SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2025
ORGANIZATION AND MANAGEMENT SERIES NO. 219

NUTRITIONAL SERVICES FROM THE PATIENT'S PERSPECTIVE: IDENTYFICATION AND ANALYSIS OF PROBLEMS AREAS

Nicoletta BASKIEWICZ

Czestochowa University of Technology; nicoletta.baskiewicz@pcz.pl, ORCID: 0000-0002-9166-435X

Purpose: The objective of this article is to identify attributes associated with nutritional services during the hospitalization process, classified from those deemed essential to those whose presence does not significantly impact perceived quality (as per the Kano methodology). The identified attributes simultaneously influence the formation of patient satisfaction. The primary aim is to elucidate the extent to which these factors determine the perception of nutritional services in satisfaction assessments and the degree to which they align with the expectations of hospitalized patients.
Design/methodology/approach: A systematic review of the literature was undertaken to identify determinants of satisfaction with nutritional services during hospitalization. The empirical component of the study is devoted to classifying these attributes using the Kano methodology, based on survey data. The subsequent stage of the research process involves evaluating hospitalized patients' satisfaction in domains corresponding to the Kano attributes—via survey research—and identifying discrepancies between patient expectations and their experienced satisfaction levels.
Findings: Among the attributes that notably enhance the perceived value of hospital wards, particular emphasis is placed on those related to the quality of meals, their adaptation to patients' specific dietary needs, and the organization of meal delivery processes. Key factors highlighted include the caloric adequacy of meals and their compliance with individual nutritional requirements. Additionally, adherence to a predefined meal delivery schedule is underscored as a critical factor influencing patient satisfaction.
Research limitations/implications: The findings presented are derived from a review of existing literature and are intended to serve as a foundation for future empirical investigations. A significant limitation of this study is the relatively narrow sample size of patients who participated in the satisfaction survey, both in terms of geographical coverage and the number of hospital facilities included. Furthermore, the study focuses solely on fundamental attributes related to the perception of nutritional services, omitting broader considerations such as staff-related factors or infrastructural conditions, which may also significantly impact patient satisfaction. These limitations underscore the need for further research to address these gaps.
Practical implications: The outcomes of this study offer practical applications for healthcare management. Insights gleaned from satisfaction surveys completed by hospitalized patients across diverse healthcare settings can facilitate the identification of critical areas where patient satisfaction with nutritional services is suboptimal. Consequently, these insights can inform the development of targeted strategies to enhance service quality. Furthermore, the Kano methodology provides a framework for prioritizing interventions by identifying which

attributes are most critical to patient satisfaction, enabling evidence-based decision-making regarding the sequence of improvements.
Social implications: The implementation of the recommendations proposed in this article, aimed at enhancing the quality of nutritional services, has the potential to elevate the overall standard of hospital care. This reflects the broader social responsibility of healthcare institutions to meet patient expectations comprehensively. For society, the value-added lies in improved access to hospitalization processes that are more aligned with patient needs, particularly in areas where absolute expectations are prevalent.
Originality/value: This article primarily targets hospital administrators and decision-makers responsible for the strategic development and optimization of healthcare processes. It provides a comprehensive framework for evaluating patient satisfaction with implemented processes and offers methodological guidance for assessing the relative importance of various quality attributes using the Kano model.
Keywords: nutritional services, quality of nutritional services, hospitalization process, patient satisfaction, Kano methodology.
Category of the paper: Research paper.

1. Introduction

The nutritional provision for patients in hospitals falls within the scope of healthcare services provided in medical facilities offering inpatient and round-the-clock care. Thus, a medical entity providing healthcare services is obligated, under the healthcare service agreement with the National Health Fund, to ensure nutrition tailored to patients' health conditions.

Modern healthcare faces numerous challenges, among which issues related to the organization and quality of nutritional services hold a special place (Kotynia et al., 2018; Rasmussen et al., 2006). Properly planned and implemented nutritional support constitutes a vital component of effective therapy (Ridley et al., 2019), contributing to the improvement of patients' health, shortening hospital stays, and reducing healthcare costs (Wyka et al., 2020; Cano-Torres et al., 2017). Despite substantial scientific evidence confirming the crucial role of nutrition in the treatment process, significant shortcomings persist in clinical practice in both the organization and adaptation of nutritional services to patients' needs (Anthony, 2008; Kondrup, 2004).

From the patient's perspective, nutritional services are not only a supporting element of the therapeutic process (Sullivan, 1995) but also an integral part of a holistic healthcare model, encompassing both physical and psychosocial aspects (Tappenden et al., 2013; Moisey et al., 2022). The rising incidence of diet-related diseases such as diabetes, obesity, and cardiovascular conditions further underscores the importance of individually tailored nutritional support (Schuetz et al., 2019; Wronka et al., 2009). However, in hospital practice, inadequacies are often observed in aligning meals with patients' dietary requirements, inconsistencies in

educational efforts, and limited communication between medical staff and patients regarding diet planning (Kirkland et al., 2013; Ruthsatz, Candeias, 2020).

This article addresses the issue of nutritional services in the context of patient experiences, focusing on identifying and analyzing key challenges in this area. The study aims to deepen understanding of the quality and effectiveness of nutritional services in the healthcare system, with particular emphasis on their impact on subjective assessments of care and treatment outcomes. Including the patient perspective not only enhances understanding of existing problems but also highlights potential directions for reforms aimed at optimizing nutritional standards in medical facilities. In an era of increasing demands on the healthcare system, this analysis gains special significance, aligning with research trends in individualized and comprehensive patient care.

2. Literature research aimed at identifying factors determining the quality of the nutritional services during hospitalization

The provision of meals for hospital patients falls under the scope of healthcare services delivered by medical facilities providing inpatient and round-the-clock care (Gębska, 2014). Consequently, healthcare providers offering medical services are obliged, under their agreements with the National Health Fund, to ensure that patients receive meals appropriate to their health conditions (Rożdżeński, 2019).

Modern healthcare adopts a holistic model in which not only medical interventions but also broader non-therapeutic support play a crucial role (Pałyska et al., 2007). Key factors contributing to the improvement of a patient's health include accurate diagnosis and treatment, nursing care, pharmacology, the involvement of dietitians, and nutrition tailored to the patient's health status (Cardenas et al., 2021). In this context, nutritional services gain particular importance as an integral element of the treatment process (Wronka et al., 2009; Young et al., 2018). The literature frequently highlights the role of proper nutrition in reducing health complications, improving treatment outcomes, and shortening hospital stays. However, studies reveal that the quality of these services in medical facilities leaves much to be desired, with organizational problems and a lack of individualized dietary adjustments negatively impacting patient satisfaction and treatment effectiveness.

The fundamental role of nutrition in healthcare has been documented in numerous scientific studies. As Young et al. (2018) emphasize, a well-balanced diet can significantly enhance the body's recovery process, support the immune system, and reduce the risk of complications. Meta-analyses suggest that patients receiving individually tailored nutritional support achieve better clinical outcomes, underscoring the importance of including nutrition as a treatment component (Bally et al., 2016; Abd Aziz et al., 2017; Thibault et al., 2011). However, studies

conducted in European healthcare facilities indicate that a significant number of patients experience malnutrition during hospitalization, negatively affecting treatment outcomes (Kieltyka et al., 2001; Namyslak et al., 2014). This often results from insufficient adaptation of meals to patients' individual dietary needs (Ostrowska, Jeznach-Steinhagen, 2017) and inadequate communication between medical staff and patients regarding diet planning and implementation (Jodczyk-Bargańska, 2024).

The organization of hospital nutrition services remains a critical challenge. The process involves several stages:

- Assessment of patients' nutritional status and dietary requirements.
- Menu planning.
- Food preparation and processing.
- Transportation and distribution of meals in hospital ward.
- Evaluation of meal quality.
- Assisting with feeding and hydration.
- Patient education.

Accurately assessing patients' nutritional status upon admission and tailoring diets to their medical conditions is essential. This is followed by preparing meals from high-quality ingredients while adhering to hygiene and sanitary standards during production, transportation, and distribution. Meals must meet appropriate caloric and nutritional requirements, be served regularly, and be adapted to the needs of patients with limited independence. Providing professional dietary assistance to patients who need to change their eating habits and lifestyles due to illness is equally critical (Boulhosa et al., 2020; Martínez-Ortega, 2022).

Studies indicate a lack of consistency in nutritional standards, resulting in significant quality disparities among hospitals (Grzesinska et al., 2014; Shimazu et al., 2021). The American Diabetes Association (2021) reports challenges in ensuring proper caloric balance and nutritional value in hospital meals, lowering the quality of services provided. Additionally, there is often a lack of systematic patient education about nutrition. Dietary education is a vital component of health prevention and therapeutic support, and its deficiency is cited as a significant limitation in treating diet-related diseases (Pasquel et al., 2021).

Incorporating the patient perspective is increasingly recognized as essential in evaluating healthcare service quality. Studies show that subjective assessments of meal quality and consumption experiences significantly influence overall satisfaction with medical care (Reber et al., 2019). Patients expect meals to be not only nutritionally valuable but also visually appealing, tasty, and culturally or dietarily appropriate (Ukleja et al., 2018). Failure to meet these expectations often leads to frustration and, in extreme cases, incomplete meal consumption, exacerbating malnutrition issues (Lean, Wiseman, 2008; Mitchell, Porter, 2016; Schuetz et al., 2021; Cass, Charlton, 2022; Uhl et al., 2022).

Qualitative studies also reveal significant communication barriers between medical staff and patients concerning nutritional services (Citty et al., 2019; Boaz et al., 2013). Patients are often uninformed about dietary options, and medical staff may lack sufficient knowledge to support them effectively in making dietary decisions (Henning, 2009).

In Poland, existing regulations do not specify nutritional standards in hospitals (Rams-Swietoniowska, Konecka-Matyjek, 2010). There are also no fixed daily nutritional allowances per patient for all medical entities. Hospital managers determine daily food allowances, and nutrition is financed under contracts with the National Health Fund, which cover both medical and accompanying services. However, treatment costs often exceed contract values, forcing providers to cut expenses, especially in patient nutrition (Riley et al., 2020; Neriz et al., 2014). Proper nutrition and dietary education are as critical as medical care for effective treatment in hospitals (Tymoszuk, Orkusz, 2015).

The Ministry of Health's pilot program "Good Meals in Hospitals" aims to improve patient nutrition by aligning it with their health conditions, integrating hospital diets into the treatment process. The program allocates an additional PLN 25.62 per patient for nutrition. From January to June 2024, the program was in its pilot phase, with evaluations continuing until October. These additional funds have the potential to significantly enhance meal quality in hospitals, focusing on high-quality ingredients such as premium cold cuts. However, challenges remain, particularly with the understanding and cooperation of hospital dietitians (Najwyższa Izba Kontroli, 2018).

Nutritional services are a crucial yet undervalued component of modern healthcare. Optimizing these services with a focus on patient perspectives can significantly enhance the quality of care and patient health outcomes. Further research on the efficiency of nutritional services, including systematic quality assessments and identifying key areas for improvement, is essential for advancing standards in this field (Thibault, 2021).

3. Research methodology

The main objectives of this article are as follows:

1. Identification of factors determining the quality of nutritional services and their categorization (Kano).
2. Assessment of patient satisfaction with their hospital stay in terms of factors determining the quality of nutritional services during the hospitalization process.
3. Identification of the gap between expectations (the highest desired level of patient satisfaction) and the actual state of patient satisfaction in terms of factors determining the quality of nutritional services during the hospitalization process.

4. Providing recommendations aimed at reducing or eliminating the identified discrepancies between the expected and actual states, as identified during the empirical research phase.

These specified research objectives have shaped the research methodology, and each stage of the research process has indicated desired outcomes at each stage (Table 1).

Table 1.
The research process stages along with the identification of results

No.	Stages of research process	Results of stages of research process
1.	Identification of factors determining the quality of nutritional services during the hospitalization process – based on literature review	List of identified determinants of the research process
2.	Selection and reduction of identified factors determining the quality of nutritional services during hospitalization based on a literature review, combined with participatory observation by the study authors and focus group research conducted with a randomly selected group of patients.	List of reduced determinants of nutritional services during hospitalization
3.	Based on the reduced list of determinants of nutritional services during hospitalization, development of a diagnostic tool to determine hospitalized patients' expectations (including absolutely essential factors and those whose absence is unacceptable) using the Kano methodology.	A survey identifying expectations regarding nutritional services during hospitalization.
4.	Based on the reduced list of determinants of nutritional services during hospitalization, development of a diagnostic tool to assess hospitalized patients' satisfaction in areas identified as factors determining the quality of the hospitalization process.	A survey evaluating satisfaction with hospital stay in terms of nutritional services during the hospitalization.
5.	Conducting research	• Completed surveys identifying expectations regarding nutritional services during the hospitalization. • Completed surveys evaluating satisfaction with hospital stay in terms of nutritional services during the hospitalization.
6.	Analysis and conclusions from the conducted research	Conclusions and Diagnosis. Identification of gaps between expectations and the actual level of satisfaction in the area of nutritional services during the hospitalization.
7.	Recommendations for business practice and directions for further research	Guidelines for hospitals. Recommendations for actions aimed at reducing or eliminating discrepancies between patients' expectations and their level of satisfaction in the determinants of nutritional services during hospitalization. Directions for further research.

Source: Own study.

As part of the research process, factors influencing the quality of nutritional services during hospitalization, initially identified through a comprehensive literature review, were refined and supplemented. This phase aimed to isolate the most significant and mutually exclusive determinants while incorporating areas not addressed in prior studies (van Loenen et al., 2014; Teng et al., 2007). The focus group session, conducted on February 10, 2024, at the Internal

Medicine Department of the Provincial Specialist Hospital of the Virgin Mary in Częstochowa, included ten participants selected at random. Participants represented diverse demographics in terms of gender, age, and educational background. The session was moderated by one of the authors, supported by a research team responsible for note-taking, recording proceedings, and identifying key insights and exceptional responses.

The outcome of the focus group was a delineated list of determinants of the quality of nutritional services during hospitalization. This list formed the basis for the development of two key research instruments:

1. Survey on Expectations Regarding Nutritional Services During Hospitalization (Kano).
2. Survey on Satisfaction with Nutritional Services During Hospitalization (Kano).

The focus group identified the following critical factors influencing the quality of nutritional services:

1. Quality of meals.
2. Meal delivery schedule.
3. Availability of hot meals and basic food items for purchase within the hospital.
4. Assessment of patients' nutritional status and individualized meal planning.
5. Assistance with feeding and hydration for patients requiring support.

The first research instrument was designed in alignment with the Kano model, a methodological approach frequently employed to assess quality in healthcare services (Jiayi Mao, 2022). The survey sought to identify and categorize patients' needs and expectations regarding nutritional services during hospitalization. The Kano model, noted for its versatility in evaluating customer satisfaction, is uniquely suited for assessing both essential attributes and those that constitute added value (Parasuraman, 1986). The model has been variously conceptualized, with terminologies such as the "asymmetric impact on overall customer satisfaction" (Mikulic, 2006), "customer requirements model" (Lee, 1996), and "two-dimensional quality model" (Schveneveldt et al., 1991).

Using this framework, the survey captured responses from a geographically diverse cohort, prioritizing the identification of critical factors influencing positive evaluations of nutritional services. Data were collected via the CAWI (Computer-Assisted Web Interview) method, yielding 315 responses. Participants assessed 41 attributes, each evaluated through paired functional ("What if it is this way?") and dysfunctional ("What if it is not this way?") questions, using a response scale ranging from "absolutely essential" to "unacceptable" (Matzler, Hinterhuber, 1998; Santhoshkumar et al., 2022).

The second instrument assessed actual satisfaction levels among patients from the studied hospital. Unlike the Kano methodology, this survey employed a Likert-type scale ranging from 1 (greatest dissatisfaction) to 5 (greatest satisfaction). It provided a distinct yet complementary perspective, focusing on the practical evaluation of identified attributes and their influence on patient experiences.

The empirical investigation highlighted critical areas for improving nutritional services during hospitalization, emphasizing attributes such as meal quality, scheduling adherence, and availability of additional food options. These factors were analyzed to identify discrepancies between patient expectations and satisfaction levels.

The study adopted a two-stage empirical framework, encompassing an exploration of patient expectations (Kano model) and an evaluation of satisfaction levels (Likert scale). This approach enabled a rigorous, multidimensional assessment of the quality of nutritional services and their impact on overall hospitalization experiences. The simultaneous use of the Kano model and Likert-scale satisfaction assessments provides a multidimensional view of patient perceptions; however, the relationship between the two methodologies warrants further clarification. While the Kano model categorizes service attributes based on their impact on satisfaction—classifying them as basic, performance, or attractive—the Likert scale offers a quantitative measure of how satisfied patients are with each attribute. By comparing the categorization from the Kano model with the satisfaction ratings from the Likert scale, it is possible to identify alignments and discrepancies. For instance, some attributes identified as "indifferent" in the Kano analysis received relatively high satisfaction scores on the Likert scale, suggesting that patients may rate an experience positively even if it does not strongly influence their overall satisfaction. Conversely, attributes categorized as "must-be" may receive lower satisfaction ratings, highlighting critical service gaps. This comparative approach enriches the analysis by revealing not only which features matter most to patients, but also how well these features are currently delivered. In future research, integrating these findings more explicitly—for example, through cross-tabulation or correlation analysis—would enhance analytical coherence and practical relevance.

The integration of the Kano methodology in this context represents a novel contribution to the field of healthcare quality assessment, addressing gaps in existing literature and providing actionable insights for hospital administrators aiming to enhance patient care.

The study underscores the necessity of optimizing nutritional services to meet and exceed patient expectations. By employing advanced methodological tools, it bridges the gap between theoretical frameworks and practical applications, offering a robust foundation for future research and quality improvement initiatives in hospital settings. Table 2 presents key attributes associated with nutritional services during hospitalization, as identified through empirical research. These attributes reflect critical aspects of meal quality, accessibility, and patient-centered care, forming the basis for evaluating and enhancing the overall nutritional experience in hospital settings.

Table 2.
Attributes related to the nutritional services during hospitalization

No.	Attribute
NSQ1	Quality of meals
NSQ2	Meal delivery schedule
NSQ3	Availability of hot meals and basic food items for purchase on hospital premises
NSQ4	Assessment of patients' nutritional status and meal planning
NSQ5	Feeding and hydrating patients requiring assistance

*NSQ (Nutritional Service Quality).

Source: Own study based on empirical research.

The example questions regarding the functional and dysfunctional aspects for attribute NSQ1 are presented in Table 3.

Table 3.
An example question related to attribute NSQ1

NSQ1. The quality of food products suitable for the individual nutritional needs of patients				
a. What if it is the case? (functional form of the question)				
like it	expect it	don't care	live with it	dislike it
b. What if it is not the case? (dysfunctional form of the question)				
like it	expect it	don't care	live with it	dislike it

Source: Own study based on Kano's Methods.

Next, in accordance with the Kano methodology guidelines, responses regarding each attribute were examined and assigned to a specific type, namely:

- ME (Must-be Elements) to elementy podstawowe – brak spełnienia tych atrybutów powoduje niezadowolenie klientów.
- OD (One-dimensional Elements) to elementy jednowymiarowe – wzrost poziomu spełnienia zwiększa satysfakcję klientów proporcjonalnie.
- AE (Attractive Elements) to elementy atrakcyjne – cechy, które zaskakują klientów i powodują ich entuzjazm, ale brak ich spełnienia nie powoduje niezadowolenia.
- IT (Indifferent Elements) to elementy obojętne – cechy, które nie mają większego wpływu na satysfakcję czy niezadowolenie klientów (Table 4).

Table 4.
Kano evaluation table

Requirements		**Disfunctional**				
		Like it	**Expect it**	**Don't care**	**Live with it**	**Dislike it**
Functional	Like it	QE	AE	AE	AE	OD
	Expect it	RE	IT	IT	IT	ME
	Don't care	RE	IT	IT	IT	ME
	Live with it	RE	IT	IT	IT	ME
	Dislike it	RE	RE	RE	RE	QE

Source: Own study based on Kano's Methods.

To investigate the correlations between specific attributes of hospital service organization and patient satisfaction, the analysis employed coefficients of satisfaction (CC) and dissatisfaction (DC), calculated according to the following formulas (Berger et al., 1993):

$$CC = (AE+OD)/(AE+OD+ME+IT) \quad (1)$$

$$DC = (OD+ME)/(AE+OD+ME+IT) \quad (2)$$

The satisfaction coefficient (CC) is quantified on a scale from 0 to 1, with values approaching 1 indicating a stronger influence on patient satisfaction. Conversely, the dissatisfaction coefficient (DC), when nearing a value of 1, signifies that patient dissatisfaction significantly impacts the associated quality attribute (Matzler, Hinterhuber, 1998).

4. Results of the research

In the preliminary phase of the analysis, the demographic profiles of respondents participating in both surveys were systematically examined. The survey employing the KANO methodology was administered utilizing the CAWI (Computer-Assisted Web Interviewing) technique, which mandated responses to all questions, thereby ensuring the acquisition of 315 fully completed questionnaires. In contrast, the survey conducted among patients of the studied hospital employed a traditional paper-based format, resulting in the collection of 149 questionnaires. However, a subset of these contained incomplete responses, introducing complexities into the analytical process. Key demographic characteristics, including the age and gender distribution of respondents from both datasets, are depicted in Figures 1 and 2.

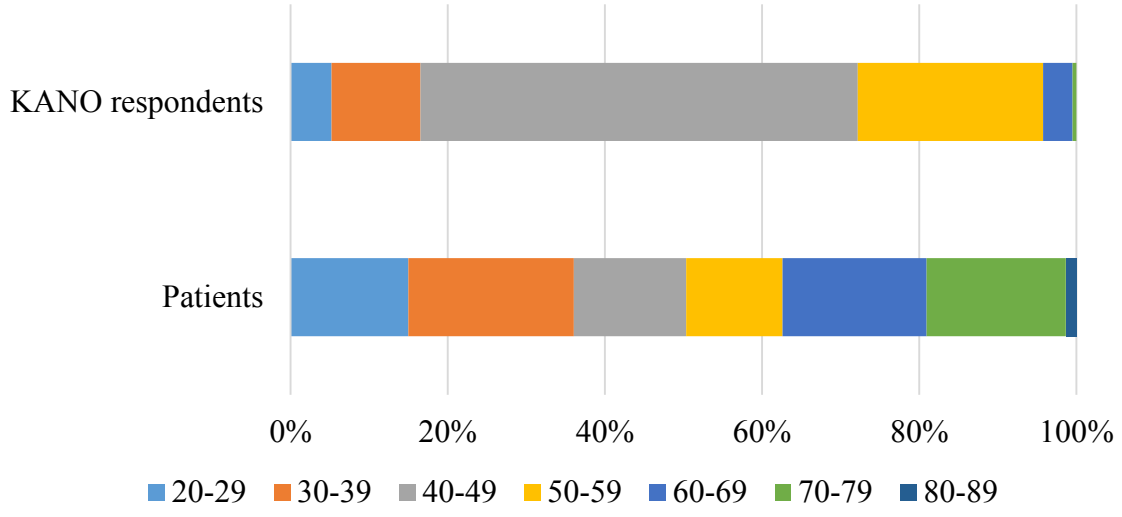

Figure 1. Age of respondents.

Source: Own study based on empirical research.

The analysis of age distribution among respondents in the two surveys revealed significant disparities. In the survey utilizing the Kano methodology, the majority of participants belonged to the 40-49-year age group. In contrast, the survey conducted with patients from the hospital

under investigation exhibited a more balanced representation across the age cohorts of 20-29, 30-39, and 60-69 years, with comparable proportions of respondents within these groups.

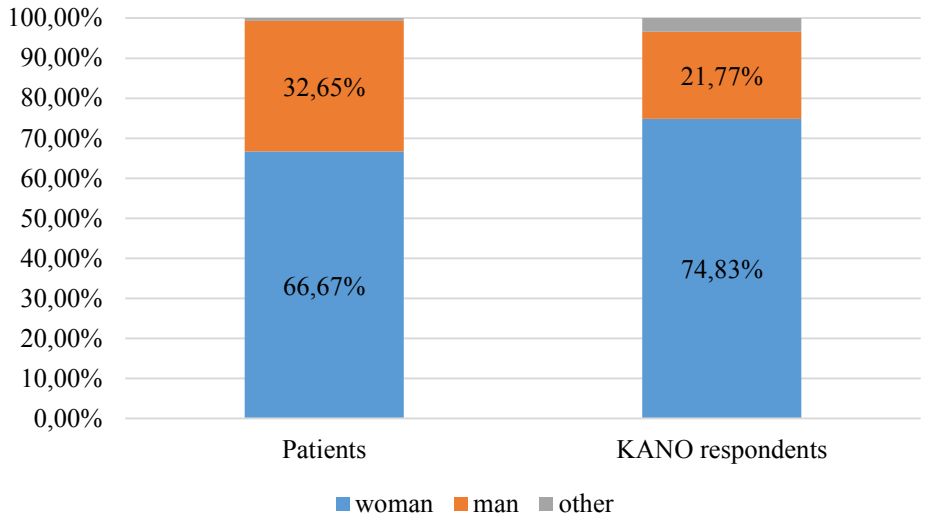

Figure 2. Gender.

Source: Own study based on empirical research.

The gender distribution of respondents in both surveys exhibited less pronounced differences compared to the age category. In both cases, female respondents constituted the majority, accounting for nearly 80% in the Kano study and approximately 70% among patients of the hospital under investigation.

In accordance with the Kano methodology, a statistical analysis of responses was conducted for each of the six evaluated attributes (NSQ1 to NSQ5), as detailed in Table 5. The analysis involved categorizing questions into two distinct types: functional (assessing reactions to the presence of a given feature: "What if it is like this?") and dysfunctional (assessing reactions to the absence of the same feature: "What if it is not like this?").

Table 5.
Set of response statistics from respondents according to the Kano methodology for attributes NSQ1 to NSQ5

	ME	OD	AE	IT	CLASS	CC	DC
NSQ1	19%	10%	24%	47%	IT	0,34	0,29
NSQ2	11%	12%	19%	57%	IT	0,32	0,24
NSQ3	23%	13%	24%	41%	IT	0,37	0,36
NSQ4	14%	0%	29%	57%	IT	0,29	0,14
NSQ5	12%	5%	20%	63%	IT	0,26	0,17

Source: Own study based on empirical research.

In the KANO analysis for attributes NSQ1-NSQ5, all attributes were classified as indifferent (IT). This classification indicates that their presence or absence does not have a significant impact on the level of customer satisfaction or dissatisfaction. The values of the satisfaction (CC) and dissatisfaction (DC) coefficients vary across individual attributes but are generally at a moderate level.

The highest CC and DC values were observed for NSQ3, suggesting that this attribute has a greater potential to influence both satisfaction and dissatisfaction reduction compared to the others. However, due to its classification as an indifferent attribute, its optimization should not be considered a priority in the context of improving overall customer satisfaction.

In the second phase of the study, data collected through questionnaires specifically designed for this research by the authors were subjected to analysis. The survey data were gathered over a two-month period, spanning July and August 2024, from two hospital units within the organizational group. The number of responses to individual survey items averaged approximately two hundred. For certain items, response rates were lower due to the voluntary nature of the questions, while in other cases, the option for respondents to select multiple answers led to an increased count of responses. In alignment with the research objectives, specific domains directly pertinent to the investigated factors were selected for detailed analysis. A subset of questions from the broader survey dataset was utilized to identify several areas necessitating improvement.

Table 6.
Basic statistics for attributes NSQ1 to NSQ5 in the patient satisfaction study

		NSQ1	NSQ2	NSQ3	NSQ4	NSQ5
N	**Important**	**145**	**141**	**135**	**133**	**132**
Mean		3,94	4,14	3,88	3,86	3,71
Standard error of the mean		0,090	0,078	0,106	0,119	0,127
Median		4,00	4,00	4,00	4,00	4,00
Mode		5	5	5	5	5
Standard deviation		1,085	0,930	1,234	1,371	1,454
Variance		1,177	0,865	1,523	1,881	2,115
Skewness		-0,914	-0,828	-0,835	-0,865	-0,740
Standard error of skewness		0,201	0,204	0,209	0,210	0,211
Kurtosis		0,186	-0,024	-0,422	-0,607	-0,856
Standard error of kurtosis		0,400	0,406	0,414	0,417	0,419
Range		4	4	4	4	4
Minimum		1	1	1	1	1
Maximum		5	5	5	5	5

Source: Own study based on empirical research.

For each evaluated attribute, the average scores ranged between 3.71 and 4.14, indicating that the overall assessment was rather positive, with a predominance of responses of "good" or "very good" (average scores close to or above 4) (Table 6). The highest-rated attribute was the meal schedule (average 4.14), while the lowest-rated was the availability of vending machines with drinks and snacks (average 3.71). The median for all categories is 4, confirming that most responses clustered around this level of evaluation. The mode for all categories is 5, indicating that the highest scores were dominant. Meanwhile, standard deviation and variance illustrate the diversity of respondents' answers. The least variability was observed for the meal schedule (standard deviation 0.930, variance 0.865), suggesting a high consistency of opinions in this area. Conversely, the greatest variability was found in the availability of vending machines with

drinks and snacks (standard deviation 1.454, variance 2.115), indicating the most divergent opinions in this category.

The skewness in all categories is negative, signifying that the distribution of scores is asymmetrical, with a predominance of high ratings. Kurtosis for most categories is close to zero or slightly negative, suggesting a flat data distribution without prominent extreme values. The range in all categories is 4, indicating the full use of the rating scale by respondents and confirming diverse perceptions of individual attributes among the surveyed group.

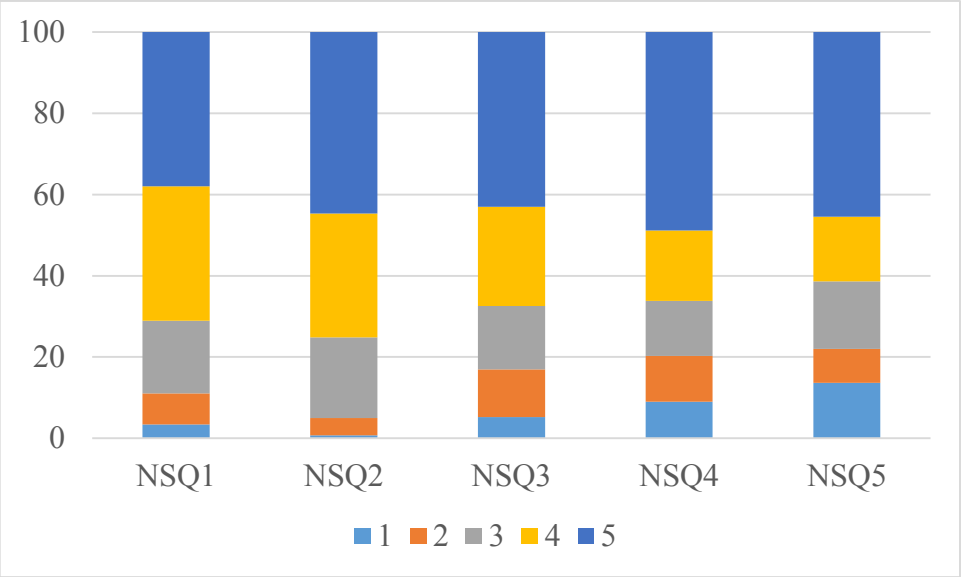

Figure 3. Evaluation of attributes SO1-SO6 in %.

Source: Own study based on empirical research.

Based on the distribution of ratings (Figure 3), it can be observed that high ratings, particularly "5" and "4", dominate, indicating a positive perception of the analyzed features by the respondents. The highest ratings have the largest percentage share in each attribute, highlighting a high level of satisfaction with these elements. The NSQ2 attribute stands out especially, where the rating "5" appears most frequently, suggesting that this aspect meets expectations to the greatest extent. The distribution of ratings for attributes NSQ1, NSQ2, NSQ3, and NSQ4 is similar, with high ratings prevailing and lower ones, such as "1" and "2", appearing relatively rarely. For NSQ5, a greater variation in opinions is noticeable, reflected in a higher proportion of lower ratings, such as "1", "2", and "3". This suggests that the perception of this attribute is more diverse compared to the others. Overall, a positive trend is visible in the ratings of the evaluated attributes, but NSQ5 may require more detailed analysis. The greater variation in ratings in this category could stem from differing expectations among respondents, indicating potential areas for improvement.

5. Conclusion and summary

The quality of nutritional services in medical facilities is a significant issue in the context of comprehensive healthcare, aimed not only at treating diseases but also at improving patients' overall health and well-being. Although this issue is increasingly raised in the academic literature, it remains insufficiently addressed in clinical practice. The complexity of the matter arises from the interdisciplinary nature of nutritional services, which require collaboration among dietitians, medical staff, hospital administration, and patients themselves.

In clinical practice, implementing effective nutritional services encounters numerous systemic, organizational, and interpersonal challenges. The most commonly identified difficulties include insufficient customization to individual patient needs and a lack of standardization in nutrition within medical facilities. Despite growing awareness of the importance of individualized nutritional therapy, in many cases, patients receive standard meals that do not meet their health needs, dietary preferences, or cultural considerations. This problem particularly affects patients with allergies, food intolerances, and diet-related diseases such as diabetes or chronic kidney disease. Many hospitals lack unified procedures for organizing nutritional services, resulting in significant variability in meal quality and their adaptation to patient needs. The lack of standardization encompasses logistical aspects, such as the timing and manner of meal service, as well as the absence of precise guidelines regarding diet composition for different patient groups.

It is worth noting that patient education on nutrition, which could support informed dietary decisions, remains underdeveloped. Meanwhile, studies indicate that dietary education can significantly improve treatment outcomes and enhance patient engagement in the therapeutic process. Considering the patient perspective is crucial in assessing the quality of nutritional services, as the subjective experience of the patient heavily influences the overall evaluation of medical care. Literature highlights that patients assess nutritional services not only in terms of the nutritional value of meals but also their taste, presentation, variety, and alignment with personal preferences. Here is a suggested paragraph in English that can be added to the conclusion of the article: Although this study highlights the importance of nutritional services in hospitals, it only minimally addresses the operational and systemic barriers that may hinder the implementation of improvements. Future research could expand on this by exploring constraints such as budget limitations, staffing shortages, and regulatory gaps. Investigating these factors would provide a more comprehensive understanding of the practical feasibility of proposed changes and support more effective, context-sensitive strategies for enhancing patient-centered nutritional care in healthcare settings.

Improving the quality of nutrition requires systemic solutions to elevate the importance of patient nutrition in medical care. This necessitates increased funding for hospitals or other entities providing inpatient and round-the-clock care to enhance both the quality of meals and

nutritional care for patients, as well as to ensure adequate technical and sanitary standards in food preparation areas. Additionally, it is essential to introduce regulations on rational nutrition in healthcare facilities, precise oversight mechanisms for hospital nutrition implementation, and appropriate sanctions in cases of identified deficiencies in patient nutrition.

References

1. Abd Aziz, N.A.S., Teng, N.I.M.F., Abdul Hamid, M.R., Ismail, N.H. (2017). Assessing the nutritional status of hospitalized elderly. *Clinical interventions in aging*, 1615-1625.
2. American Diabetes Association (2021). Diabetes care in the hospital: Standards of Medical Care in Diabetes—2021. *Diabetes Care, 44(Supplement_1),* S211-S220.
3. Anthony, P. S. (2008). Nutrition screening tools for hospitalized patients. Nutrition in Clinical Practice, 23(4), 373-382.
4. Bally, M.R., Yildirim, P.Z.B., Bounoure, L., Gloy, V.L., Mueller, B., Briel, M., Schuetz, P. (2016). Nutritional support and outcomes in malnourished medical inpatients: a systematic review and meta-analysis. *JAMA internal medicine, 176(1),* 43-53.
5. Berger, C., Blauth, R.E., Boger, D., Bolster, C.J., Burchill, G., DuMouchel, W., Pouliot, F., Richter, R., Rubinoff, A., Shen, D., Timko, M., Walden, D. (1993). *Kano's methods for understanding customer-defined quality*.
6. Boaz, M., Rychani, L., Barami, K., Houri, Z., Yosef, R., Siag, A., Leibovitz, E. (2013). Nurses and nutrition: A survey of knowledge and attitudes regarding nutrition assessment and care of hospitalized elderly patients. *The Journal of Continuing Education in Nursing, 44(8),* 357-364.
7. Boulhosa, R.S.S.B., Lourenço, R.P., Côrtes, D.M., Oliveira, L.P.M., Lyra, A.C., De Jesus, R.P. (2020). Comparison between criteria for diagnosing malnutrition in patients with advanced chronic liver disease: GLIM group proposal versus different nutritional screening tools. *Journal of Human Nutrition and Dietetics, 33(6),* 862-868.
8. Cano-Torres, E.A., Simental-Mendía, L.E., Morales-Garza, L.A., Ramos-Delgado, J.M., Reyes-Gonzalez, M.M., Sánchez-Nava, V.M., Guerrero-Romero, F. (2017). Impact of nutritional intervention on length of hospital stay and mortality among hospitalized patients with malnutrition: a clinical randomized controlled trial. *Journal of the American College of Nutrition, 36(4),* 235-239.
9. Cardenas, D., Correia, M.I.T.D., Ochoa, J.B., Hardy, G., Rodriguez-Ventimilla, D., Bermúdez, C.E., .Barazzoni, R. (2021). Clinical nutrition and human rights. An international position paper. *Clinical nutrition, 40(6),* 4029-4036.

10. Carino, S., Porter, J., Malekpour, S., Collins, J. (2020). Environmental sustainability of hospital foodservices across the food supply chain: a systematic review. *Journal of the Academy of Nutrition and Dietetics, 120(5)*, 825-873.
11. Cass, A.R., Charlton, K.E. (2022). Prevalence of hospital-acquired malnutrition and modifiable determinants of nutritional deterioration during inpatient admissions: A systematic review of the evidence. *Journal of Human Nutrition and Dietetics, 35(6),* 1043-1058.
12. Citty, S.W., Cowan, L.J., Wingfield, Z., Stechmiller, J. (2019). Optimizing nutrition care for pressure injuries in hospitalized patients. *Advances in wound care, 8(7),* 309-322.
13. Gębska, K. (2014). Leczenie żywieniowe pacjentów to obowiązek, nie przywilej. *Menedżer Zdrowia, 5,* 64-68.
14. Grzesinska, W., Tomaszewska, M., Bilska, B., Trafialek, J. (2014). Optymalizacja uwarunkowań wyboru systemu dystrybucji posiłków w żywieniu szpitalnym. *Żywność Nauka Technologia Jakość, 21(4).*
15. Hager, K., Cudhea, F.P., Wong, J.B., Berkowitz, S.A., Downer, S., Lauren, B.N., Mozaffarian, D. (2022). Association of national expansion of insurance coverage of medically tailored meals with estimated hospitalizations and health care expenditures in the US. *JAMA Network Open, 5(10),* e2236898-e2236898.
16. Henning, M. (2009). Nursing's role in nutrition. *CIN: Computers, Informatics, Nursing, 27(5),* 301-306.
17. https://www.wspolczesnadietetyka.pl/wywiad/lepsze-jedzenie-lepsze-zdrowie-pacjentow-program-dobry-posilek-w-szpitalach
18. Jiayi Mao, Liling Xie, Qinghua Zhao, Mingzhao Xiao c, Shuting Tu, Wenjing Sun, Tingting Zhou (2022). Demand analysis of an intelligent medication administration system for older adults with chronic diseases based on the Kano model. *International Journal of Nursing Sciences, 9,* 63-70.
19. Jodczyk-Bargańska, A., Ukleja, A., Śliż, D. (2024). Czym żywimy naszych pacjentów? Analiza danych o jakości żywienia w polskich szpitalach ze szczególnym uwzględnieniem pacjenta kardiologicznego. *Folia Cardiologica, 19*, 242-247.
20. Jonsson Kvist, A.K., Klefsjo, B. (2006). Which service quality dimensions are important in inboundtourism? A case study in a peripheral location. *Managing Service Quality, vol. 16, no. 5,* pp. 520-537.
21. Jonsson, A.S., Öström, Å., Nyberg, M. (2021). Performance of hospitality within restricting meal frames: An observational study of four h
22. Kieltyka, A., Narojek, L., Kandefer, K. (2001). Ocena jakosci zywienia szpitalnego na podstawie badan w dwoch wybranych szpitalach o roznej stawce zywieniowej. *Żywienie Człowieka*.
23. Kirkland, L.L., Kashiwagi, D.T., Brantley, S., Scheurer, D., Varkey, P. (2013). Nutrition in the hospitalized patient. *Journal of hospital medicine, 8(1),* 52-58.

24. Kondrup, J. (2004). Proper hospital nutrition as a human right. *Clinical Nutrition, 23(2),* 135-137.
25. Kotynia, Z., Tuzikiewicz-Gnitecka, G., Szewczyk, P. (2018). Żywienie pacjentów w szpitalach-brak zasad odżywiania chorych w publicznych placówkach. *Kontrola Państwowa, 63(4(381))*, 77-86.
26. Lean, M., Wiseman, M. (2008). Malnutrition in hospitals. *BMJ, 336(7639),* 290-290.
27. Martínez-Ortega, A.J., Piñar-Gutiérrez, A., Serrano-Aguayo, P., González-Navarro, I., Remón-Ruíz, P.J., Pereira-Cunill, J.L., García-Luna, P.P. (2022). Perioperative nutritional support: a review of current literature. *Nutrients, 14(8),* 1601.
28. Matzler, K., Hinterhuber, H.H, (1998) How to make product development projects more successful by integrating Kano's model of customer satisfaction into quality function deployment. *Technovation, Vol. 18, Iss. 1,* 25-38, ISSN 0166-4972, https://doi.org/10.1016/S0166-4972(97)00072-2.
29. Mikulic, J. (2006). *The Kano model-a review of its application in marketing research from 1989 to 2006.* Proceedings of the 1st International Conference marketing theory challenges in transitional societies. University of Maribor, pp. 87-96.
30. Mitchell, H., Porter, J. (2016). The cost-effectiveness of identifying and treating malnutrition in hospitals: a systematic review. *Journal of Human Nutrition and Dietetics, 29(2),* 156-164.
31. Moisey, L.L., Merriweather, J.L., Drover, J.W. (2022). The role of nutrition rehabilitation in the recovery of survivors of critical illness: underrecognized and underappreciated. *Critical Care, 26(1),* 270.
32. Namyslak, M., Kanikowska, A., Grzymislawski, M. (2014). Analiza czynników ryzyka niedożywienia szpitalnego. *Żywienie Człowieka i Metabolizm, 1(41).*
33. Neaves, B., Bell, J.J., McCray, S. (2022). Impact of room service on nutritional intake, plate and production waste, meal quality and patient satisfaction and meal costs: a single site pre-post evaluation. *Nutrition & Dietetics, 79(2),* 187-196.
34. Neriz, L., Núñez, A., Ramis, F. (2014). A cost management model for hospital food and nutrition in a public hospital. *BMC health services research, 14*, 1-12.
35. Nilsson-Witell, L., Fundin, A. (2005). Dynamics of service attributes: a test of Kano's theory of attrac-tive quality. *International Journal of Service Industry Management, vol. 16, no. 2*, pp. 152-168.
36. Ostrowska, J., Jeznach-Steinhagen, A. (2017). Niedożywienie szpitalne. Metody oceny stanu odżywienia. *Forum Medycyny Rodzinnej, Vol. 11, No. 2,* pp. 54-61.
37. Pałyska, M., Janczewska, M., Raduj, J.O., Induska, A., Prot, K. (2007). Znaczenie zmiennych społecznych dla różnicowania ocen jakości usług medycznych przez pacjentów. *Postępy w Psychiatrii i Neurologii, 16,* 309-314.
38. Parasuraman, A. (1985). A Conceptual Model of Service Quality and Its Implications for Future Research. *Journal of Marketing Fall, vol. 49*, pp. 41-50.

39. Pasquel, F.J., Lansang, M.C., Dhatariya, K., Umpierrez, G.E. (2021). Management of diabetes and hyperglycaemia in the hospital. *The lancet Diabetes & endocrinology, 9(3),* 174-188.
40. Rams-Swietoniowska, M., Konecka-Matyjek, E. (2010). Systemy zarządzania bezpieczeństwem żywności w szpitalnych blokach żywienia zgodnie z wymaganiami normy ISO 22 000: 2006. *Żywienie Człowieka i Metabolizm, 3(37).*
41. Rasmussen, H.H., Kondrup, J., Staun, M., Ladefoged, K., Lindorff, K., Jørgensen, L.M., Wengler, A. (2006). A method for implementation of nutritional therapy in hospitals. *Clinical Nutrition, 25(3),* 515-523.
42. Reber, E., Gomes, F., Bally, L., Schuetz, P., Stanga, Z. (2019). Nutritional management of medical inpatients. *Journal of clinical medicine, 8(8),* 1130.
43. Ridley, E.J., Parke, R.L., Davies, A.R., Bailey, M., Hodgson, C., Deane, A.M., Cooper, D. J. (2019). What happens to nutrition intake in the post–intensive care unit hospitalization period? an observational cohort study in critically ill adults. *Journal of Parenteral and Enteral Nutrition, 43(1),* 88-95.
44. Riley, K., Sulo, S., Dabbous, F., Partridge, J., Kozmic, S., Landow, W., Sriram, K. (2020). Reducing hospitalizations and costs: a home health nutrition-focused quality improvement program. *Journal of Parenteral and enteral Nutrition, 44(1),* 58-68.
45. Rożdżeński, W. (2019). Niewłaściwe wyżywienie jako podstawa odpowiedzialności podmiotu leczniczego. *Przegląd Prawa Medycznego, 1(2).*
46. Ruthsatz, M., Candeias, V. (2020). Non-communicable disease prevention, nutrition and aging. *Acta Bio Medica: Atenei Parmensis, 91(2),* 379.
47. Santhoshkumar, F., Jeyarajasekar, T., Kumar, S.A. (2022). Kano's model for customer satisfaction analysis of a hospital. *International Journal Of Health Sciences, 6(S1),* 11081-11089. https://doi.org/10.53730/ijhs.v6nS1.7654
48. Schuetz, P., Fehr, R., Baechli, V., Geiser, M., Deiss, M., Gomes, F., Mueller, B. (2019). Individualised nutritional support in medical inpatients at nutritional risk: a randomised clinical trial. *The Lancet, 393(10188),* 2312-2321.
49. Schuetz, P., Seres, D., Lobo, D.N., Gomes, F., Kaegi-Braun, N., Stanga, Z. (2021). Management of disease-related malnutrition for patients being treated in hospital. *The Lancet, 398(10314),* 1927-1938.
50. Schveneveldt, S.J., Enkawa, T., Miyakawa, M. (1991). Consumer evaluation perspectives of service quality: evaluation factors and two-way quality. *Total Quality Management, vol. 2, no. 2,* pp. 149-161.
51. Shimazu, S., Yoshimura, Y., Kudo, M., Nagano, F., Bise, T., Shiraishi, A., Sunahara, T. (2021). Frequent and personalized nutritional support leads to improved nutritional status, activities of daily living, and dysphagia after stroke. *Nutrition, 83*, 111091.

52. Shuhaimi, N.A.M., Mohamad, M., Sudin, N. (2022). Development of Daily Meal Ordering System for Patient in Hospital using Web-Based Technology. *Evolution in Electrical and Electronic Engineering, 3(1),* 136-146.
53. Sullivan, D.H. (1995). The role of nutrition in increased morbidity and mortality. *Clinics in geriatric medicine, 11(4)*, 661-674.
54. Tappenden, K.A., Quatrara, B., Parkhurst, M.L., Malone, A.M., Fanjiang, G., Ziegler, T.R. (2013). Critical role of nutrition in improving quality of care: an interdisciplinary call to action to address adult hospital malnutrition. *Journal of the Academy of Nutrition and Dietetics, 113(9),* 1219-1237.
55. Thibault, R., Abbasoglu, O., Ioannou, E., Meija, L., Ottens-Oussoren, K., Pichard, C., Bischoff, S.C. (2021). ESPEN guideline on hospital nutrition. *Clinical Nutrition, 40(12),* 5684-5709.
56. Thibault, R., Chikhi, M., Clerc, A., Darmon, P., Chopard, P., Genton, L., Pichard, C. (2011). Assessment of food intake in hospitalised patients: a 10-year comparative study of a prospective hospital survey. *Clinical Nutrition, 30(3),* 289-296.
57. Tymoszuk, M., Orkusz, A. (2015). Ocena wartości energetycznej i odżywczej diet szpitalnych na podstawie jadłospisów dekadowych. *Nauki Inżynierskie i Technologie, 4(19).*
58. Uhl, S., Siddique, S.M., Bloschichak, A., McKeever, W., D'Anci, K., Leas, B., Tsou, A.Y. (2022). Interventions for malnutrition in hospitalized adults: A systematic review and meta-analysis. *Journal of Hospital Medicine, 17(7),* 556-564.
59. Ukleja, A., Gilbert, K., Mogensen, K.M., Walker, R., Ward, C.T., Ybarra, J. (2018). Standards for nutrition support: adult hospitalized patients. Task Force on Standards for Nutrition Support: Adult Hospitalized Patients, the American Society for Parenteral and Enteral Nutrition. *Nutrition in Clinical Practice, 33(6),* 906-920.
60. van Loenen, T., van den Berg, M.J., Westert, G.P., Faber, M.J. (2014). Organizational aspects of primary care related to avoidable hospitalization: a systematic review. *Family Practice, 31(5),* 502-516. https://doi.org/10.1093/fampra/cmu053
61. Volkert, D., Beck, A.M., Cederholm, T., Cruz-Jentoft, A., Hooper, L., Kiesswetter, E., Bischoff, S.C. (2022). ESPEN practical guideline: Clinical nutrition and hydration in geriatrics. *Clinical Nutrition, 41(4),* 958-989.
62. Wronka, L., Sinska, B., Wójcik, Z. (2009). Catering-sposób na żywienie pacjentów w szpitalach?. *Żywienie Człowieka i Metabolizm, 5(36),* 736-746.
63. Wyka, J., Wrona, A. (2020). Żywienie w szpitalach–dziś i jutro. *Bromatologia i Chemia Toksykologiczna, 3*.
64. Young, A.M., Banks, M.D., Mudge, A.M. (2018). Improving nutrition care and intake for older hospital patients through system-level dietary and mealtime interventions. *Clinical nutrition ESPEN, 24*, 140-147.