Web-Based Nutrition Information in Spanish for Cancer Patients

Subjects: Nutrition & Dietetics

Contributor: Raul Zamora-Ros , Fjorida Llaha , , Marta Bellver , Elena Roura , Isabel Megias-Rangil , Anna Tresserra-Rimbau

Digital and online information empowers citizens to make their own health decisions, including diet choices and cancer management. There are 100 national cancer organizations (NCOs) that provided content in Spanish on their websites. Twenty out of the 100 NCOs contained nutrition-cancer-related information addressed to the general audience. Healthy eating information and content focused on the management of side effects during cancer treatments was provided by all websites. Nutrition guidelines for cancer survivors were not always addressed but were well-described for cancer prevention. The possibilities for personalized guidelines and interaction with web-based information remain uncovered.

nutrition cancer patients cancer treatment dietary guidelines diet health information

1. Introduction

Cancer is one of the most frequent causes of morbidity and mortality worldwide, and 19.3 million incident cases and almost 10.0 million deaths were estimated for 2020 [1]. Cancer and its treatment cause metabolic and nutritional derangements with a subsequent increased risk of malnutrition and muscle mass loss in cancer patients [2][3][4][5]. The prevalence of malnutrition ranges from 15–40% at the time of cancer diagnosis and can increase up to 80% in cases with advanced tumors [6]. Malnutrition and muscle mass loss negatively impact on patients' outcomes, decreasing survival and ability to complete treatment and increasing post-surgical complications and public health system costs [7][8][9]. Common causes of poor nutrition intake during cancer treatment are anorexia, xerostomia, early satiety, nausea, vomiting, dysgeusia, dysphagia, depression, anxiety, and pain [10]. These symptoms can be due to the cancer itself and/or the side effects of cancer treatments (surgery, chemotherapy, and radiotherapy), which are usually very aggressive [11]. Changes in the metabolism of proteins, carbohydrates, and fats are major determinants of weight loss. Cachexia has been often recognized as an adverse effect of cancer. Cancer cachexia is a multifactorial syndrome, characterized by ongoing loss of skeletal muscle mass, reduced food intake, and abnormal metabolism, producing a negative balance of protein and energy intake [12]. To prevent cancer cachexia development, patients need regular assessment of their nutritional status, advice on practical methods to ensure adequate nutrition, and interventions that enhance nutrition. Increased energy and protein intake are often needed during cancer treatment. Lifestyle interventions (diet and exercise) have shown a positive effect in clinical outcomes by improving physical function, body composition, fatigue, quality of life, and even

survival in cancer patients [13][14][15]. However, weight loss and malnutrition in patients with cancer is not always assessed or managed actively [16][17]. An increase of body weight can also occur in some patients with cancer, for example, in patients with breast and prostate cancer due to hormonal treatments [18][19]. There is evidence linking obesity with lower survival, certainly observed among women with breast cancer [20]. The heterogeneity of cancer's adverse effects demonstrates the need for specific dietary guidelines, considering the cancer type and treatment plan. Cancer survivors remain at risk of cancer recurrence and have a higher risk for diabetes and cardiovascular disease [21][22]. A healthy diet, often combined with physical activity, can improve prognosis in cancer survivors [23]. However, their adherence to dietary and physical activity recommendations is relatively low [24]. Principal reasons for ineffective nutritional practice among cancer patients and survivors include lack of knowledge and time of the cancer care team [16][25]. Additional nutrition and lifestyle education resources are, therefore, of interest for cancer patients and survivors throughout the cancer continuum.

Digital and online information empowers citizens to make their own health decisions, including diet choices and cancer management [26][27]. Online health resources are used for four primary reasons: (i) to gain knowledge about the diagnosed disease, (ii) to obtain advice from other patients with the same disease, (iii) to receive social support, and (iv) to communicate with health professionals [28]. Unfortunately, a significant amount of online medical information is not peer-reviewed by experts and may contain inaccurate or misleading information [29]. Despite that, online resources have many potential benefits, such as improving patients' cancer-related knowledge [30], self-help skills, and psychological outcomes [31][32]. Internet users for cancer information do not value all of the information equally [33].

2. Web-Based Nutrition Information in Spanish for Cancer Patients

2.1. National Cancer Organization (NCO) Websites

There are 100 NCOs that provided content in Spanish on their websites. Twenty out of the 100 NCOs contained nutrition-cancer-related information addressed to the general audience. Only the website of the Spanish Ministry of Health, Consumer Affairs, and Social Welfare contained links to NCOs. The web-based resources of nine NCOs with major nutrition content for cancer patients and survivors were selected for presentation (**Table 1**).

Table 1. Nutrition content in the selected websites.

Organizations/ Websites	Disease Phase	Nutrition Content	Side Effects
AECC www.aecc.es/es accessed on 5 October 2021	Prevention, during treatment	Healthy eating in adults and children, side effects, cancer myths, recipes	Anorexia, mucositis, dysgeusia, diarrhea, constipation, dysphagia, lactose intolerance, nausea, and vomiting

Organizations/ Websites	Disease Phase	Nutrition Content	Side Effects
GEICAM www.geicam.org/ accessed on 5 October 2021	Prevention, during and post treatment	Healthy eating, side effects, recipes	Anorexia, mucositis, dysgeusia, diarrhea, constipation, dysphagia, nausea and vomiting, xerostomia, fatigue, weight loss, weight gain
AEAL www.aeal.es/ accessed on 5 October 2021	During and post treatment	Healthy eating, side effects, food safety, malnutrition, and nutritional status assessment	Anorexia, mucositis, dysgeusia, diarrhea, constipation, dysphagia, nausea, and vomiting
SEOM/Oncosaludable [1] www.oncosaludable.es/ accessed on 5 October 2021	Prevention and during treatment	Healthy eating, side effects, nutrient-drug interaction, menus, recipes	Anorexia, mucositis, xerostomia, esophagitis, dysgeusia, diarrhea, constipation, nausea and vomiting, low defenses, weight loss
FECEC www.juntscontraelcancer.cat accessed on 5 October 2021	Pre, during, and post treatment	Healthy eating, side effects, nutrient-drug interactions, malnutrition and nutritional status assessment, cancer myths, menus, recipes	Anorexia, mucositis, dysgeusia, diarrhea, constipation, dysphagia, nausea and vomiting, xerostomia, mouth ulcers, early satiety, high blood pressure, diabetes, pancreatic insufficiency, weight loss, weight gain, liquid retention, ileostomy, colostomy, intestinal obstruction
ICO/Què i Com Menjar Durant el Càncer [1], www.menjardurantelcancer.cat accessed on 30 October 2021	During treatment, survivorship	Healthy eating in adults, side effects, cancer myths, recipes	Anorexia, constipation, diarrhea, nausea and vomiting, mucositis, dysgeusia, dysphagia to solid foods, dysphagia to liquid foods
SAV/Ayuda al Paciente Oncológico [1], www.ayudaalpacienteoncologico.org.ve/, La Lonchera de mi Hijo [1] www.laloncherademihijo.org/ accessed on 5 October 2021	Prevention, pre, during, and post treatment	Healthy eating in adults and children, food safety, food portions, food groups, side effects, menus, recipes	Anorexia, mucositis, xerostomia dysgeusia, diarrhea, constipation, dysphagia, nausea and vomiting, weight gain

Organizations/ Websites	Disease Phase	Nutrition Content	Side Effects
ACS www.cancer.org/es/ accessed on 5 October 2021	Prevention; pre, during, and post treatment; survivorship	Healthy eating in adults and children, side effects, food safety, meal planification, recipes	Anorexia, dysgeusia, diarrhea, constipation, dysphagia, nausea and vomiting, xerostomia, mouth ulcers, weight gain, fatigue
NCI www.cancer.gov/espanol accessed on 5 October 2021	Prevention, pre, during, and post treatment, survivorship	Healthy eating in adults, side effects, food safety, meal planification, recipes	Anorexia, mucositis, dysgeusia, diarrhea, constipation, dysphagia, nausea and vomiting, xerostomia, esophagitis, lactose intolerance, weight gain, weight loss

[1] Separate websites of the organizations with information aimed to a general audience. ACS, American Cancer Society; AEAL, Asociación Española de Afectados por Linfoma, Mieloma y Leucemia; AECC, Asociación Española Contra el Cáncer; FECEC, Federació Catalana Entitats Contra el Càncer; GEICAM, Geicam Investigación en Cáncer de Mama; ICO, Catalan Institute of Oncology; NCI, National Cancer Institute; SAV, Sociedad Anticancerosa de Venezuela; SEOM, Sociedad Española de Oncología Médica.

2.2. Nutrition Information

Similar to the revised reports of the WCRF/AICR for cancer survivors [34], websites advised maintaining a healthy body weight and following well-balanced diets. They recommended decreasing the intake of high-fat processed foods, refined starches, sugars, and red and processed meat; avoiding alcohol intake; and increasing the intake of wholegrains, legumes, fruits, and vegetables. These recommendations are similar to those given for cancer prevention [35]. Nutrition information for cancer patients was mostly focused on the adequate intake of nutrients and energy and on the management of the potential side effects of cancer and its treatments. Guidelines for the side effect management were consistent throughout the websites. For example, a diet rich in fiber was recommended for constipation, while a low-fiber diet was recommended for diarrhea. Content at pre- and post-treatment was more limited. At pre-treatment, websites advised to eat healthily and maintain a similar body weight as before the treatment and to be aware and discuss the management of possible side effects of cancer treatment with the cancer care team. Patients were recommended to (i) buy larger amounts of their favorite foods (thus, they would not need to go shopping very often); (ii) cook in advance and refrigerate foods in meal-sized portions; and (iii) talk to a friend or relative to help with shopping and cooking. Visiting the dentist to ensure optimal oral health before treatment was also highlighted. At post-treatment, patients were advised to first discuss any food and dietary restrictions with the cancer care team and to follow a healthy well-balanced diet; to eat a variety of fruits and vegetables every day, high-fiber foods, and low-fat foods; to limit the intake of red and processed meat; to avoid alcohol drinks; and for patients that were overweight/with obesity, to consider losing weight by reducing calorie intake and increasing physical activity. Three NCOs (Asociación Española Contra el Cáncer (AECC,)

lobal

nergy balance among premenopausal breast cancer patients receiving adjuvant chemotherapy. J. Clin. Oncol. 2001, 19, 2381–2389.

3. Brown, J.C.; Caan, B.J.; Meyerhardt, J.A.; Weltzien, E.; Xiao, J.; Cespedes Feliciano, E.M.; Kroenke, C.H.; Castillo, A.; Kwan, M.L.; Prado, C.M. The deterioration of muscle mass and radiodensity is prognostic of poor survival in stage I-III colorectal cancer: A population-based cohort study (C-SCANS). J. Cachexia Sarcopenia Muscle 2018, 9, 664–672.

4. Blauwhoff-Buskermolen, S.; Versteeg, K.S.; de van der Schueren, M.A.; den Braver, N.R.; Berkhof, J.; Langius, J.A.; Verheul, H.M. Loss of muscle mass during chemotherapy is predictive for poor survival of patients with metastatic colorectal cancer. J. Clin. Oncol. 2016, 34, 1339–1344.

5. Baracos, V.E. Cancer-associated malnutrition. Eur. J. Clin. Nutr. 2018, 72, 1255–1259.

6. August, D.A.; Huhmann, M.B.; American Society for Parenteral and Enteral Nutrition. Clinical guidelines: Nutrition support therapy during adult anticancer treatment and in hematopoietic cell transplantation. J. Parenter. Enter. Nutr. 2009, 33, 472–500.

7. Marshall, K.M.; Loeliger, J.; Nolte, L.; Kelaart, A.; Kiss, N.K. Prevalence of malnutrition and impact on clinical outcomes in cancer services: A comparison of two time points. Clin. Nutr. 2019, 38, 644–651.

8. Bruyère, O.; Beaudart, C.; Ethgen, O.; Reginster, J.Y.; Locquet, M. The health economics burden of sarcopenia—A systematic review. Maturitas 2019, 119, 61–69.

9. Grossberg, A.J.; Chamchod, S.; Fuller, C.D.; Mohamed, A.S.; Heukelom, J.; Eichelberger, H.; Kantor, M.E.; Hutcheson, K.A.; Gunn, G.B.; Garden, A.S.; et al. Association of body composition with survival and locoregional control of radiotherapy-treated head and neck squamous cell carcinoma. JAMA Oncol. 2016, 2, 782–789.

10. Ravasco, P. Nutrition in cancer patients. J. Clin. Med. 2019, 8, 1211.

America, Cancer Society (ACS), and Sociedad Anticáncer de Venezuela (SAV); **Table 1**) had separate sections for children, showing menus and recipes. Two websites (Asociación Española de Afectados por Linfoma, Mieloma, Leucemia (AEAL) and Federació Catalana Entitats Contra el Càncer (FECEC); **Table 1**) gave an overview about malnutrition during cancer and the methods for assessing nutritional status in pre-treatment. Patients were recommended to require professional assistance if they experienced involuntary weight loss, loss of appetite, felt tired, and had difficulties performing physical exercise. Together with the website (www.menjardurantelcancer.cat accessed on 30 October 2021), two others (AECC, FECEC, **Table 1**) shared content that helped to dispel nutrition-cancer related myths. The most common myths were regarding red meat, sugar, dairy products, soya, gluten, anti-cancer foods, anti-cancer diets, anti-cancer supplements, kitchen utensils and cooking methods, and the role of organic and conventional products in cancer. Two websites (FECEC, Sociedad Española de Oncología Médica (SEOM), **Table 1**) contained examples of foods and medicinal plants that could interact with cancer treatments, such as Hipericum perforatum, grapefruit, and soya products. Extensive content regarding food safety was offered by four NCOs (ACS, AEAL, National Cancer Institute (NCI), and SAV; **Table 1**), which emphasized recommendations for food handling, cross-contamination, grocery shopping, and eating outside.

2.3. Quality Assessment and Website Navigation

The promotion of nutrition information for a general audience was not the only objective of the selected NCOs. They also aimed to support investigation in cancer and to promote educational materials for health professionals. Despite the broad objectives, the nutrition content addressed to patients was easily accessible on their websites. In general, the selected websites were well-organized, with headings, subheadings, internal links, and an internal search engine. It observed that 2–4 clicks were needed to reach the nutrition-cancer content from the homepage. To interact with the audience (contact or receive feedback), the selected websites mostly provided a phone number or an email (**Table 2**). All identified websites were linked to at least two social media platforms, mostly to Twitter, Facebook, and Instagram. Five of the websites had the highest number of followers on Facebook (AECC, Geicam, Investigación en Cáncer de Mama (GEICAM), AEAL, ACS, and NCI; **Table 2**), two on Twitter (SEOM and FECEC; **Table 2**), and one on Instagram (SAV, **Table 2**).

Table 2. Other features of the selected websites.

Organizations/Websites	Country of Origin	Language	Content Format	Social Media Platforms	Interaction Methods
AECC www.aecc.es/es accessed on 5 October 2021	Spain	Spanish, Catalan [1], Basque [2]	Webpage (Video-recipes), PDF	Facebook [3], Twitter Instagram, YouTube	Email, phone, social share buttons
GEICAM www.geicam.org/ accessed on 5 October 2021	Spain	Spanish, English	Webpage, PDF	Facebook [3], Twitter,	Email, phone, social

11. Coa, K.I.; Epstein, J.B.; Ettinger, D.; Jatoi, A.; McManus, K.; Platek, M.E.; Price, W.; Stewart, M.; Teknos, T.N.; Moskowitz, B. The impact of cancer treatment on the diets and food preferences of patients receiving outpatient treatment. Nutr. Cancer 2015, 67, 339.
12. Fearon, K.; Strasser, F.; Anker, S.D.; Bosaeus, I.; Bruera, E.; Fainsinger, R.L.; Jatoi, A.; Loprinzi, C.; MacDonald, N.; Mantovani, G.; et al. Definition and classification of cancer cachexia: An international consensus. Lancet Oncol. 2011, 12, 489–495.
13. Capozzi, L.C.; McNeely, M.L.; Lau, H.Y.; Reimer, R.A.; Giese-Davis, J.; Fung, T.S.; Culos-Reed, S.N. Patient-reported outcomes, body composition, and nutrition status in patients with head and neck cancer: Results from an exploratory randomized controlled exercise trial. Cancer 2016, 122, 1185–1200.
14. Zuniga, K.B.; Chan, J.M.; Ryan, C.J.; Kenfield, S.A. Diet and lifestyle considerations for patients with prostate cancer. Urol. Oncol. 2020, 38, 105–117.
15. Gagnon, B.; Murphy, J.; Eades, M.; Lemoignan, J.; Jelowicki, M.; Carney, S.; Amdouni, S.; Di Dio, P.; Chasen, M.; MacDonald, N. A prospective evaluation of an interdisciplinary nutrition–rehabilitation program for patients with advanced cancer. Curr. Oncol. 2013, 20, 310.
16. Spiro, A.; Baldwin, C.; Patterson, A.; Thomas, J.; Andreyev, H.J.N. The views and practice of oncologists towards nutritional support in patients receiving chemotherapy. Br. J. Cancer 2006, 95, 431–434.
17. Caccialanza, R.; Goldwasser, F.; Marschal, O.; Ottery, F.; Schiefke, I.; Tilleul, P.; Zalcman, G.; Pedrazzoli, P. Unmet needs in clinical nutrition in oncology: A multinational analysis of real-world evidence. Ther. Adv. Med. Oncol. 2020, 12, 1758835919899852.
18. Braunstein, L.Z.; Chen, M.H.; Loffredo, M.; Kantoff, P.W.; D'Amico, A.V. Obesity and the Odds of Weight Gain following Androgen Deprivation Therapy for Prostate Cancer. Prostate Cancer 2014, 2014, 1–6.
19. Ginzac, A.; Barres, B.; Chanchou, M.; Gadéa, E.; Molnar, I.; Merlin, C.; Coudert, B.; Thivat, E.; Durando, X. A decrease in brown adipose tissue activity is associated with weight gain during chemotherapy in early breast cancer patients. BMC Cancer 2020, 20, 96.
2... ni, L.; ... With
2... n, L.T.; ... nd
2... te, K.; Yahalom, J.; Constine, L.S.; et al. Second malignant neoplasms and cardiovascular disease

Organizations/Websites	Country of Origin	Language	Content Format	Social Media Platforms	Interaction Methods
				Instagram, YouTube, LinkedIn	share buttons
AEAL www.aeal.es/ accessed on 5 October 2021	Spain	Spanish	Webpage,	Facebook [3], Twitter	Email, phone, forum website
SEOM/Oncosaludable [4] www.oncosaludable.es/ accessed on 5 October 2021	Spain	Spanish	Webpage, PDF		Email, phone
FECEC www.juntscontraelcancer.cat accessed on 5 October 2021	Spain	Spanish, Catalan [1], English	PDF	Facebook, Twitter [3], Instagram, YouTube	Email, phone, social share buttons, comments box
ICO/Què i Com Menjar Durant el Càncer [4], www.menjardurantelcancer.cat accessed on 30 October 2021	Spain	Spanish, Catalan [1], English	Webpage (Video-recipes), Podcast, PDF		Social share buttons
SAV/Ayuda al Paciente Oncológico [4], www.ayudaalpacienteoncologico.org.ve/ La Lonchera de mi Hijo [4], www.lalonchera demihijo.org/ accessed on 5 October 2021	Venezuela	Spanish	Webpage, PDF	Facebook, Twitter, Instagram [3]	Email, phone, forum on WhatsApp
ACS www.cancer.org/es/ accessed on 5 October 2021	US	Spanish, English, Others [5]	Webpage (Videos), PDF	Facebook [3], Twitter, Instagram	Phone, live chat, comments box
NCI www.cancer.gov/espanol accessed on 5 October 2021	US	Spanish, English	Webpage, PDF	Facebook [3], Twitter, Instagram, LinkedIn	Phone, live chat

ACS, American Cancer Society; AEAL, Asociación Española de Afectados por Linfoma, Mieloma, Leucemia; AECC, Asociación Española Contra el Cáncer; FECEC, Federació Catalana Entitats Contra el Càncer; GEICAM, Geicam, Investigación en Cáncer de Mama; ICO, Catalan Institute of Oncology; NCI, National Cancer Institute; SAV, Sociedad Anticancerosa de Venezuela; SEOM, Sociedad Española de Oncología Médica; PDF, Portable

34. Cancer Survivors—World Cancer Research Fund (WCRF) International. Available online: https://www.wcrf.org/dietandcancer/cancer-survivors/ (accessed on 18 October 2021).

35. Cancer Prevention Recommendations—WCRF International. Available online: https://www.wcrf.org/diet-and-cancer/cancer-prevention-recommendations/ (accessed on 18 October 2021).

36. Okuhara, T.; Ishikawa, H.; Okada, M.; Kato, M.; Kiuchi, T. Cancer information needs according to cancer type: A content analysis of data from Japan's largest cancer information website. Prev. Med. Rep. 2018, 12, 245.

37. Wieldraaijer, T.; Duineveld, L.A.M.; Bemelman, W.A.; van Weert, H.C.P.M.; Wind, J. Information needs and information seeking behaviour of patients during follow-up of colorectal cancer in the Netherlands. J. Cancer Surviv. 2019, 13, 603.

38. Sillence, E.; Briggs, P.; Harris, P.R.; Fishwick, L. How do patients evaluate and make use of online health information? Soc. Sci. Med. 2007, 64, 1853–1862.

39. Arribas, L.; Hurtos, L.; Taberna, M.; Peiro, I.; Vilajosana, E.; Lozano, A.; Vazquez, S.; Mesia, R.; Virgili, N. Nutritional changes in patients with locally advanced head and neck cancer during treatment. Oral Oncol. 2017, 71, 67–74.

40. Taberna, M.; Moncayo, F.G.; Jané-Salas, E.; Antonio, M.; Arribas, L.; Vilajosana, E.; Torres, E.P.; Mesía, R. The multidisciplinary team (MDT) approach and quality of care. Front. Oncol. 2020, 10, 85.

3. Summary

Healthy eating information and content focused on the management of side effects during cancer treatments was provided by all websites. This is an important finding, as the management of side effects, food and nutrition are among the greatest information needs of cancer patients [36][37]. Content for cancer survivors was more limited but well addressed for cancer prevention.

One of the websites (GEICAM, **Table 1**) was specific for patients with breast cancer and another (AEAL, **Table 1**) for patients with lymphoma, myeloma, and leukemia. Other NCO websites (SEOM, FECEC, and ACS, **Table 1**) structured or divided the information by tumor site, such as colorectal, prostate, pancreas, kidney, lung, and breast cancer. Although all websites addressed the most frequent side effects that appear during cancer, presenting the content according to tumor site could assist in the selection of information provided to patients with specific cancers. Previous findings suggest that patients may reject high quality information if it does not appear to be aimed at people with the same condition [38]. Moreover, different degrees of side effects can appear, and specific nutrition recommendations cannot be applied to different cancer types. For example, a significant nutritional deterioration and a decrease in body weight and body mass index (BMI) can occur in head and neck cancer patients, who can easily become moderately to severely malnourished [39], while an increase in body weight can occur in patients with breast and prostate cancer [18][19]. Among the websites, it was observed that the information at pre-treatment was limited and not always addressed. Improvements in nutritional support prior to treatment reduce the incidence of infections and length of hospital stay [40]. Moreover, an early nutritional assessment with dietetic counseling prior to the treatment of patients with a high prevalence of malnutrition, such as head and neck tumors, seems to be more effective [39]. Common advice of dietary guidelines during cancer treatment was to ensure an adequate calorie and protein intake. Most of the websites offered practical strategies on how to prepare high protein and high calorie meals.