Food Intake of Women with Gynecological Tumors Undergoing Cancer Treatment: Integrative Literature Review

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Ingestão Alimentar de Mulheres com Tumores Ginecológicos em Tratamento Oncológico: Revisão Integrativa da Literatura

Ingestión de Alimentos de Mujeres con Tumores Ginecológicos en Tratamiento Oncológico: Revisión Integradora de la Literatura

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ABSTRACT

Introduction: Cancer patients tend to lose weight and energy-protein malnutrition because of the changes the organism undergoes caused by the progression of the disease and treatment-related adverse effects that contribute for the reduction of food intake. **Objective:** To identify scientific literature-based evidences on food intake of women with gynecological tumors undergoing cancer treatment. **Method:** Integrative literature review through searches at the Embase, MEDLINE and LILACS databases with the association of descriptive terms and free words. Observational studies in Portuguese, English and Spanish that evaluated the food intake of this population were included in the analyzes. **Results:** This review identified 6 studies that investigated the change in food intake of women with gynecological cancer undergoing oncologic treatment. A reduction in intake was identified in until 31% of energy, 39.9% of proteins, 33.7% of lipids, 28.7% of carbohydrates and inadequate intake of certain micronutrients. **Conclusion:** Women with gynecological tumors during cancer treatment present significant reduction of energy, proteins, lipids, carbohydrates and micronutrients intake. Considering that weight loss and malnutrition in cancer patients are associated with negative clinical outcomes, the evaluation and analysis of the food intake of this population is essential for early nutritional intervention, good response to treatment and improvement of the quality of life.

Key words: genital neoplasms, female/drug therapy; genital neoplasms, female/radiotherapy; antineoplastic agents; eating; review.

RESUMO

Introdução: Pacientes com câncer apresentam uma tendência à perda ponderal e à desnutrição energético-proteica. Isso ocorre em razão das modificações que o organismo sofre pelo desenvolvimento da doença e pelos efeitos adversos do tratamento oncológico que contribuem para a redução da ingestão alimentar. **Objetivo:** Identificar evidências disponíveis na literatura científica sobre a ingestão alimentar de mulheres com tumores ginecológicos em tratamento oncológico. **Método:** Revisão integrativa da literatura cujas buscas foram realizadas nas bases de dados Embase, MEDLINE e LILACS por meio da associação de termos descritores e palavras livres. Foram incluídos nas análises estudos observacionais que avaliaram a ingestão alimentar de mulheres adultas com tumores ginecológicos durante o tratamento oncológico, redigidos em português, inglês e espanhol. **Resultados**: Esta revisão analisou seis estudos que investigaram a mudança na ingestão alimentar dessa população. Identificou-se uma redução da ingestão em até 31% de energia, 39,9% de proteínas, 33,7% de lipídeos, 28,7% de carboidratos e uma inadequação da ingestão de determinados micronutrientes. **Conclusão:** Mulheres com tumores ginecológicos durante o tratamento oncológico apresentam redução significativa da ingestão de energia, proteínas, lipídeos, carboidratos e micronutrientes. Considerando que a perda de peso e a desnutrição em pacientes com câncer está associada a desfechos clínicos negativos, a avaliação e a análise da ingestão alimentar desses indivíduos são fundamentais para possibilitar uma intervenção nutricional precoce, boa resposta ao tratamento e consequente melhoria da qualidade de vida.

Palavras-chave: neoplasias dos genitais femininos/tratamento farmacológico; neoplasias dos genitais femininos/radioterapia; antineoplásicos; ingestão de alimentos; revisão.

RESUMEN

Introducción: Los pacientes con cáncer tienen tendencia a la pérdida de peso y a la desnutrición calórico-proteica. Esto ocurre debido a los cambios que sufre el organismo debido al desarrollo de la enfermedad y los efectos adversos del tratamiento del cáncer que contribuyen a la reducción de la ingesta alimentaria. **Objetivo:** Identificar la evidencia disponible en la literatura científica sobre la ingesta alimentaria de mujeres con tumores ginecológicos en tratamiento oncológico. **Método:** Revisión integrativa de la literatura cuyas búsquedas se realizaron en las bases de datos Embase, MEDLINE y LILACS mediante la asociación de términos descriptivos y palabras libres. Se incluyeron en los análisis estudios observacionales que evaluaron la ingesta de alimentos de mujeres adultas con tumores ginecológicos durante el tratamiento del cáncer, escritos en portugués, inglés y español. **Resultados:** Esta revisión analizó seis estudios que investigaron el cambio en la ingesta de alimentos en esta población. Cuantificamos una reducción de la ingesta de hasta un 31% en energía, 39,9% en proteínas, 33,7% en lípidos, 28,7% en carbohidratos y una ingesta inadecuada de determinados micronutrientes. **Conclusión**: Las mujeres con tumores ginecológicos durante el tratamiento del cáncer tienen una reducción significativa en la ingesta de energía, proteínas, lípidos, carbohidratos y micronutrientes. Teniendo en cuenta que la pérdida de peso en pacientes con cáncer se asocia con resultados clínicos negativos, la evaluación de la ingesta alimentaria de estos individuos es fundamental para permitir una intervención nutricional precoz, una buena respuesta al tratamiento y la consecuente mejora de la calidad de vida.

Palavras clave: neoplasias de los genitales femeninos/tratamiento farmacológico; neoplasias de los genitales femeninos/radioterapia; antineoplásicos; ingestión de alimentos; revisión.

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INTRODUCTION

Cancer is a public health issue, is one of the main four causes of death worldwide. Its incidence and mortality are increasing concomitantly to population growth and ageing[1]. The most recent estimate for Brazil indicates 625 thousand new cases of cancer (450 thousand, excluding non-melanoma skin cancer) for each year of the triennium 2020-2022[2].

Among neoplasms affecting women, cervical is ranked third, ovarian, seventh and endometrium, eighth as the most incident, excluding non-melanoma skin cancer. Still, for each year of the triennium 2020-2022, 16,710, 6,650 and 6,540 new cases of cervical, ovarian and endometrium cancer are estimated, respectively[2]. Surgery, chemotherapy, radiotherapy and even combined therapies are the main modalities of oncologic treatment[3]. Associated therapies potentialize their efficacy, attacking tumor or normal cells of anyone, increasing the risk of toxicity[4].

Gastrointestinal toxicities are common in patients in oncologic treatment, may lead to the appearance of clinical manifestations as anorexia, food aversion, mucositis, dysgeusia, early satiety, nausea, vomits, diarrhea, constipation and pain, contributing for substantial reduction of food intake[5]. In addition, the progress of the disease is able to promote several metabolic alterations, eventually with deterioration of the nutritional status such as increase of energetic catabolism disorders in absorption and metabolism of carbohydrates, proteins and lipids and competing nutrients between the tumor and the individual[6]. Due to this, despite the patients with gynecological tumors have high prevalence of overweight at the diagnosis during the treatment, there is a significant reduction of body weight, body mass index (BMI) and more incidence of low weight[7].

Malnutrition associated with cancer leads to harmful complications to the patient quality-of-life, affecting the response to the treatment, increasing chemotherapy-induced toxicity and prolonging hospital stay[5]. Proper food intake works as a non-pharmacological strategy to maintain or recover the nutritional status, it is an important adjuvant in relieving chemotherapy-related gastrointestinal symptoms and favoring a satisfactory response to the oncologic treatment, minimizing the complications of the disease and optimizing the quality-of-life[8].

As food intake plays a key role in the nutritional status and consequently the response to oncologic treatment, the objective of the study was to detect evidences available in the scientific literature about food intake of women with gynecological tumors during oncologic treatment.

METHOD

Integrative literature review to gather and synthesize findings of former studies about food intake of women with gynecological tumors during oncologic treatment. The study was designed according to the stages: (1) elaboration of the research question; (2) search of scientific literature according to inclusion criteria; (3) data collection; (4) interpretation of the results and (5) summary of the evidences found in the studies selected[9].

The strategy PICOS – where P is the population (women with gynecological tumors); I, intervention (oncologic treatment); C, comparison (not applicable because this is not a comparative study) and O, outcome (food intake)[10] was utilized to elaborate the research question: does oncologic treatment influence food intake of women with gynecological tumors?

The following databases were searched: Embase, Medical Literature Analysis and Retrieval System Online (MEDLINE) and Latin American and Caribbean Health Sciences Literature (LILACS) through association of descriptors and free words with Boolean operators corresponding to conceptual blocks.

Upon investigating the Health Science Descriptors (DeCS) and PubMed's Medical Subject Headings (MeSH) the descriptors utilized in the search were selected. Different combinations of the descriptors were utilized: genital neoplasms, female, gynecologic cancer, cervical cancer, ovarian cancer, (endometrial cancer, nutrient intake, dietary intake, food intake, protein intake, food consumption, chemotherapy, drug therapy and radiotherapy (Table 1).

The search was carried out on August 8, 2020, at the databases, without language, age or date restriction to avoid potential limitation of the results because of the paucity of studies and to minimize publication bias.

Observational studies written in Portuguese, English and Spanish evaluating food intake of adult women older than 18 years with gynecological tumors including cervix, endometrium, ovarian, vagina and vulva who were in oncologic treatment (chemotherapy and radiotherapy) were included. Studies about the same theme, but before the beginning of the treatment or after its end and still listed were excluded as well as duplicates and those unable to be retrieved cost-free and in full.

Two investigators evaluated the titles and abstracts identified in the initial search pursuant to the inclusion criteria. If the title and abstract were not clear, the article was searched and evaluated in full. The level of evidence of the studies followed the Centre for Evidence-Based Medicine[11], whose classification ranges from 1A for systematic reviews and meta-analyzes of comparable

Table 1. Combinations of descriptors utilized as search strategy

("genital neoplasms, female" OR (gynec* OR genital* OR cervical OR ovarian] OR endometrial) AND (onco* OR cancer* OR tumor*[tiab] OR neoplas*) AND ("nutrient intake" OR "dietary intake" OR "food intake" OR Eating OR eating OR "protein intake" OR "food consumption" OR Food Consumption) AND (chemotherap* OR radiotherap* OR "drug therapy" OR radiotherapy)
("genital neoplasms, female" OR (genital* OR genitais OR gyneco* OR gineco* OR cervical OR uter*OR ovar* OR endometr* OR gynec*) AND (onco* OR cancer* OR tumor* OR neoplas*) AND ("nutrient intake" OR "dietary intake" OR "food intake"" OR "protein intake" OR "food consumption") AND ("drug therapy" OR "chemotherapy" OR "radiotherapy")
("genital neoplasms, female" OR "gynecologic cancer" OR "cervical cancer" OR "ovarian cancer" OR "endometrial cancer" OR (gynec* OR genital*) AND (onco* OR cancer* OR tumor* OR neoplas*) AND ("nutrient intake" OR "dietary intake" OR "food intake" OR tw:"protein intake" OR mh:"food consumption") AND (tw: "drug therapy OR tw:" chemotherapy" OR tw: "radiotherapy")

clinical trials to 5 for opinion of renowned authorities or experts and non-systematic literature review.

The flowchart of studies selection was described in four stages according to the recommendations of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[12] (Figure 1). Next, the name of the author, year of publication, country of origin, title, objective, methods of evaluation of food intake, population, main results of energetic intake, macronutrients and micronutrients and levels of evidence were extracted and described in Table 2.

Ethical review was waived because no human beings were involved.

RESULTS

After searching the database, 349 articles have been identified, of which 336 were excluded for failing to respond to the research question upon reading the abstracts and duplicates. Other 7 articles were excluded for not meeting the inclusion criteria (Figure 1).

This review identified six studies evaluating food intake of women with gynecological tumors. Table 2 summarizes the main results of food intake of 367 patients submitted to curative or palliative chemotherapy and/or radiotherapy. Patients with ovarian, cervical and endometrium cancers

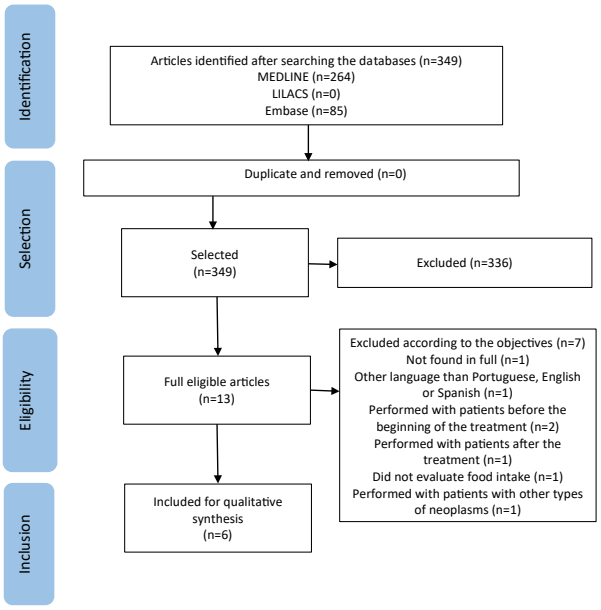

Figure 1. Flowchart for studies selection according to PRISMA[12]

at initial and advanced stages were enrolled, however, stages III and IV were more predominant, at least in 41% of the cases[13-15].

Only one article enrolled patients in radiotherapy treatment while the others included women in different lines of chemotherapy. Chemotherapy treatment consisted mainly by platinum-based drugs, doxorubicin, paclitaxel, etoposide, docetaxel, topotecan and gemcitabine[13,14,16,18]. These are moderate to high emetogenic agents[13,16] and some authors pointed out the prophylactic use of antiemetics[13,15].

In addition, different methods, single or combined were applied by the studies to evaluate food intake, among them the Food Frequency Questionnaire (FFQ) [14,17,18], food record[16,17], 24h Recall (R24H)[15,18], and one study utilized nursing records to obtain the quantity of the food ingested before and during chemotherapy[13].

The authors opted to utilize different parameters to analyze the adequacy of food intake during oncologic treatment comparing with nutritional recommendations for the population investigated, intake before the treatment, among groups submitted to different lines of chemotherapy or even in different time points of the same chemotherapy cycle. One study alone compared the dietary pattern of women with gynecological tumors with women without signs of cancer, applying R24h and FFQ[18].

One of the studies measured the dietary intake in three time points through food register: three days before the next cycle of chemotherapy to avoid acute effects of the treatment over food intake, the day of the administration of the chemotherapy at the hospital

Table 2. Characterization of the studies evaluating food intake of patients submitted to oncologic treatment

Author, year and country	Komatsu, et al., 201913 (Japan)	Ghisoni, et al., 201914 (Italy)	Mardas, et al., 201715 (Poland)	Mardas, et al., 201616 (Poland)	Mardas, et al., 201517 (Poland)	Labani, et al., 200918 (India)
Journal	Anticancer Res.	World J Clin Oncol.	Contemp Oncol (Pozn).	Support Care Cancer.	Support Care Cancer.	Indian J Med Paediatr Oncol.
Title	Evaluating Chemotherapy-induced Nausea and Vomiting and Food Intake in Patients with Gynecologic Cancer	Role of Mediterranean diet in preventing platinum-based gastrointestinal toxicity in gynecological malignancies: a single Institution experience	Link between diet and chemotherapy related gastrointestinal side effects	Dietary intake variability in the cycle of cytotoxic chemotherapy	Dietary habits changes and quality of life in patients undergoing epithelial ovarian cancer chemotherapy	Food consumption pattern in cervical carcinoma patients and controls
Objective	Determine when nausea and anorexia are controlled and food intake post CT	Evaluate the role of Mediterranean diet in reducing gastrointestinal toxicity in patients with gynecological cancer submitted to CT	Find association among CT and food intake, specific food and gastrointestinal symptoms	Evaluate food intake in different timepoints of the CT cycle and compare food intake with nutritional status	Evaluate food behavior changes and in QoL of patients with ovarian cancer submitted to CT	Provide data about food intake standard in patients with cervical cancer and control group
Evaluation of the intake	Nursing records	FFQ	R24h	Food record	Food record and FFQ	R24h and FFQ
Population	156 women with endometrium, cervix and ovarian cancer submitted to CT	22 women with endometrium, cervix and ovarian cancer submitted to CT	44 women with ovarian cancer submitted to CT	41 women with ovarian cancer submitted to CT	44 women with ovarian cancer submitted to CT	60 women with cervix cancer submitted to RT and CT. 60 women with no signs of cancer
Age of the population	47-78 years Median: 58 years	Mean: 61 years	Mean: 56 years	30-49 years: n=6 (15%) 50-69 years: n=30 (73%) +70 years: n=5 (12%)	Submitted to first line CT Mean±SD: 57.9 ±10.1 Submitted to subsequent line Mean±SD: 57.0±8.7	Mean±SD: 47.2±10.3 years
Staging	Unavailable information	Unavailable information	Initial: n=11 (25%) Advanced: n=33 (75%)	I: n=8 (20%) II: n=1 (2%) III: n=17 (41%) IV: n=4 (10%)	I: n=7 (15.9%) II: n=1 (2.3%) III: n=26 (59%) IV: n=7 (15.9%)	Ib: 11.7% IIa: 28.4% IIIa or b: 50% IV: 5%
Statistics test	Unidentified test for difference of proportions	Unidentified test for difference of means and proportions	Data were compared using Kruskal-Wallis test with Dunn post-hoc test. The Spearman correlation coefficient (r) was calculated to measure the strength and direction of a relationship	ANOVA test was utilized to compare groups with multiple Dunn post-hoc test	Student's test was utilized to compare groups for normality; in other cases, Mann-Whitney test was utilized to compare data in nominal scale.	Food intake and other variables of cases and controls were compared with parametric and non-parametric tests for independent groups

to be continued

Table 2. continuation

Author, year and country	Komatsu, et al., 201913 (Japan)	Ghisoni, et al., 201914 (Italy)	Mardas, et al., 201715 (Poland)	Mardas, et al., 201616 (Poland)	Mardas, et al., 201517 (Poland)	Labani, et al., 200918 (India)
Energy and macronutrients	HECT: 82.6% of the patients ate in the first day of CT at least half of what they did the date before the beginning of the cycle. Intake dropped to 43.4% in day 2 ($p=0.006$) and 39.1% in day 3 ($p=0.0025$). MECT: 75.3% ate at least half of the meal in day 1, 60.0% in day 2 ($p=0.008$) and 40.0% in day 3 ($p=0.0013$)	Energy intake dropped from 1,959.4 kcal ± 552.1 at the beginning of the study to 1,764.6 kcal ± 557.5 in the second cycle of CT. Protein, lipids and carbohydrate declined from de 74.9 g ± 25.1, 81.8 g ± 32.6 and 218.8g ± 59.8, in the beginning of the study to 62.7g ± 26.1, 70.8 ± 25.6 and 213.6 ± 74.5 in the second cycle, respectively	Energy intake substantially reduced because of nausea ($r = –0.38$; CI 95%: from –0.62 to –0.08, $p=0.0141$) and vomits ($r = –0.56$; CI 95%: from –0.74 to –0.30, $p=0.0002$). Mean energetic intake was 452 kcal lower due to nausea (1,619 to 1,167 kcal) and 443 kcal lower due to vomits (1,493 to 1,050 kcal)	Energy intake declined significantly in average 413.8 kcal in the day of administration of CT ($p<0.0001$) and 284 kcal in the first day after the end of the cycle ($p<0.001$). Protein intake reduced nearly 22.9 g ($p<0.0001$) in the day of CT and 12.2 g after the end of CT ($p<0.0001$). Carbohydrate intake dropped nearly 55.2 g ($p<0.0001$) and 45.1 g ($p<0.001$) in the first day and after the end of the cycle of CT, respectively. Lipids dropped 14.6 g compared with before CT ($p<0.001$)	Energetic intake was lower than recommended (2,000 kcal) in first line of CT (1,439 ± 324 kcal) and subsequently (1,507 ± 338 kcal). Lipids and protein intake was above the recommendation in all lines. In first line CT, women ate more frequently: dairy, eggs, sea food, offal, snacks and jams. Subsequently, they ate more rye bread, pasta, yogurt, legumes and fruits	For the group of cases, the mean intake was 867.2 kcal, 25.6 g of protein and 25.2 g of lipids which correspond to 11.8% and 26.2% of TEV ingested, respectively. For control group, mean intake was 764.5 kcal, 22.0 g of protein and 22.2 g of lipids corresponding to 11% and 26.1% of TEV respectively. There was no statistical difference in feeding standard among the groups, both were below the recommendations of DRI for this age range: 25 to 35% of TEV corresponding to total fats and 10 to 35% of proteins
Micronutrients	Not analyzed	Not analyzed	With vomits during CT, the intake of phosphorus, zinc and vitamins thiamin, riboflavin, pyridoxine and cobalamin were reduced significantly	Biggest reduction of micronutrients intake occurred in the first day of CT. There was significant reductions of sodium, potassium, calcium, phosphorous, magnesium, iron, zinc, vitamin E and C, thiamin, riboflavin, niacin, pyridoxine and folate	Women receiving first line and subsequent CT had low intake of calcium, magnesium, potassium, retinol, folate and thiamin	Both in case and control groups, low intake of zinc, beta carotene, thiamin, riboflavin, pyridoxine, vitamin C, folate and cobalamin without statistical difference
Level of Evidence	2B	2B	2B	2B	2B	3B

Captions: SD = standard deviation; DRI = Dietary References Intake; CT = chemotherapy; kcal = kilocalories; g = grams; HECT = highly emetogenic chemotherapy; MECT = moderate emetogenic chemotherapy; FFQ = food frequency questionnaire; R24h = 24h Recall; QoL = quality of life; RT = radiotherapy; CI = confidence interval; TEV = total energy value; 2B = poor quality randomization, control or without long-term follow up cross-sectional cohort studies; 3B = case report with control group.

and the first day after the end of the cycle at home to concentrate in the period directly related to the phase of chemotherapy visible side effects[16]. The same authors applied the FFQ and food register in another study for seven days to evaluate food habits before and after the treatment, respectively and compared the food intake, macronutrients and micronutrients selected as well as the intake of specific food in the group who received the first line of chemotherapy (n=16) and the group who received a subsequent line (n=28)[17]. In addition, the results were compared with the dietary recommendations for the Polish population. A study carried out in India has also applied FFQ but in the beginning of the study before the patients initiated the chemotherapy treatment and at every two cycles. The subsequent FFQ included two questions about differences of food intake and its causes in relation to baseline[13].

Further to R24H utilized to estimate energy intake, a study applied a 77-items validated questionnaire to evaluate the incidence of chemotherapy-induced gastrointestinal symptoms and describe the association between them and selected food[15]. The study from Japan evaluated the food intake retrospectively from the nursing records and classified the patients according to the intake or not of at least half of the amount of food ingested at dinner the day before the beginning of chemotherapy[13].

Up to 31% of reduction of energy intake was found in this review before the beginning of the chemotherapy treatment, or in-between cycles and lines of chemotherapy, diminishing the ingestion of proteins, lipids and carbohydrates in 39.9%, 33.37% and 28.75, respectively. The intake of specific micronutrients was also below the recommendations, including iron, calcium, potassium, magnesium, zinc, sodium, vitamins of the complex B, particularly riboflavin, pyridoxin and folic acid and vitamin C (Table 2).

DISCUSSION

There are few studies in the scientific literature evaluating food intake of women with gynecological tumors. Apparently, this is the only review addressing the theme in the international literature which was able to identify six observational studies investigating changes of the food intake of patients with different types of gynecological cancer in oncologic treatment.

In any stage of the oncologic treatment (curative, adjuvant and palliative), the attention to food and nutritional status are essential because until 20% of the patients with cancer die of malnutrition and not by the malignancy[19]. Reduced food intake varies according to the modality of treatment but all the therapies can potentially impact the nutritional status due to gastrointestinal symptoms, food aversion and disorders of nutrients absorption[7,20]. Chemotherapy can raise the energetic necessities and promote catabolism, in addition to being directly related to the incidence of nausea and vomits, depending on the agent utilized, particularly cisplatin, a typically high-risk emetogenic drug utilized to treat gynecologic tumors[4,13,16].

Platinum-based chemotherapics are able to promote hematological, liver, neurologic and gastrointestinal toxicities, of which the most prevalent are nausea, vomits, dyspepsia and anorexia[4]. Nearly 80% of the patients with cancer had already nausea and more than 50%, vomits during chemotherapy[15]. Women with gynecological tumors believed that reduction of food intake resulted from gastrointestinal symptoms[14].

Reduction of energy and nutrients intake is more visible when chemotherapy cycles are compared, mainly because the negative impressions during the treatment can affect the tolerance to the subsequent cycles[15]. A study carried out in Italy in 2019 reported that 60% of the sample of women with gynecological tumors in chemotherapy reduced the intake of energy in comparison with the previous cycle[14]. Patients with ovarian cancer were not even able to reach 25 kcal per kilo of body weight during chemotherapy[16,17].

The studies of this review have also shown that the populations investigated presented inadequate intake at least of one of the dietary items, as energy, macronutrients and micronutrients. Food intake of women with gynecological tumors in treatment were below the recommended nutrition level when compared with healthy women or even in relation to pre-treatment intake, in-between cycles or lines of chemotherapy depending on the methodology.

Usually, changes of energy intake are directly related to weight alterations and body composition[15]. As expected, the authors found positive correlation between energy consumption and protein in patients with different types of cancer and weight loss and reduction of the arm circumference, respectively[21]. Clinical findings suggest that skeletal muscle plays a key role in the response to chemotherapy and prevention of associated toxicities and even survival of oncologic patients[22]. Sarcopenia, a syndrome characterized by progressive loss of muscle strength and skeletal muscle mass is associated with reduction of functioning and quality of life and excessive toxicities during oncologic therapies and reduction of the dosage or, still, delayed cycles[23,24].

In Brazil, Aredes et al.[7] developed a study with 49 women with cervical cancer and found that 20.4% (n = 10) discontinued chemotherapy because of severe toxicity and 83% presented cachexia and weight loss above 5%. In

addition, the discontinuation was significantly associated with variables of nutritional status as percentage of weight loss, cachexia and sarcopenia. As counterpart, a retrospective study with 123 women with ovarian cancer submitted to neoadjuvant chemotherapy showed that the patients who were able to keep or gain skeletal muscle during treatment increased their global survivorship compared with those who have lost (p=0.004)[25].

As the deterioration of the nutritional status in cancer is multifactorial, mostly when reduction of food intake is prevalent, person-centered nutritional intervention is relevant to optimize clinical outcomes, promoting symptoms relief, minimizing metabolic derangements, protecting muscle mass and physical performance to improve survivorship[4,6]. For this, a skilled nutritionist must perform the anamneses associated with other parameters able to identify the patients' needs, food intolerance, gastrointestinal symptoms and lab analyzes[4,6]. As weight loss is multifactorial, the multidisciplinary team must identify, prevent and treat malnutrition to avoid its worsening, prioritizing early detection[6].

As mentioned earlier, there was wide variation of methodologies and mainly the tools utilized to evaluate food intake found in the studies selected. Despite their low cost, the disadvantages may bias the results if these tools are not controlled.

Two studies[15,18] utilized R24H as tool to evaluate food intake of their samples and other combined with FFQ. R24H is an easily applicable method which evaluates the current diet, the interviewee does not need to be literate, but whose main limitation is relying upon the patient memory to identify and quantify the servings[26]. Two studies[16,17] applied food register to quantify the current dietary intake of the population investigated, and one of the studies[17] associated with FFQ. Despite its high cost, food register is a safer option for the investigator who wishes to eliminate the memory bias as the record is made at the moment of the intake. However, the intake can be altered since the interviewee knows it is being evaluated, further to the difficulty in estimating portions and the requirement that they know how to measure food[26]. FFQ was applied in three studies[14,17,18], but only one utilized it in a single way. It is considered the most practical and informative method of evaluation of the regular food intake and is commonly used in epidemiological studies. The disadvantages are relying in the interviewee's memory about past habits that can be mixed with current habits, further to the clear limitations of illiterate and older adults and poor quantification accuracy[26].

In contrast with other studies which utilized validated, reproducible and well consolidated tools in the literature, a study[13] opted to evaluate the food intake from the investigation of nursing records and classified the patients according to the intake or not of at least half of the quantity of food they ingested at dinner the day before the beginning of chemotherapy[13]. The investigator must think about the type and objectives of the study as well as the available resources to reach a reliable dietary characterization of a certain population ensuring validity and reproducibility. Typically, these methods should be articulated among themselves or associated with other parameters of evaluation of nutritional status for better understanding and interpretation of the results[27].

The studies analyzed were observational and with levels of evidence 2B and 3B, corresponding to cohort studies with poor quality of randomization, control or without long-term follow-up, cross-sectional study and case report with control group, respectively. In addition, observation and memory biases and inability to control the variables are factors influencing the results of these studies, further to scant accurate variables in case of retrospective studies[11,28].

The scarcity of studies about food intake of oncologic patients in general is a limitation of this review, but mainly for women with gynecological tumors and as earlier mentioned the utilization of observational studies with inherent study design limitations. Only one study with women in radiotherapy was identified in this integrative review, and more publications are necessary to build up more robust evidences about the nutritional impact of this therapy over this specific population. Additionally, the application of different instruments to evaluate the food intake in the studies analyzed impacted the comparison of the studies.

However, due to the paucity of the studies evaluating the food intake of patients with gynecological tumors, to the best of the existing knowledge, the present review is the only one available in the international literature offering a compilation of available studies with percentage of reduction of energy and macronutrients. In addition, it indicates which micronutrients tend to be below the recommendations during oncologic treatment, facilitating the conducts in clinical practice. More future prospective observational studies addressing food intake of women with gynecological tumors are suggested, considering that the profile of the Brazilian women are different from the studies found in the international literature so far, further to randomized clinical trials with control group receiving routine orientations and intervention groups with orientations to modify the eating habits of this population.

CONCLUSION

Women with gynecological tumors along the oncologic treatment reduce in until 31% the intake of energy, 39.9%

of proteins, 33.7% of lipids and 28.7% of carbohydrates in addition to not meeting the dietary recommendations of iron, calcium, potassium, magnesium, zinc, sodium, vitamins of the complex B and vitamin C.

As weight loss and malnutrition of patients with cancer are associated with negative clinical outcomes, it is essential the evaluation and analysis of food intake to allow an earlier nutritional intervention which leads to good response to the treatment and better quality of life. Nevertheless, to broaden the discussion and consubstantiate the scientific evidences, new studies on the theme are recommended.

CONTRIBUTIONS

All the authors contributed to the study conception and/or design, acquisition, analysis and interpretation of the data, wording and critical review. They approved the final version to be published.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

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