

**MANAGING THE SAFETY OF CLINICAL NUTRITION  
AS AN IMPORTANT ELEMENT OF COMPREHENSIVE  
HEALTH SATISFACTION**

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**INTRODUCTION**

Adherence to rules of good nutrition is essential for hospitalised patients. Clinical nutrition serves a medicinal and educational function, being an integral part of the diagnostic and therapeutic process, and is a deciding factor in patients' health satisfaction. Rational, adjusted, varied and moderate nutrition satisfying the individual's demand for energy and nutrients is a determinant of good health [Goldfinch 2010, Szymanski 2014] and improves the quality of life. Irregularities in the nutritional process, shaped by qualitative or quantitative elements, are important factors in both causing and preventing disease. As a product of public hospitals, health services are provided by a diagnostic and therapeutic team cooperating at different stages. Clinical nutrition is an integral part of comprehensive health services.

The purpose of this article is to demonstrate the importance and the impact of following the rules of proper clinical nutrition (institutional feeding) on the effectiveness of services, with a view to increasing patient satisfaction. In the subject literature, the most frequently presented factors that influence the quality of food served (including in public hospitals) are nutritional value, taste, smell, appearance, price, food safety and served [Cieślak et al. 2010, Grębowiec 2010, Markovic et al. 2010]. The patient can make an individual, subjective evaluation. Objective evaluations are carried out through public institutions, and are intended to evaluate both the quality of food and nutrition in all of the links "from farm to fork". The research done for this paper was based on an analysis of the opinions of 104 public hospital patients in the Warmia and Mazury, Pomorskie and Wielkopolskie Provinces, from December 2007 to January 2011. The consumer evalua-

tion process included a number of characteristics affecting different quality areas, particularly on safety and health aspects. Evaluation by independent state institutions is the subject of further research proceedings.

## NUTRITIONAL TREATMENT – CLINICAL NUTRITION

A holistic approach in the process of clinical nutrition [Commission Regulation 1441/2007]<sup>1</sup> has been the subject of interdisciplinary research. A characteristic feature of cachexia is weight loss associated with a number of adverse changes in the patient's metabolism. The individual's state of nutrition is contingent upon a number of factors, including diet, age, sex, physical activity, stress, genetic pathologies, medical conditions, economic and socio-cultural conditions. The risk assessment process associated with improper nutrition can determine appropriate dietary behaviour not only during hospitalisation, but also for the future [Cardona 2006]. It is included in the routine behaviour in the process of the environmental interview<sup>2</sup>. Information gathered from patients during community interviews concerning non-prescription OTC drugs, which can cause side effects as they interact with other drugs, is also important. On the other hand, packaging leaflets fail to provide patients with comprehensive information [Czarniecka-Skubina and Janicki 2009].

A determinant influencing the adverse drug reaction (ADR) is also a lack of regular check-ups [Bober 2013]. The relatively low level of patient awareness results in susceptibility to diseases and increases the costs of hospital service. The nutrients provided by clinical nutrition can be obtained from nutritional products, and an industrial, liquid or artificial diet. Nutrient mixtures are prepared in laboratories meeting the conditions of the production process in accordance with Good Manufacturing Practice (GMP) as well as Good Hygienic Practice (GHP).

The present study focuses on enteral nutrition (oral), parenteral nutrition and is the subject of further studies (Table 1). In clinical nutrition, food is administered in one of the following ways:

- Enteral nutrition, through the gastrointestinal tract, orally or by tube inserted into the stomach or directly into the intestine and by surgical procedure – nutritional fistula. The term includes all forms of nutritional therapy led with preparations (industrial diet) administered by the digestive tract.
- External nutrition, parenteral nutrition – administering nutrients through an external tract (intravenous or in special cases – intra-arterial).

In the present considerations, it was also assumed that health behaviours are attitudes towards one's own health formed from an early age, which determine significant decision-making risks.

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<sup>1</sup> It is estimated that 30 and 70% of hospitalised patients require specialised clinical nutrition.

<sup>2</sup> Since 1 January 2012 hospitals have been required to perform a pre-screening assessment of the nutritional status of each patient admitted to the hospital – § 1 point 4 of the Ordinance of the Minister of Health of 15 September 2011 amending the regulation on guaranteed benefits in the field of hospital treatment (Journal of Laws 2011 No 202, item 1191).

TABLE 1. The number of the feeding rooms of internal and external nutrition at hospitals by provinces

Specification	Laboratories of internal and external nutrition	Number of nutritionists
Warmia and Mazury	2	85
Pomorskie	6	78
Wielkopolskie	3	164
Total	11	327

Source: developed on the basis of the NRA and the Centre for Health Information Systems (per diem 30.11.2012).

## QUALITY IN THE CONSUMER EVALUATION

According to the methodological assumptions, the respondents assessed the characteristics of the reproducible quality of clinical nutrition during the study. Food quality is inextricably linked to safety and health quality, compliance with laws, standards, specifications and the quality consumers will accept [Jasiulewicz-Kaczmarek and Wieczorek 2008]. The following aspects of quality can be and were taken into consideration:

- expected quality – of specific products;
- induced quality – a reference to a certain brand of product, based on previous experience;
- effective quality – an actual state;
- overall quality – the sum of the effective and induced qualities, which can be higher or lower than expected;
- potential quality – the level of improvement that may occur in the future.

Today's patients are becoming more aware and educated, and make ever-increasing demands of clinical nutrition, its distribution and promotion. Basic requirements include quality, safety and food hygiene, which "will not harm their health" [Kowalczyk 2009].

Community food law strives for a relatively repeatable level of quality. Food chain quality assurance systems are based on good practices in:

- production – Good Manufacturing Practice (GMP);
- agriculture – Good Agriculture Practice (GAP);
- hygiene – Good Hygienic Practice (GHP).

The assessment of individual clients is based on available information on packaging, opinions, media information and sensory evaluation including appearance, taste and smell. In addition, the relationship between ingredients and the amount used to make a product determine quality. The choice of food of appropriate quality and its composition can be generated by evaluating characteristics including sensory properties, durability, reliability, functionality, and the health aspects and characteristics of production, innovation and availability [Kowalska 2010]. The quality of clinical nutrition at public hospital networks is an important determinant of patient health satisfaction.

Food market quality policy in EU countries includes permanent monitoring of products "from farm to fork". Hazard Analysis and Critical Control Point (HACCP) is

a system that guarantees food health safety<sup>3</sup>, and all food chain operators in Poland must implement and follow it. The development and implementation of systems [Olkiewicz 2012b] in public hospital networks determines the ISO 9001-compliant Quality Management System (QMS) implementation process. Quality activities are put in place to enable the pursuit of comprehensive organisational management [Olkiewicz 2012a], Total Quality Management –TQM [Szymanski 2014]<sup>4</sup> through the integration of pro-quality systems which guarantee, among other things, stable, high-quality clinical nutrition and increasing patient satisfaction.

The manner and form of communicating information in the process of community interviews improves patients' awareness of clinical nutrition (essentially, this is the medical community encouraging healthy behaviour). As many as 84% of respondents confirmed that the physician attending community interviews transmitted reliable information about clinical nutrition and alternative treatment processes. Share of 71% indicated that the language used in the interview can be understood without knowledge of specialist terms [Bober 2013].

## CLINICAL NUTRITION IN THE PUBLIC HOSPITAL NETWORK

Clinical nutrition in public hospitals is exposed to adverse health determinants for which, according to current EU and Polish legislation, the manufacturer or the entity placing the product on the market is responsible [Turlejska 2007].

It was assumed that the safety of clinical nutrition in the network organisation is: "The general health-related value chain elements determining the so-called quality health food products, translating into an increase in patient health satisfaction and the awareness that the services in the field of the clinical nutrition process is not harmful to one's health" [Leba 2008].

The primary objective of ISO 22000:2006<sup>5</sup> is to harmonise requirements for food safety management of all entities directly or indirectly involved in the food chain [Kowalczyk 2009]. Quality is inextricably linked to security, quality of care and compliance with laws, and the specifications and standards accepted by patients. A determinant of the safety and quality of clinical nutrition is constant oversight for the presence of harmful substances and pathogenic parasites, bacteria, viruses and prions [Directive 2003/99/EC, Food Safety and Nutrition Act 2006, Piškula and Strączkowski 2011]. Changes in diet and lifestyle, including limiting physical activity and a sedentary lifestyle are determinants of quality of life, and cause three-quarters of all deaths [WHO 2008]. Like the diseases these factors give rise to, malnutrition generates significant socio-economic costs [Jarosz and

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<sup>3</sup> The obligation to apply HACCP covers all parties involved in the food industry, not only production, but also those engaging in distribution, trade, catering etc. (Food Safety and Nutrition Act of 25 August 2006, Journal of Laws 2006 No 171, item 1225).

<sup>4</sup> In 2013, there were 475 entities certified in Poland to provide healthcare, including public and private hospitals. The increase in certified medical entities to ISO standard 9001 rose from 10,295 in 2004 to 26,992 in 2013.

<sup>5</sup> Europe 2007–2479; Poland 2007-137. ISO 22000-certified entities is rising; in Europe in 2013 there were 9,733 while in Poland there were 640.

Respondek 2006]. A rise in the incidence of diet-related disease (the increasing number of children and young people with high cholesterol) may result from the low level of awareness among parents about the existence of a direct relationship between health and lifestyle. Yet another worrying phenomenon is the increasing incidence of food allergies, which 5% of children and 3–4% of adults suffer from [Sicherer and Sampson 2010].

In the light of these problems, a factor influencing the level of awareness of food safety is consumer knowledge, including knowledge about risks and confidence in the institutions responsible for food safety and information media [Sobotka 2007]. In this article it is assumed that safety in clinical nutrition and repeatable quality can be achieved by establishing a network of public hospitals, implementing ISO series 22000:2006, the requirements of the HACCP system and uniform distribution of medical personnel, equipment and hospital equipment in the demographic-social context.

## METHODOLOGY OF RESEARCH AND DISCUSSION

Both quantitative and qualitative methods were used to gather information. The aim was to discover patient opinions of public hospitals on issues related to clinical nutrition [Ordinance of Minister of Health 2012] in an effort to determine overall satisfaction with the care. In line with the principle of triangulation research methodology, secondary data, obtained from an analysis of the literature and research of documents, were used. The raw data were obtained with a questionnaire completed by a selected group of respondents<sup>6</sup>. The empirical studies were conducted from January 2007 to December 2011, in annual cycles.

The expected accuracy and representativeness of assessments was obtained through a survey based on a random sample comprising 104 public hospitals (20.43% of total) selected from the REGON<sup>7</sup> database, operating in three randomly selected provinces: Warmia and Mazury, Pomorskie and Wielkopolskie (18.8% of the total), marked as A, B and C in Table 2. The sample was chosen on a random layer, with the layers being the public entities (small, medium and large)<sup>8</sup> presented in Table 2. Share of 64.8% of the hospitals that ended up participating were small, 26.5% were medium and 8.7% were large. That breakdown is consistent with the requirements of the network organisation proposed. Following the pilot research on a sample N5 – 100 respondents, a number of issues were elaborated (ensuring transparency and comprehensibility).

Anonymous questionnaires were sent to 104 public hospitals functioning in the analysed provinces. Each was issued 900 questionnaires, which were filled out on computers during discharge supervised by a trained nurse (questions and doubts could be clarified on a regular basis). This approach resulted in 100% of the questionnaires being returned.

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<sup>6</sup> The study assumed that discharged patients are more objective in their statements involving the research issues analysed.

<sup>7</sup> As of 31 December 2007, 509 public hospitals excluding those of the Ministry of Defense and Ministry of Interior and Administration.

<sup>8</sup> Commission Recommendation of 6 May 2003 concerning the definition of micro-, small- and medium-sized enterprises (EU L 124 of 05.20.2003).

In both studies, Computer Assisted Personal Interviewing (CAPI) was used with direct computer-assisted questionnaire interviews. Answers were sought concerning knowledge of two types of characteristics: those determining the quality of clinical nutrition and those influencing the clinical nutrition security process. Share of 19.88% of the population analysed was hospitalised<sup>9</sup> patients. The material gathered was analysed statistically, with the level of significance set to  $\alpha = 0.05$ .

Table 2. Characteristics of the hospitals by provinces

Specification	Province	Quantity	Percentage (%)	Overall percentage (%)
Small hospitals (from 51 to 250 employees)	A	25	23.7	64.8
	B	23	22.2	
	C	20	18.9	
Medium hospitals (from 250 to 500 employees)	A	4	4.5	26.5
	B	19	17.9	
	C	4	4.1	
Large hospitals (over 501 employees)	A	1	0.8	8.7
	B	5	4.9	
	C	3	3.0	
Total	104	100	100	100

A – Warmia and Mazury Province, B – Pomorskie Province, C – Wielkopolskie Province

Source: the author, developed from January 2007 to December 2011 and CSO data.

The usefulness of the research methodology and the scale of benefits achieved by it showed the problem of clinical nutrition and the impact on the comprehensive satisfaction of care in managing the provision of services in public hospitals. That satisfaction has been disclosed through a consistent and systematic repetition of studies in annual research cycles and the same content of frequently asked questions. It has also allowed us to formulate the research problem in the form of a general question: To what extent does patient knowledge of qualitative factors determining clinical nutrition influence the effectiveness of the management of hospital services rendered and health satisfaction?

The study also allowed us to classify the factors affecting a certain level of quality and food safety in determining repeatable quality. The resulting statements, grouped into collections of major importance, as Table 3 shows, include the presence of: genetic modifications, additives, plant protection product residues, pathogenic microorganisms and foreign odours and flavours.

<sup>9</sup> Hospitalisation – round-the-clock provision of benefits guaranteed in elective and emergency situations, including diagnostic-therapeutic process ongoing since the patient came on to the ward until discharge or death. Provider assuring benefits under the hospital provides round-the-clock medical and nursing care seven days a week (Ordinance of the Minister of Health of 29 August 2009 on guaranteed benefits in the field of hospital treatment (Journal of Laws 2009 No 140, item 1143) – regulation for the implementation of the “bill basket”).

The legal requirements of clinical nutrition were also examined. Share of 51.5% of respondents were aware of the existence of legal provisions determining the processes involved in producing food of adequate quality, while 3.5% said there was a lack of solutions in this field and another 24% did not trust certificates and declarations on the packaging describing the safety of raw materials used to manufacture the product. In contrast, 62% of respondents believe that Poland's accession to the EU has improved the quality and safety of clinical nutrition.

Table 2. Factors determining the safety of clinical nutrition by provinces

Number of indications	Safety factors		
	Warmia and Mazury	Pomorskie	Wielkopolskie
2007-1	5 123	6 331	7 266
2007-2	5 217	6 200	7 303
2007-3	5 302	6 239	7 179
2007-4	5 499	6 389	6 832
2007-5	5 593	5 606	7 521
2008-1	5 923	6 331	6 466
2008-2	5 877	6 340	6 503
2008-3	5 802	6 239	6 679
2008-4	5 709	6 079	6 932
2008-5	5 893	5 906	6 921
2009-1	6 923	6 131	5 666
2009-2	6 877	5 340	6 503
2009-3	6 802	5 839	6 079
2009-4	6 709	5 879	6 132
2009-5	6 893	5 806	6 021
2010-1	6 023	6 531	6 166
2010-2	6 157	6 040	6 523
2010-3	6 202	6 139	6 379
2010-4	6 109	6 279	6 332
2010-5	6 493	6 106	6 121
2011-1	6 303	6 231	6 186
2011-2	6 157	6 240	6 323
2011-3	6 132	6 109	6 479
2011-4	6 019	6 309	6 392
2011-5	6 293	6 256	6 171

1 – genetic modifications; 2 – the presence of additives; 3 – the presence of residues of plant protection products; 4 – the presence of pathogenic microorganisms; 5 – the presence of extraneous odours

Source: the authors, compiled between January 2007 and December 2011.

Studies have also shown that quality consists of many attributes with varying degrees of significance depending on the patient's expectations. Share of 47.5% of respondents perceived clinical nutrition quality in various ways, making it difficult to arrive at a clear definition. The sensory properties of appearance and smell were rated most important. The research also showed that quality assurance systems have little effect on the quality of clinical nutrition. It was assumed for this paper that this is due to the level of knowledge (education) bearing on system implementation. According to 63.5% of respondents, process quality and the safety of clinical nutrition was determined by the presence of foreign odours and flavours, as well as the lack of harmful residues (61.4%). A study conducted by Piškula and Strączkowski [2011] demonstrated the importance of controlling chemical residues and microbiological contaminants in ensuring food safety.

Up to 79.5% of the respondents believed genetic modifications are a threat, while 36.4% of respondents considered the inability to define quality (the lowest level of education) to be an unimportant feature in the clinical nutrition process. Share of 54.4% of respondents (56.5% of respondents with secondary or higher education) indicated that this was a very important feature.

Analysis of the survey responses allows the following thesis to be put forward: "The state of knowledge among patients on the effects of qualitative factors and on the effectiveness and safety in clinical nutrition management services in public hospitals is satisfactory". Especially noteworthy are the subjects aged 20–40, who paid particular attention to the quality parameters on labels and packaging, including the nutritional value of products, number of ingredients, expiration date, brand, and certificates. The results obtained on quality management in public hospitals show a rising trend. While only 25% of food businesses within SMEs use self-assessment [Tile and Sikora 2013] techniques, there is no indication that the Polish Quality Award was used.

Health-related aspects of satisfaction with the quality of clinical nutrition are interdisciplinary. For the purpose of the discussion, it was assumed that the process of social inquiry should also take into account the procedures and standards in diagnoses of clinical nutrition (dietary consultation). In addition, malnutrition contributes to negative biochemical reactions in patients while at the same time driving up the cost of services rendered. Prioritising measurable quality objectives, the implementation and monitoring of the planned process (analysis and measurement of the effectiveness of clinical nutrition), and the implementation of corrective-preventive actions are crucial determinants of the value chain of a healthy subject network organisation. In addition, implementing procedures for monitoring adverse events (pharmacovigilance) is an important link in the growth of satisfaction and lower risk decision-making in clinical nutrition.

## CONCLUSIONS

The preceding analysis and empirical material describing the important areas of decision-making in clinical nutrition allows the following conclusions to be drawn:

- One of the important objectives of this study was to raise awareness among stakeholders in clinical nutrition about the implementation of standards, methods of assessment, monitoring processes, nutrition and food safety management.

- We are convinced that it will also help support efforts to improve the quality and safety of clinical nutrition in organising the healthcare network, preventing malnutrition in hospitals while at the same time determining the efficacy of diagnostic and therapeutic processes and reducing costs.
- The factors that determine the quality of clinical nutrition according to respondents are flavour, appearance, odour, safety and nutritional value.
- In the opinion of most respondents, clinical nutrition is safe for human health, as determined by a lack of presence of foreign odours and tastes, as well as harmful factors.

In summary, the qualitative aspects of assessing the effectiveness of clinical nutrition in management to provide services in a network of public hospitals are important, as is detecting gaps in previously existing standards, procedures and instructions in conducting community interviews.

In addition, there is also room for remedial and preventive actions, but most respondents assessed as positive the impact of clinical nutrition and believed the medical and mental health community possessed professional competence in conforming to ethical standards. Clinical nutrition as a component of comprehensive hospital services is an important indicator of quality. In addition, the time necessary for hospitalisation and overall treatment costs are also reduced.

When considering the problem of clinical nutrition from the point of view of economics, the realisation and implementation of the research proposals will be beneficial, especially in increasing quality of life. It should be expected that as a result of these actions, a change in public hospitals will also take place. Consideration of the views presented, supported by the present research, leads to the following conclusion: health is the greatest treasure.

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**Summary.** The health of society treated as a set of potential consumers requires effective action and a multidisciplinary approach. For the paper, a survey (a proprietary questionnaire) was used to determine the impact of quality and the factors determining it. Excessive consumption of high-energy food is the cause of diet-related diseases, aggravating both household budgets and the healthcare system. Healthy eating habits and the elements of food production safety should be monitored by a food security system. Such a system should be based on permanent control of nutritional, health-related characteristics and the presence of harmful substances to minimise the risk of disease. The process of improving threat detection systems is based on scientific risk analysis, the results of which form the basis for comprehensive risk management in clinical nutrition. Understanding patients' opinions about the importance of quality nutrition in public hospitals may be among the

determinants for improved multidirectional activities and increase the effectiveness of safe clinical nutrition. This aspect plays an important role in health education.

**Key words:** quality, management, clinical nutrition, food safety

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