Review paper

The problem of hospital malnutrition and its consequences

Problem niedożywienia szpitalnego i jego konsekwencje

Monika Pierzak[1], Grażyna Szczukiewicz-Markowska[2], Stanisław Głuszek[2]

[1]Department of Nutrition and Dietetics, Institute of Health of Sciences, *Collegium Medicum*, Jan Kochanowski University, Kielce, Poland
Head of the Department: Edyta Suliga Prof. JKU, PhD
[2]Department of Interventional Medicine with the Laboratory of Medical Genetics, Institute of Medical Sciences, *Collegium Medicum*, Jan Kochanowski University, Kielce, Poland
Head of the Department: Prof. Stanisław Głuszek MD, PhD

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Słowa kluczowe: niedożywienie szpitalne, ocena stanu odżywienia, konsekwencje niedożywienia.

Abstract

Statistics show that about 35% to 55% patients admitted to a hospital ward are undernourished, 20% of whom are found in the group of patients with severe malnutrition. According to ESPEN (European Society of Parenteral and Enteral Nutrition), 'Malnutrition is a condition resulting from a lack of absorption or a lack of consumption of nutrients, leading to a change in body composition (the reduction of free fat mass and body cell mass), thus resulting in physical and mental activity impairment and having a negative effect on the treatment of the original condition.' Taking into consideration the serious health and socio-economic consequences related to malnutrition, a priority of the health care policy of every country should involve a targeted active response aimed at impelling hospital authorities and health care decision-makers to devise relevant hospital malnutrition battle plans and strategies. The aim of this paper is to presentat the consequences related to faulty screening of the nutritional status of hospitalised patients.

Streszczenie

Statystki wskazują, że ok. 35–55% chorych przyjmowanych na oddział szpitalny jest niedożywionych, z czego 20% znajduje się w grupie chorych o ciężkim stopniu niedożywienia. Według Europejskiego Towarzystwa Żywienia Klinicznego i Metabolizmu (ESPEN) „niedożywienie to stan wynikający z braku wchłaniania lub braku spożywania składników odżywczych, który prowadzi do zmiany składu ciała (zmniejszenia wolnej masy tłuszczowej i masy komórkowej), upośledzenia aktywności fizycznej i psychicznej organizmu oraz wpływa niekorzystnie na wynik leczenia choroby podstawowej". Ze względu na stosunkowo poważne konsekwencje zdrowotne oraz społeczno-ekonomiczne niedożywienia priorytetem polityki zdrowotnej każdego z państw powinno być ukierunkowane działanie, którego celem jest nakłanianie władz szpitali oraz decydentów opieki zdrowotnej do stworzenia odpowiednich planów i strategii walki z niedożywieniem w szpitalu. Celem poniższego artykułu jest przedstawienie konsekwencji nieprawidłowego skriningu stanu odżywienia hospitalizowanych chorych.

Introduction

Statistics indicate that 35% to 55% of hospitalised patients are undernourished at the moment of admission, and half of them are characterised by severe malnutrition. According to the European Society of Parenteral and Enteral Nutrition (ESPEN), 'Malnutrition is a condition resulting from a lack of absorption or a lack of consumption of nutrients, leading to a change in body composition (the reduction of free fat mass (FFM) and body cell mass (BCM)), thus resulting in physical and mental activity impairment and having a negative effect on the treatment of the original condition.' [1]. Taking into consideration the serious health and socio-economic consequences related to malnutrition, a priority of the health care policy of every country should involve a targeted active response aimed at impelling hospital authorities and health care decision-makers to devise relevant hospital malnutrition battle plans and strategies [2]. The aim of the screening assessment of nutritional status should involve the identification of patients with malnutrition, as well as those at risk of malnutrition. In Poland, a binding legal act regulating the policy of nutritional care of hospitalised patients is the Regulation by the Minister of Health dated 15 September 2011, changing the regulation on guaranteed services in the

scope of hospital treatment [3]. The problem of malnutrition of patients in Polish hospitals results from a low level of awareness among the members of therapeutic teams of the importance of nutritional intervention undertaken at once. It is extremely important to organise training courses for doctors, nurses, and other members of the therapeutic team. In every hospital there should be a nutrition support committee, which, like an infection control committee, would be in charge of controlling and monitoring the effectiveness of the nutrition intervention implementation in every hospital ward. The Ministry of Health, at the beginning of the implementation of the Regulation dated 15 September 2011, regulated by law the appointment of nutrition support committees in every hospital, but soon after, the regulation was suspended for an unlimited period, and such is the state of affairs until today. Due to such a turn of events in the Polish legislation, the Polish Society for Parenteral and Enteral Nutrition, and Metabolism is making an attempt to form nutrition support committees. In 1997, hospitals in the European countries with staff nutrition support teams comprised only 2% to 37% [4]. This fact seems quite surprising, especially when taking into consideration the number of mechanical, metabolic, and septic complications related to the introduction of parenteral nutrition in hospitals not supported by nutrition teams, compared to the lack of complications in hospitals having nutrition support teams [4, 5]. Teams for nutritional therapy should include doctors, nurses, dieticians, and pharmacists. The role of nutrition teams involves the introduction of nutritional therapy in hospital wards, the evaluation of its effectiveness, monitoring, prophylaxis, and intervention in the direction of related complications, devising and implementing recommendations, standards of nutritional therapy, education, and training in a broader sense [3].

The aim of the study is to present the consequences of faulty screening of the nutritional status of hospitalised patients.

Factors influencing the nutritional status of hospitalised patients and consequences of malnutrition

In several clinical cases, disease is the cause of malnourishment. Malnutrition resulting from illness can be traced to a failure to proportionally balance the body's nutritional adequate intake, digestive and absorption disorders, an increased need for nutrients, increased loss (e.g. in malabsorption syndrome), and increased catabolism. An abnormal nutritional status is defined as a condition in which the functioning of particular systems is impaired and there is a measurable negative effect on the tissues, organs, and the whole body including its shape, size, and composition, resulting from an excess or inadequate provision of energy, protein, and other nutrients [6]. In clinical practice, there are three types of malnutrition distinguished. Firstly, malnutrition characterised by a decrease of serum protein, especially albumin, short half-life protein, and a decrease of cellular immunity is known as Kwashiorkor malnutrition. Specific symptoms of this type of malnutrition include water-electrolyte and acid-base imbalance and oedemas [7]. Secondly, malnutrition manifesting in the reduction of body mass while maintaining normal concentrations of serum albumin and protein is known as Marasmus malnutrition [8]. The third type of malnutrition is mixed malnutrition. The reduction of protein concentration and adipose tissue is characteristic of this type of malnutrition [7]. There are several causes of malnutrition. Malnutrition resulting from an insufficient intake of vitamins or macroelements concerns mainly older people and patients with a severe or chronic disease [6, 8, 9]. Healthy body development and functioning is dependent on the provision of nutrients based on age, sex, physical activity, and current general condition [6, 7].

Nutritional status affects the functioning and composition of the body. Malnutrition has a negative influence on cognitive functions. Depression is bodily responses of an adult to a deficiency of micro and macroelements. Epidemiological research has shown a correlation between diet quality and the occurrence of cognitive disorders. Malnutrition leads to a decrease of muscle strength and stamina. A reduction of heart muscle mass results in the decrease of ejection fraction, bradycardia, and finally hypotension. A reduction of heart volume, which in 40% of cases is a result of heart muscle loss, is proportional to body reduction mass [9, 10]. People with severe malnutrition suffer from decreased exercise tolerance, which leads to peripheral circulatory failure [10]. The failure to meet nutritional requirements also contributes to renal impairment, through the decrease of glomerular filtration rate (GFR), renal flow, urine concentration ability, and acid, salt, and water excretion, which results in the increase of extracellular fluid volume and the formation of so-called starvation oedema [11]. Malnutrition also disturbs the activity of the respiratory, digestive, and immune systems, thermoregulation, and wound healing processes [1]. Protein insufficiency exceeding 20% in the course of malnutrition leads to a change in the structure and function of respiratory muscles. The following undergo reduction: diaphragm muscle mass, maximum voluntary ventilation, and respiratory muscle strength [12]. The mechanism of malnutrition also involves the impairment of the digestive system functioning. The absorption area of the small intestine decreases, and thus the absorption of fat, disaccharides, and glucose becomes disturbed. Stomach, pancreas, and gall excretion reduction occur, which results in absorption disorders. Worsening and untreated malnutrition leads to hepat-

ic steatosis and steatohepatitis [13]. Malnutrition impairs the functioning of the immune system through the weakening of cellular response and immunity to infections [14]. The reduction of spinal temperature by one or two degrees results in confusion, a decrease of cognitive functions, muscle strength weakening, and disturbed coordination. Severe malnutrition causes an impairment of the body's response to high temperature [15].

Discussion

Hospital malnutrition resulting from the faulty screening of hospitalised patients' nutritional status comprises one of the most serious problems in the clinical practice of Polish hospitals. About 35% to 55% of patients admitted to a hospital ward are at risk of malnutrition or are undernourished, and 20% of patients suffer from severe malnutrition. Ignorance and the lack of inclusion of the relevant nutritional therapy leads to so-called hospital malnutrition. Hospital malnutrition concerns about 30% of patients with a healthy nutritional status, and in 70% of the undernourished at the moment of admission, during 10 to 12 days of a stay in a hospital ward, it evolves into more severe malnutrition [16, 17]. Dzieniszewski *et al.* evaluated the nutritional status of patients in Polish hospitals [18]. The subject of the study involved 3310 patients randomly chosen. The nutritional status of the patients was assessed with anthropometric tests and biochemical indicators. In the extended study the concentrations of vitamins A, C, E, B_{12}, and folic acid were also measured. The conclusions of the study showed that patients admitted to Polish hospitals are undernourished at the moment of admission or at risk of malnutrition. About 21% of the subjects revealed an increased risk of malnutrition, evaluated on the basis of biochemical indicators. The authors of the study also underlined the importance of hospitalisation time and its correlation with worsening malnourishment. Perioperative malnutrition is a problem concerning patients not only in Poland but in hospitals worldwide. The results of the studies presented by Ostrowska and Jeznach-Steinhagen. [19], concerning the nutritional status of Polish hospital patients, as with the study by Dzieniszewski *et al.* [18], stress the problem of malnutrition among patients of Polish hospitals. The study shows that the problem of malnutrition in Polish hospitals is comparable to the problem of malnutrition of patients in hospitals worldwide. The study results show a great need to fight hospital malnourishment by implementing relevant action not only nationally, but also worldwide. Konturek *et al.* [20], in their own study, emphasise the fact of underrating malnutrition as a problem of hospitalised patients. The study involved 815 patients admitted to German hospitals. A screening analysis of nutritional status was performed with the use of Subjective Global Assessment (SGA) and Nutritional Risk Screening 2002 (NRS). The study revealed that 53.6% of patients were undernourished according to the SGA scale, and according to the NRS scale, malnutrition affected 44.6% of patients. The study results indicate unambiguously that a lack of screening analysis of nutritional status and the implementation of adequate nutritional therapy among hospital patients is a cause of malnutrition that worsens along with the hospitalisation time. Similarly, the study results by Dzieniszewski *et al.* [18] and Correia and Campos. investigated the problem of hospital malnutrition among patients of hospitals in Central America [21]. In the study the frequency of malnutrition occurrence among patients in hospitals in Central America was assessed. This study highlighted that as many as 50.2% of patients are undernourished, 11.2% of whom are characterised by severe malnutrition. The authors underline the great significance of patients malnutrition in Central American hospitals as well as the low level of awareness of doctors concerning malnutrition, its health consequences, and the importance of the implementation of nutritional therapy. The guidelines of the European Society for Parenteral and Enteral Nutrition (ESPEN) clearly stress the necessity of compensating for the imbalance of nutrients, including trace elements in undernourished patients in the perioperative period, scheduled to undergo a surgical operation. In the study conducted by Khatib-Chahidi *et al.* [22], the authors pay special attention to the problem of poor compliance to the guidelines of the European Society for Nutrition in German hospitals and consequences related to patient health and life. Mowe *et al.* [23], like the authors mentioned above, attempted to diagnose the causes of insufficient nutritional care in hospitals. The focus of the study was directed at the poor knowledge on the significance of introducing nutritional therapy among health care employees. The studies were conducted among doctors and nurses in Denmark, Sweden, and Norway. The conclusion of the study unambiguously shows that the cause of nutritional care negligence of surgical patients involves insufficient knowledge on nutritional care. The introduction of an integrated teaching program concerning the significance of the nutrition of patients in the education of all the staff would seem to be a good solution to the problem.

Malnutrition is a serious problem of all hospitalised patients and beneficiaries of nursing homes, resulting in a series of negative consequences such as longer treatment times and generating additional costs related to the patient's stay in hospital. Additionally, it is also a cause of several complications, thus making the treatment process more difficult [24]. Based on epidemiological data, it can be assessed that in Great Britain about 3 million inhabitants (5% of the British population) are included in the group of people with an increased risk of malnutrition [25].

The National Institute of Health and Clinical Excellence (NICE) published these estimates. It follows then that interventions related to the early screening diagnosis of undernourished patients undertaken with the inclusion of nutritional therapy would save hospitals about $28,473 for every 100,000 people [26]. Curtis *et al.* [27], in their own study, attempted to estimate the costs of hospital malnourishment. The authors revealed that, on average, 34% of hospitalised patients are undernourished, which makes hospitalisation time longer by about 18%, compared to patients with a healthy nutritional status. A consequence of a longer hospital stay involves higher expenditure, between 31% and 34%, compared to well-nourished patients. Leiva Badosa *et al.* [28], similarly to Curtis *et al.* [27], in their own study, presented results describing the influence of malnutrition on longer hospitalisation, an increase in costs, and a higher percentage of deaths. Freijer *et al.* [29] dealt with an aspect concerning the effect of disease-related malnutrition on the increase of patient hospitalisation costs. The study was conducted among hospital patients in Holland. The total additional cost, being an effect of malnutrition resulting from the treatment of adult patients, equalled €1.9 billion in 2011, which comprised as much as 2.1% of all health care expenditure in Dutch hospitals. The study results by Freijer *et al.* [29] are futher confirmation of the fact that hospital malnutrition generates higher hospitalisation costs compared to patients with healthy nutritional status. Aeberhard *et al.* [30], presented negative consequences of malnutrition on patients' life quality, the immune system, muscle strength, and disease prognosis. The authors stress the importance of systematic identification of patients' nutritional status in order to diagnose malnutrition or the risk of malnutrition at an early stage.

Malnutrition is also a significant clinical problem among oncological patients [31–33]. The symptoms of malnutrition and wasting (cachexia) are present in about 30% to 85% of patients in the generalised stage of the disease [32, 34]. In a large group of oncological patients, from 5% to 20% of malnutrition is a cause of death in the terminal stage of the disease [31, 34]. The intensity of malnutrition and cachexia in patients undergoing oncological treatment is dependent on tumour type, the patient's age, and the stage of the disease [31, 34]. Elderly patients and children are those who are at higher risk of malnutrition and cachexia caused by neoplasm [31]. Tumours that predispose patients to the development of malnutrition and cachexia in the course of a tumour disease involve tumours of the digestive tract, such as: stomach, oesophagus, or pancreas cancer [31]. Malnutrition in oncological patients is a result of a failure of meeting nutritional requirements due to their nutrient loss and an increased demand caused by hyper metabolism caused by disease [31]. One mechanism responsible for malnutrition in oncological patients is cachexia. Planas *et al.* [35] included in their study 401 oncological patients describing their nutritional status by means of the NRS questionnaire. The presented study results have shown that 33.9% of the patients admitted to hospitals qualified to the group of patients at risk of malnutrition, and 36.4% were undernourished at the moment of discharge. The authors of the study emphasise that average hospitalisation time and the cost of health care was higher in relation to patients with nutritional risk at the moment of discharge, compared to the patients with a healthy nutritional status. The study presented by the authors is just another confirmation of the fact that hospital malnutrition is a common problem of hospitalised patients leading to longer hospital stays and higher health care costs as well as longer recovery.

Summary

Hospital malnutrition is a problem present in hospitals not only in Poland, but also worldwide. Despite measures taken by societies for parenteral and enteral nutrition at a national, European, and worldwide levels, it is still a significant issue. Statistics inexorably show that about 35% to 55% of patients admitted to a hospital ward are undernourished, and 20% of them are in the group with severe malnutrition [1, 36]. The problem of hospital malnutrition is serious to such an extent that it comprises a disease, which can be found in the International Classification of Diseases and Health Problems under "malnutrition". In hospital conditions it is rarely diagnosed and left untreated, which results in a worsening of the condition of health, a longer hospital stay, generating additional treatment costs, and even leading to an increase of the death rate among patients. Basic tasks and skills of every member of a therapeutic team should involve the evaluation of nutritional status and recognition of the symptoms of malnutrition. The consequences of untreated malnutrition are so serious that the screening assessment of nutritional status, which is aimed at the identification of undernourished patients or those at risk of malnutrition, is a priority. The evaluation of nutritional status is performed by means of standardised questionnaires, biochemical tests, and anthropometric measurements. Training of therapeutic teams in the scope of clinical nutrition and the appointment of nutritional support teams in hospital wards seem to be a solution, which will reduce the number of patients with unidentified and untreated malnutrition, which in turn will bring measurable benefits for both patients and hospitals.

Conflict of interest

The authors declare no conflict of interest.

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Corresponding author:

Dr. **Monika Pierzak**
Department of Nutrition and Dietetics
Institute of Health of Sciences
Collegium Medicum
Jan Kochanowski University
al. IX Wieków Kielc 19, 25-317 Kielce, Poland
Phone: +48 530 169 219
E-mail: monikapierzak03@o2.pl