

The food waste of patients on the high-energy, high-protein (HEHP) diet in the hospital, exceeding 20%, was found in staple foods, plant-based proteins, vegetables, and extra protein dishes. However, the food waste for animal-based proteins was below 20%. The portion sizes were generally inaccurate for most foods, whereas the timing of meal delivery for the HEHP diet was accurate and adhered to the established Standard

Operating Procedures (SOP). A significant relationship was observed between the meal delivery time for staple foods, animal-based proteins, and extra proteins with food waste. This indicates the importance of ensuring timely distribution and presentation of meals in hospital wards to ensure that patients consume the provided food efficiently. The study was conducted in a single hospital with a relatively small sample size, potentially limiting generalizability. Future research should involve mulicenter studies and explore additional factors influencing plate waste, such as food organoleptic qualities and patient health status. Ensuring timely meal delivery, alongside improving portioning practices, can significanty enhance the nutritional intake of hospitalized patients and reduce plate waste. These findings underscore the need for integrated approaches to hospital food service management, balancing operational efficiendy with patient-centered care.

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REFERENCES

1. Kemenkes RI.(2013). *Pedoman Pelayanan Gizi Rumah Sakit*. Jakarta: Kemenkes RI.
2. Kemenkes RI.(2008). *Menteri Kesehatan Republik Indonesia Nomor : 129/Menkes/SK/II/2008 Tentang Standar Pelayanan Minimal Rumah Sakit*. Jakarta: Kemenkes RI.
3. PERSAGI dan ASDI (2019) *Penuntun Diet dan terapi Gizi* . 4th edn. Jakarta: EGC.
4. Anggraeny Putri, N., Ruliana, R. and Yulianingrum, C. (2022) 'Pengaruh Makanan Kaya Gizi (KAYAZI) sebagai Variasi Diet Energi Protein Tinggi terhadap Daya Terima Makanan Pasien Covid-19', *Jurnal Klinik dan Riset Kesehatan*, 1(2), pp. 69–78. Available at: https://doi.org/10.11594/jk-risk.01.2.2.
5. Tanuwijaya, L.K., Sembiring, L.G., Dini, C.Y., Arfiani, E.P. and Wani, Y.A. (2018) 'Sisa makanan pasien rawat inap: analisis kualitatif', *Indonesian Journal of Human Nutrition*, 5(1), pp. 51–61. Available at: https://doi.org/10.21776/ub.ijhn.2018.005.01.6.
6. Astari, A.P., Setyowati, S. and Kadaryati, S. (2021) 'Ketepatan pemorsian hidangan di RSUD Dr. Tjitrowardojo Purworejo', *AcTion: Aceh Nutrition Journal*, 6(1), p. 33. Available at: https://doi.org/10.30867/action.v6i1.351.
7. Istiyaningsih, Sulistyani, T. and Saraswati, P. (2020) 'Penyajian dan Pemorsian Makanan Pokok pada Penyelenggaraan Makan Pasien Anak di RSA UGM', *Jurnal Socia Akademika*, 6(1).
8. Nainggolan, H., Aritonang, E.Y. and Siregar, M.A. (2013) 'Analisis Diet Tinggi Kalori Tinggi Protein (TKTP) pada Penderita TB Paru Rawat Inap di Rumah Sakit Martha Friska Pulo Brayan Tahun 2012', *Gizi, Kesehatan Reproduksi, dan Epidemiologi*, 2(4).

9. Arsyih, S., Sofiyatin, R., Suhaema and Suranadi, L. (2019) 'Kesesuaian Besar Porsi Nasi yang Disajikan dengan Standar Porsi pada Menu Makanan Biasa', *Jurnal Gizi Prima*,4(2),pp.87–93. Available at: https://doi.org/https://doi.org/10.32807/jgp.v4i2.136.
10. Cendanawangi, D.N., Tjaronosari, T. and Palupi, I.R. (2016) 'Ketepatan porsi berhubungan dengan asupan makan pada lanjut usia di Panti Sosial Tresna Werdha Budi Luhur, Bantul, Yogyakarta', *Jurnal Gizi dan Dietetik Indonesia (Indonesian Journal of Nutrition and Dietetics)*, 4(1), p. 8. Available at: https://doi.org/10.21927/ijnd.2016.4(1).8-18.
11. Rosita, Y. (2017) *Hubungan Ketepatan Waktu Distribusi dengan Asupan Makan Pasien di RSUD Wates Kabupaten Kulon Progo*. Universitas Alma Ata Yogyakarta.
12. Rochmawati, N.W., Kusuma, T.S. and Husna, F. (2022) 'Tingkat Kepuasan terhadap Pelayanan Makanan dan Kecukupan Gizi pada Pasien Non Communicable Diseases di Rumah Sakit Bersertifikasi Halal', *Journal of Nutrition Collge*, 11(3), pp. 211–219. Available at: http://ejournal3.undip.ac.id/index.php/jnc/.
13. Duan, F. M. J., van't Veer, P., & Biesbroek, S. (2024). Change in diet-related environmental impact by substituting meat and dairy for alternatives: Dutch National Food Consumption Survey 2019-2021. wur.nl
14. Zhou, J., Li, D., Zhang, X., Liu, C., & Chen, Y. (2023). Valorization of protein-rich waste and its application. Science of The Total Environment. [HTML]
15. Smith, R., Clegg, M., & Methven, L. (2024). Review of protein intake and suitability of foods for protein-fortification in older adults in the UK. Critical Reviews in Food Science and Nutrition, 64(12), 3971-3988. tandfonline.com
16. Hendriks, F. K., Kooman, J. P., & van Loon, L. J. (2021). Dietary protein interventions to improve nutritional status in end-stage renal disease patients undergoing hemodialysis. Current Opinion in Clinical Nutrition & Metabolic Care, 24(1), 79-87. lww.com.
17. Hew, J. J., Parungao, R. J., Mooney, C. P., Smyth, J. K., Kim, S., Tsai, K. H., & Wang, Y. (2021). Low-protein diet accelerates wound healing in mice post-acute injury. Burns & Trauma, 9, tkab010. oup.com
18. Ginastrysusatya (2023) *Hubungan Tingkat Kematangan, Tekstur Makanan dan Besar Porsi Makanan Pokok dengan Sisa Makanan pada Pasien Rawat Inap Kelas II/III di RSUD Bahteramas Provinsi Sulawesi Tenggara*. Poltekes Kemenkes Kendari.
19. Firmansyah, C., Novianti, S. and Gustaman, R.A. (2021) 'Manajemen Sistem Penyelenggaraan Makanan pada Bagian Proses Terhadap Kepuasan Pasien Rawat Inap Kebidanan di BLUD Rumah Sakit Umum Kota Banjar Tahun 2021', *Jurnal Kesehatan Komunitas Indonesia*, 18(1), pp. 368–379.
20. Anwar, I., Herianandita, E. and Ruslita, I. (2012) 'Evaluasi Sistem Penyelenggaraan Makanan Lunak dan Analisis Sisa Makanan Lunak di Beberapa Rumah Sakit di DKI Jakarta, Tahun 2011', *Gizi Indon*, 35(2), pp. 97–108.
21. Nicholas, C., Patokos, T., & Rughoo, A. (2023). Waste Britain-An evaluation of the economic & social impact of FareShare's contribution to fighting hunger and tackling food waste. herts.ac.uk
22. Collins, J. & Porter, J. (2023). Quantifying waste and its costs in hospital foodservices. Nutrition & Dietetics. wiley.com
23. Imlach, F., McKinlay, E., Middleton, L., Kennedy, J., Pledger, M., Russell, L., & McBride-Henry, K. (2020). Telehealth consultations in general practice during a pandemic lockdown: survey and interviews on patient experiences and preferences. BMC family practice, 21, 1-14. springer.com
24. Nurhamidah, Yensasnidar and Manora, E. (2019) 'Hubungan Penampilan, Rasa, dan Keramahan Penyajian terhadap Sisa Makanan pada Pasien Rawat Inap RSUD Arosuka Solok', *Sainstek : Jurnal Sains dan Teknologi* , 11(2), pp. 56–64.
25. Firmansyah, C., Novianti, S. and Gustaman, R.A. (2021) 'Manajemen Sistem Penyelenggaraan Makanan pada Bagian Proses Terhadap Kepuasan Pasien Rawat Inap

Kebidanan di BLUD Rumah Sakit Umum Kota Banjar Tahun 2021', *Jurnal Kesehatan Komunitas Indonesia*, 18(1), pp. 368–379.
26. De Foubert, M., Cummins, H., McCullagh, R., Brueton, V., & Naughton, C. (2021). Systematic review of interventions targeting fundamental care to reduce hospital-associated decline in older patients. Journal of advanced nursing, 77(12), 4661-4678. wiley.com
27. Raphaeli, O., Singer, P., Robinson, E., Statlender, L., & Kagan, I. (2024). Characterizing and Predicting Outcomes in Critically Ill Patients Receiving Low or High Protein Doses with Moderate Energy Support: A Retrospective Study. Nutrients, 16(19), 3258. mdpi.com
28. Kalaja, R. (2023). Determinants of patient satisfaction with health care: a literature review. European Journal of Natural Sciences and Medicine. revistia.org
29. Geense, W. W., Zegers, M., Peters, M. A., Ewalds, E., Simons, K. S., Vermeulen, H., ... & van den Boogaard, M. (2021). New physical, mental, and cognitive problems 1 year after ICU admission: a prospective multicenter study. American journal of respiratory and critical care medicine, 203(12), 1512-1521. atsjournals.org
30. Nishimura, Y., Højfeldt, G., Breen, L., Tetens, I., & Holm, L. (2023). Dietary protein requirements and recommendations for healthy older adults: a critical narrative review of the scientific evidence. Nutrition research reviews, 36(1), 69-85. cambridge.org