Loera Heras, Z. L., García Gaxiola, S. K., y Moguel Méndez, S. (2025). Effect of nutritional interventions on the risk of malnutrition in breast cancer patients. En G. Mercado Mercado y M Del R. Moyeton Hernández (Coords). *Nutrition: Challenges, Opportunities, and Essential Strategies in the Prevention and Management of Chronic Diseases* (pp. 94-112). Religación Press. http://doi.org/10.46652/religacionpress.280.c474

Chapter 6

Effect of nutritional interventions on the risk of malnutrition in breast cancer patients

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Abstract

Breast cancer is a disease that mainly affects women. Cancer treatments used against breast cancer can cause negative effects, including malnutrition. Nutritional screening is used to identify the risk of malnutrition in patients with breast cancer. To reduce the risk of malnutrition in cancer patients, nutritional interventions have been proposed. There are different types of nutritional interventions such as the calorie restriction diet, ketogenic diet, intermittent fasting, vegetarian diet, Mediterranean diet and the traditional Mexican diet. These nutritional interventions have had positive results in patients with breast cancer, impacting their body composition, anthropometric measurements and serum markers, resulting in tumor reduction in some cases. For these reasons, nutritional interventions are considered as adjuvants in the treatment of breast cancer. However, these interventions must be individualized and appropriately selected, considering the nutritional needs, lifestyle, and preferences of the patient.
Keywords: Assessment algorithm; Malnutrition; Breast cancer; Nutritional intervention; Nutritional screening.

Introduction

Breast cancer is a disease in which cells in the breast tissue multiply uncontrollably and form primary tumors. The cells can metastasize, that is, they break away from the primary tumor and invade nearby tissues such as bone, spleen, lung, and brain (Obeagu and Obeagu, 2024). Patients with breast cancer are at high risk of developing malnutrition, especially in advanced stages of the disease (Arends et al., 2024). Malnutrition results from the combination of metabolic dysregulation and anorexia (Bossi et al., 2022). Nutritional screening is used to identify whether breast cancer patients are malnourished or at risk of malnutrition.

Nutritional screening is a procedure in which the nutritional status of individuals is assessed (Álvarez, 2018). In Mexico, a comprehensive care protocol has been proposed by the Mexican Social Security Institute (IMSS, 2017), as well as the publication of the Mexican Official Standard (NOM-041-SSA2-2011) which establishes the guidelines for the prevention, diagnosis, treatment, control and epidemiological surveillance of breast cancer in order to establish tools aimed at health personnel involved in the care of this type of patients (Diario Oficial de la Federación, 2011). Both are governed by the guidelines of the European Society of Clinical Nutrition and Metabolism (ESPEN) (Arends et al., 2017).

To reduce the risk of malnutrition in cancer patients, nutritional interventions have been proposed, defined as "intentionally planned actions aimed at positively changing a nutrition-related behavior, an environmental condition, or an aspect of health status" (Swierz et al., 2020). Such interventions have demonstrated positive clinical results on disease prognosis. Among the nutritional interventions we find the calorie restriction diet, the ketogenic diet, intermittent fasting, the vegetarian diet, the Mediterranean diet, and the traditional Mexican diet.

Breast cancer and its risk factors

Cancer is a disease in which some cells undergo carcinogenesis (Matthews, 2022). Carcinogenesis is a multifactorial process stimulated mainly by epigenetic causes (Łukasiewicz et al., 2021). During carcinogenesis, cells undergo alterations in the genes involved in the control, growth, and division of the cell cycle. Such genes are called proto-oncogenes, when they are mutated, that is, they undergo a change in the DNA sequence that makes up these genes, they become oncogenes. This is how cancer cells acquire the capacities to maintain proliferative signaling, evade growth suppressors, resist cell death, allow replicative immortality, induce/access the vasculature, activate invasion and metastasis, reprogram cellular metabolism and avoid immune destruction (Hanahan, 2022).

Tumor suppressor genes are critical for controlling normal cell growth. These genes encode proteins that function to limit proliferation. Both BRCA1 (breast cancer) and *BRCA2 (*breast cancer) 2 are thought to be involved in the control of normal cell growth. cancer 1), located on chromosome 17 like *BRCA2* (from its acronym in English " Breast Cancer Type 2 susceptibility protein") located on chromosome 13 act as tumor suppressor genes. However, a mutation in *BRCA1* or *BRCA2* confers an increased risk of breast and other cancers (Casaubon et al., 2023). Up to 25% of inherited cases are due to a mutation in one of a few identified, but highly penetrant, rare genes (BRCA1, BRCA 2, PTEN, TP53, CDH1, and STK11), which confer up to an 80% lifetime risk of breast cancer. An additional 2%–3% of cases are due to a mutation in a moderately penetrant rare gene (e.g., CHEK2, BRIP1, ATM, and PALB2), each associated with a twofold increased risk (Shiovitz et al., 2015). Patients with *BRCA1* and *BRCA2 mutations* have worse breast cancer-specific survival compared with *BRCA1 patients negative. BRCA1* carriers have a worse overall survival than BRCA2 patients (Casaubon et al., 2023).

Breast cancer is a disease characterized by uncontrolled growth of cells that form breast tissue, mainly from the inner lining of the ducts or from the cells of the breast lobules (Łukasiewicz et al., 2021). Breast cancer can be classified according to tumor size, location, and degree of spread (stage), with 0 being the least advanced and 4 being the most advanced, or by the presence of hormone receptors (subtypes) such as human epidermal growth factor receptor 2 (HER2) protein, estrogen receptors (ER), and progesterone receptors (PR), as shown in Table 1.

Table 1. Breast cancer classification.

Classification	Subtype	Feature
According to the degree of invasion	In situ	Inside the milk ducts that carry milk to the nipple
	Infiltrating	The tumor breaks the duct and invades the fat of the breast.
Depending on where the tumor originates and its appearance	Lobular	It originates in the lactiferous ducts.
	Ductal	Present in the lining of a mammary duct.
	Medullary	Grouped cancerous marrows.
	Colloid	Infiltrating ductal carcinoma.
	Inflammatory	Blockage of lymphatic vessels causing inflammation.

Classification	Subtype	Feature
According to the biological and genetic characteristics of the cells	Epithelial basal	Absence of ER and human epidermal growth factor receptor 2.
	HER2 positive	High expression of the HER2 protein.
	HER2 negative	Little or no HER2 protein in cancer cells.
	Luminal A	High expression of ER.
	Luminal B	Positive for one of the hormone receptors, either ER or PR.
	Luminal B and C	Low to moderate expression of specific genes including ER.
	Triple negative	HER, ER and PR negative.
According to the stage of cancer development	Stage 0	Abnormal cells are present, but have not spread to other tissue.
	Stage I	Early stage (tumors spread to other tissues in small areas)
	Stage II	Localized (tumor 20 to 50 mm and affected node, or 50> mm without affecting the node).
	Stage III	Regional spread (tumor 50> mm and affected node in a wider region).
	Stage IV	Foreign spread (cancer spread to more parts of the body).

RE: Estrogen Receptor; PR: Progesterone receptor

Source: Lehmann (2016).

Female breast cancer had a global incidence in 2022 of more than 2.3 million new cases, comprising 11.6% of all cancer cases. In addition, it was the fourth leading cause of cancer mortality worldwide with more than 666,000 deaths (6.9% of all cancer deaths) (Bray et al., 2024). In Mexico, it has had a constant increase, both in its incidence and mortality (Cárdenas-Sánchez et al., 2023). According to data from the World Cancer Observatory in Mexico, in 2022 more than 111,200 new cases were reported in the female population, and more than 49,795 died from this cause (Ferly et al., 2024). In 2023, according to the National Institute of Statistics, Geography and Informatics, there were 8,034 deaths from breast cancer in the population aged 20 years and older, of which 99.5% occurred in women. At the national level, the mortality rate in women aged 20 years and older from breast cancer was 17.9 per 100,000. Sonora had the highest rate (27.5) and Campeche, the lowest (9.9) (INEGI, 2024).

The causes of the appearance of breast cancer are varied, which is why it is considered a multifactorial disease. Among the risk factors for breast cancer

are non-modifiable and modifiable. It is known that non-modifiable factors are female sex, age, family history (of breast or ovarian cancer), genetic mutations, race/ethnicity, pregnancy and lactation, menstrual period and menopause, breast tissue density, previous history of breast cancer. Modifiable factors include hormone replacement therapy, physical activity, development of overweight/obesity after menopause, alcohol and cigarette consumption, exposure to chemicals and nutritional factors (Łukasiewicz et al., 2021; Martínez, 2019).

There are multiple studies that indicate that nutritional factors have a great impact on the risk and progression of cancer, among them are the Western-type diet, excessive consumption of fats, especially animal fats, high consumption of red and fried meats, high consumption of iron, low consumption of fresh vegetables and fruits, low consumption of phytoestrogens (isoflavones, lignans) (Dong, 2023; Łukasiewicz et al., 2021). Likewise, cachexia, sarcopenic obesity and malnutrition are secondary conditions that frequently develop in patients with breast cancer (Rodríguez, 2023).

Malnutrition

Malnutrition is the result of the combination of metabolic dysregulation and anorexia. The causes are classified as those related to the tumor itself, to the patient, or to cancer treatments. Several mechanisms have been proposed for why malnutrition may occur in cancer patients: decreased desire to eat, difficulties in eating, alteration of gastrointestinal motility, digestion and/or absorption, decreased ability to use nutrients, and increased energy expenditure as shown in Table 2 (Bossi et al., 2022).

Table 2. Effects of Disease and Treatment on Nutritional Status and Clinical Outcome.

Causes of malnutrition	Causes of metabolic disorders
Decreased desire to eat (e.g. anorexia, changes in smell and taste, nausea)	Inflammatory and immune cells in the tumor microenvironment
Difficulty eating (e.g., impaired chewing, dysphagia, vomiting, abdominal pain)	Cancer cell-derived mediators
Disturbance of gastrointestinal motility, digestion and/or absorption (e.g. mucositis, stenosis, diarrhea)	Outbreaks of infections
Decreased ability to utilize nutrients (e.g., low body cell mass, hypothyroidism)	Tissue destruction by invasive cancer, wounds, or therapeutic interventions (e.g., surgery, radiotherapy, systemic therapies)

Causes of malnutrition	Causes of metabolic disorders
Increased energy expenditure (e.g. increased activity, heat losses)	

Source: Arends (2024).

Early diagnosis of nutritional problems can ensure adequate management of malnourished cancer patients as well as those at high risk of malnutrition. Such diagnosis can be made by standardizing protocols, performing nutritional screening tests, and including nutritional parameters in the patients' medical history would help achieve good clinical outcomes. Nutritional screening should begin at the time of diagnosis and be repeated at each visit to initiate nutritional intervention early, before the general condition is severely compromised and the chances of recovering normal body conditions are low. The goals of nutritional treatment are to prevent and treat malnutrition, reinforce the effects of anti-tumor treatment by reducing its adverse effects, and improve quality of life (Arends, 2024).

Nutritional screening

Nutritional screening is a procedure in which the nutritional status of individuals is assessed in order to identify whether they are malnourished or at risk of malnutrition. The steps to perform nutritional screening are: 1) Screen all cancer patients at risk of malnutrition early, 2) Expand assessment measures to include measures of anorexia, body composition, inflammatory biomarkers, resting energy expenditure, and physical function, 3) Use individualized multimodal nutritional interventions to increase nutritional intake, decrease inflammation and metabolic stress, and increase physical activity (Arends et al., 2017).

ESPEN recommends simple nutritional screening methods including: **Nutritional Risk Screening 2002 (NRS, 2002):** This screening material is designed for use in hospitalized adults at risk of malnutrition, as well as being a more widely validated predictor for patients in Intensive Care Units (ICU). It consists of four questions that are answered with "yes" or "no", and the more negative answers obtained, the lower the patient's risk of malnutrition (Kondrup, 2003).

Malnutrition Universal Screening Tool (MUST): MUST is a 5-step tool to identify adults with malnutrition (undernutrition or obesity) and is a management guide to develop a care plan. This tool is primarily used in hospital and community settings (Russell and Elia, 2012).

Mini Nutritional The MNA (National Nutritional Assessment) tool can identify elderly patients aged 65 years and older who are at risk of malnutrition, both in the hospital and community settings, as well as in long-term care and rehabilitation. The MNA was developed approximately 20 years ago and remains the best validated tool for this population group. This tool consists of 6 questions with answers ranging from 0 to 3 points, the higher the final score, the lower the risk of malnutrition (Nestlé Nutritional Assessment Institute, 2013).

Malnutrition Screening Tool (MST): This is one of the easiest and simplest tools to handle, which is designed for use in mainly hospitalized adult patients. The MST consists of 2 questions, with answers that have scores ranging from 0 to 4 points, and the higher the score, the greater the risk of malnutrition (Tasmanian Department of Health, 2021).

It should be noted that nutritional screening is a primary tool for the management of patients with a degenerative disease such as cancer, thus becoming a necessity for healthcare as it is the first step in addressing disease-related malnutrition. In addition, it is the basis for finding the appropriate dietary intervention that adapts to the specific nutritional needs that the patient requires in the course of his or her disease (Álvarez, 2018).

Dietary interventions in patients with breast cancer

For many years, nutritional intervention has been performed only in cancer patients in advanced stages of the disease, as part of a palliative treatment regimen. However, the greater efficacy of nutritional support is related to an early approach. However, early nutritional assessment is not routinely performed (<50% of patients) and a large proportion of patients are not identified as at risk or malnourished at the time of cancer diagnosis. Evidence indicates that almost 65% of patients remain without any nutritional intervention. Nutritional interventions in cancer patients are not only effective in preventing malnutrition in cancer patients, but also have positive effects even in patients with a normal nutritional status (Bossi et al., 2022).

Calorie restriction diet

Calorie restriction is characterized by a reduction in calorie intake (Pons et al., 2018). Calorie restriction interventions in the oncology setting have the assumption that starvation-induced autophagy can sensitize cancer cells to chemotherapy by reducing side effects. Such sensitization promotes an effect

known as "differential stress resistance." Furthermore, caloric restriction brings about beneficial effects such as the reduction of oxidative stress and growth factors related to cell proliferation of cancer cells (Gray, 2022).

This is due to its impact on reducing oxidative stress, acting through three cellular mechanisms: a decrease in the generation of free radicals, an increase in their elimination, and the activation of repair processes. The main source of reactive oxygen species (ROS) is the mitochondria, and caloric restriction modulates their production without affecting the activity of the electron transport chain, but rather through changes in the mitochondrial membrane potential (Alidadi et al., 2021).

According to various studies, caloric restriction in breast cancer patients undergoing neoadjuvant treatment (chemotherapy, radiotherapy, hormonal therapy, immunotherapy) and macronutrient distribution showed a significant improvement in quality of life. As well as a decrease in the stage of axillary lymph nodes in more than 60% of the participants. Another significant improvement was the reduction in body mass index (BMI). In addition to the reduction in tumor size and no signs of tumor progression (Vafa et al., 2020; Castellano et al., 2023).

Intermittent Fasting

Intermittent fasting is an ancient practice with a pattern where food and drink are not consumed for a period of time. Different approaches have been proposed, among the most popular ones being the time-restricted diet (TRF) and the intermittent fasting mimicking diet (FMD) (Vega et al., 2024) ; (Vasim et al., 2022).

In the time-restricted diet, intake is limited to 4 to 12 hours daily. The effect of this method regulates appetite and accelerates fat mobilization through the circadian cycle and interacts with RNA to regulate glucose and lipid metabolism, also improving axonal and hematopoietic stem cell (HSC) regeneration. Each fasting method, including FMD (Intermittent Fasting Mimicking Diet), presents different physiological mechanisms that impact health (Dogmeni et al., 2023).

In the intermittent fasting-mimicking diet, caloric intake is reduced for 5 days per month. The macronutrient distribution on the first day is 40-50% of the regular caloric intake and on the following days around 10-20%. The benefits are associated with the regeneration of tissues and cells such as β cells and neurons. In addition, intestinal cells improve the anti-tumor immune response and chemotherapy toxicity (Bocardi et al., 2023).

Among the benefits of intermittent fasting is the synergy with drugs, strengthening the immune system, improving the effect of chemotherapy and

protecting the body from toxins. One of the proposed mechanisms is that tumor cells become sensitive to chemotherapy and side effects are reduced. At the same time, the liver oxidizes fatty acids and provides fuel in the form of ketone bodies that inhibit the growth of carcinoma cells. Likewise, the autophagy of fasting protects cells from cancerous mutation (Dogmeni et al., 2023). Studies have shown that adherence to intermittent fasting patterns improves overall well-being, which contributed to weight reduction and waist circumference (Lutenberg et al., 2021) (Vega et al., 2024).

Ketogenic diet

The ketogenic diet is characterized by a high fat intake (55%-60%) (Moon et al., 2017), mostly long-chain triglycerides (Pedron et al., 2016), moderate protein intake (30%-35%), and low carbohydrate intake (5%-10%) (Moon et al., 2017). This type of diet causes ketosis (Salvatierra et al., 2012), which is defined as a metabolic pathway that produces ketone bodies (Padron et al., 2016).

The primary goal of the ketogenic diet is to decrease overall body fat and improve metabolic health. Recent research indicates potential benefits in type 2 diabetes, hyperlipidemia, heart disease, and cancer(Masood et al., 2023) . Currently, there are different ketogenic diet patterns, such as the classic ketogenic diet, the medium-chain triglyceride (MCT) diet, the modified Atkins diet (MAD), and the low glycemic index treatment (LGIT). The difference between these patterns lies in the distribution of macronutrients (Moon et al., 2017).

During ketogenesis, low insulin secretion regulates blood glucose levels, which reduces the stimulation of fat and glucose storage (Masood et al., 2023). The human body metabolizes fat stores through lipolysis and fatty acids through beta-oxidation, giving rise to ketone bodies (KB) such as acetoacetate, β-hydroxybutyrate, and acetone (Pedrón et al., 2016). Ketone body production depends on resting metabolic rate, BMI, and fat percentage (Masood et al., 2023). In this sense, ketone body production increases due to decreased carbohydrates and increased fatty acids (Dillon and Gupta, 2023). The way in which side effects on tumor growth are minimized is through the production of ketone bodies, which replace glucose as an energy source (Masood et al., 2023).

These metabolites can be used as energy precursors and generate adenosine triphosphate (ATP). Therefore, in cancer, the KD (ketogenic diet) can exert a protective effect, providing an additional energy substrate to tissues at risk of cell death (Pedrón et al., 2016). Glucose is crucial for tumors and they depend on it to survive and multiply. Ketone bodies increase in the body and cancer cells use them for ATP production. Therefore, KD causes malnutrition of tumor cells promoting an anticancer effect (Talib et al., 2021).

In this sense, the tumor tissue absorbs glucose and secretes lactate, which promotes angiogenesis and plays a crucial role in the metabolism, development and growth of cancer cells. This metabolic alteration is known as the Warburg effect (Dong et al., 2015). Most preclinical and clinical studies support that the use of a ketogenic diet in combination with standard therapies enhances the antitumor effects of conventional chemotherapy. It is a safe, tolerable diet that improves quality of life (Jemal et al., 2021).

Similarly, according to new evidence, it reduces the level of glucose and insulin in the blood, decreasing the dependence between this axis that promotes tumor growth. Changes in the use of substrates such as fatty acid oxidation and decreased use of glucose may be therapeutic for the treatment of breast cancer (Jamal et al., 2021). In this sense, the host's hormonal and inflammatory environment is restored, which suppresses tumor growth. The ketogenic diet promotes an anti-inflammatory phenotype, which may result in lower invasiveness and survival. Finally, it improves biochemical parameters and body composition. Clinical studies showed that adherence impacted the decrease in body weight and fat mass. Also, hormonal benefits were obtained such as a decrease in T3 and fasting plasma insulin levels, improving quality of life (Jamal et al., 2021).

Mediterranean diet

In the area of nutrition, the Mediterranean diet is the most studied and recommended. It mainly leans towards a high consumption of fruits, vegetables, whole grains and legumes; in addition to olive oil, nuts, seeds and dairy products. It promotes a moderate intake of poultry and fish, as well as low consumption of red meat, sweets and processed foods (Wang et al., 2018) ; (Augimeri et al., 2021). Therefore, it is a diet low in saturated fat, cholesterol, rich in carbohydrates, monounsaturated fats, fibers and antioxidants. It provides cardiovascular benefits and prevents type 2 diabetes. It helps in the management and prevention of different types of cancer, including breast cancer (Hernando and García, 2021).

Diet plays an important factor in the incidence of breast cancer; Between 30 and 35% of cancer cases are related to eating patterns. The Mediterranean diet rich in polyphenols and vitamins protects cells from oxidation and inflammation by inhibiting carcinogenesis and increasing antiproliferation in different neoplasms (Augimeri et al., 2021). Studies have shown that adherence to the Mediterranean diet is associated with a better level of physical activity. Consequently, loss of body weight in cases of overweight and obesity. Consequently, improving the secondary symptoms derived from anticancer treatment. Likewise, smaller tumor size and absence of metastasis in lymph nodes were observed (Mantzorou et al., 2022) (Montagnese et al., 2020).

Vegetarian Diet

A vegetarian diet focuses on eating vegetables. This includes fruits, vegetables, dried peas and beans, grains, seeds, and nuts. There is no single type of vegetarian diet. There are different models of vegetarian diets, such as the strict diet that excludes all meats and animal products. The lacto-vegetarian diet is another model that consists of including foods derived from plants and dairy products. A third alternative to the vegetarian diet is the lacto-ovo vegetarian diet, which in addition to including vegetables, includes dairy products and eggs (González et al., 2022).

Vegetarian diets have been associated with a lower risk of cancer in general and a lower risk for some types of cancer (colorectal, breast and prostate). Despite this, the evidence in this regard remains insufficient (Godos et al., 2017). According to various studies on the effects of vegetarian diets, it was found that, although people who follow this type of diet do not have a lower risk of developing breast cancer, they do have some protection against it compared to omnivorous people. Other benefits that could be observed are weight loss, decreased fasting insulin, and decreased total cholesterol. The vegetarian diet can be a good alternative for the treatment and prevention of breast cancer, however, some of its limitations must be taken into account to prevent it from causing damage to health, such as insufficient intake of high-quality proteins, omegas, DHA, EPA, iodine, vitamin B12, zinc, iron, and vitamin D (Campbell, 2024; Heianza, 2018).

Traditional Mexican diet

The traditional Mexican diet is characterized by its high nutritional quality, due to the high consumption of legumes such as beans, lentils and chickpeas, cereals such as corn (mainly), rice and wheat, and proteins of animal origin such as eggs, chicken, beef and pork, as well as vegetables and quelites typical of each region, including all elements of the milpa (Figure 1) (Galán, 2021).

Among its main advantages are: an excellent protein balance, since when consuming foods with a large amount of fiber it is difficult to exceed in proteins, it favors the acid-alkaline balance because the vegetable protein has a greater contribution of calcium and magnesium, therefore, more adequate values of the acid renal potential, lower contribution of fats, favors the state of oxidative balance, in addition to favoring the elimination of toxins through its contribution of substances that favor the lower formation of toxic substances in the metabolisms and the optimization in the elimination of these substances.

Figure 1. Traditional Mexican diet or milpa diet.

Source: Secretaría de Salud

The traditional Mexican diet has no disadvantages, since it is a traditional, sustainable, and accessible model that even promotes a greater consumption of vegetables and fruits from each region and the reduction of consumption of products of animal origin. However, being a diet specific to the country, it is difficult to replicate it outside the national territory (Secretaría de Salud, 2025).

The traditional Mexican diet is said to be a great ally in reducing the rates of malnutrition and other diseases such as obesity and diabetes, in addition to acting as a protective factor in the treatment and prevention of breast cancer (Galán, 2021).

According to some studies that sought to demonstrate the protective effect of the traditional Mexican normocaloric diet appropriate to the patient's needs for the prevention of breast cancer, it was shown that the benefits may vary according to BMI and menopausal status (women with BMI <25 kg/m2 and premenopausal women having a lower risk of breast cancer), in addition to modestly improving insulin biomarkers by 14% (Murtaugh et al., 2008; Torres et al., 2016).

Conclusion

Breast cancer is a multifactorial disease and is considered one of the main causes of death in women worldwide and nationally. In order to reduce the risk of malnutrition in cancer patients, nutritional interventions such as caloric restriction, intermittent fasting, ketogenic diet, vegetarian diet and traditional Mexican diet have been proposed. Although the aforementioned diets have different characteristics, they are all used as a tool to improve the quality of life of patients with breast cancer in order to avoid the side effects of cancer treatments such as malnutrition.

Acknowledgements

This chapter has been supported by the Fund of Centro de Estudios Universitarios Vizcaya de las Americas within the framework of the celebration of the day of the nutritionist in Mexico and with the purpose of increasing the academic and scientific capacity of Universidad Vizcaya de las Americas.

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Efecto de las intervenciones nutricionales sobre el riesgo de desnutrición en pacientes con cáncer de mama

Efeito das intervenções nutricionais sobre o risco de desnutrição em pacientes com câncer de mama

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Resumen

El cáncer de mama es una enfermedad que afecta principalmente a las mujeres. Los tratamientos oncológicos utilizados contra el cáncer de mama pueden provocar efectos negativos, incluida la desnutrición. Con el fin de identificar el riesgo de desnutrición en pacientes con cáncer de mama es utilizado el cribado nutricional. Para disminuir el riesgo de desnutrición en los pacientes oncológicos se han propuesto a las intervenciones nutricionales. Existen diferentes tipos de intervenciones nutricionales como la dieta de restricción calórica, dieta cetogénica, el ayuno intermitente, dieta vegetariana, dieta mediterránea y la dieta tradicional mexicana. Dichas intervenciones nutricionales han tenido resultados positivos en los pacientes con cáncer de mama que impactan en su composición corporal, medidas antropométricas y marcadores séricos, dando como resultado en algunos casos la reducción de tumores. Por tales razones se consideran a las intervenciones nutricionales como coadyuvantes en el tratamiento del cáncer de mama. Sin embargo, dichas intervenciones deben ser individualizadas y seleccionadas adecuadamente, considerando las necesidades nutrimentales, estilo de

vida y preferencia de los pacientes.
Palabras clave: Algoritmo de evaluación; Malnutrición; Cáncer de mama; Intervención nutricional; Cribado nutricional.

Resumo

O câncer de mama é uma doença que afeta principalmente as mulheres. Os tratamentos usados contra o câncer de mama podem causar efeitos negativos, inclusive a desnutrição. A triagem nutricional é usada para identificar o risco de desnutrição em pacientes com câncer de mama. Para reduzir o risco de desnutrição em pacientes com câncer, foram propostas intervenções nutricionais. Há diferentes tipos de intervenções nutricionais, como a dieta de restrição calórica, a dieta cetogênica, o jejum intermitente, a dieta vegetariana, a dieta mediterrânea e a dieta tradicional mexicana. Essas intervenções nutricionais tiveram resultados positivos em pacientes com câncer de mama, afetando a composição corporal, as medidas antropométricas e os marcadores séricos, resultando na redução do tumor em alguns casos. Por esses motivos, as intervenções nutricionais são consideradas adjuvantes no tratamento do câncer de mama. No entanto, essas intervenções devem ser individualizadas e adequadamente selecionadas, considerando as necessidades nutricionais, o estilo de vida e as preferências do paciente.
Palavras-chave: Algoritmo de avaliação; Desnutrição; Câncer de mama; Intervenção nutricional; Triagem nutricional.