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REVIEW

Risk factors for colorectal cancer, a present and a future

Factores de riesgo del cáncer colorrectal, un presente y un futuro

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ABSTRACT

Introduction: colorectal cancer (CRC) is the most frequent malignant neoplasm that can occur in the digestive system, it is the tumor with the highest incidence in Europe if both sexes are grouped together.
Objective: to provide updated information on the risk factors of colorectal cancer and its prevention from primary health care.
Method: a search of the respective literature was performed in the databases PubMed, Medline, SciELO and Google Scholar published during the period 2018- 2023, using the keywords: colorectal cancer, risk factors, genetics, diet, habits, mortality.
Conclusions: the risk of developing this cancer is related to poor dietary habits, sedentary lifestyle, stress, smoking, inflammatory bowel disease, genetic factors and aging. Knowing the risk factors for colorectal cancer allows us to modify some of them, and thus improve the quality of life and mortality from this cause.

Keywords: Colorectal Cancer; Risk Factors; Diet; Habits; Mortality.

RESUMEN

Introducción: El cáncer colorrectal (CCR) es la neoplasia maligna más frecuente que se puede presentar en el sistema digestivo, es el tumor con mayor incidencia en Europa si se agrupan ambos sexos.
Objetivo: proporcionar información actualizada sobre los factores de riesgo del cáncer colorrectal y su prevención desde la atención primaria de salud.
Método: se realizó una búsqueda de la bibliografía respectiva en las bases de datos PubMed, Medline, SciELO y Google Académico publicadas durante el período 2018- 2023, mediante las palabras clave: Cáncer colorrectal, factores de riesgo, genética, dieta, hábitos, mortalidad.
Conclusiones: el riesgo de desarrollar este cáncer está relacionado con malos hábitos alimentarios, el sedentarismo el estrés, el tabaquismo, la enfermedad inflamatoria intestinal, factores genéticos y envejecimiento. Conocer los factores de riesgo del cáncer colorrectal permite realizar modificaciones en algunos de ellos, y con ello mejorar la calidad de vida y mortalidad por esta causa.

Palabras clave: Cáncer Colorrectal; Factores de Riesgo; Dieta; Hábitos; Mortalidad.

INTRODUCTION

Colorectal cancer (CRC) is the most frequent malignant neoplasm that can occur in the digestive system; it is the tumor with the highest incidence in Europe if both sexes are grouped.[1,2]

A gradual increase in the incidence of CRC has been observed, with a notorious rise in Latin America, from three to four percent per year in the last decade.[3] In the world, 1,3 cases are detected annually, leaving more than 700,000 dead.[4]

Colorectal cancer is the fourth most common cancer in the Americas. Every year in the region, there are more than 240,000 new cases and approximately 112,000 deaths due to this disease. Canada, Uruguay, and Barbados have the highest incidence rates, while Central American countries have the lowest. If no action is taken, the incidence of colorectal cancer is expected to increase by 60 % by the year 2030.[5]

The development of CRC is a multifactorial process, which includes genetic and environmental factors, as well as the interaction of both, and multi-stage, in which mutations accumulate that can give rise to the tumor. Lifestyles such as the consumption of alcohol and processed meats or physical inactivity are some risk factors for its development with strong evidence, as well as body fat and a greater height reached in adulthood.[6]

Cuba presents health indicators similar to those of developed nations, where cardiovascular diseases and malignant tumors are the main causes of death. Colorectal cancer is the third leading cause of death among malignant diseases. The highest mortality rate by type of cancer corresponds to malignant tumors of the trachea, bronchus, and lung, followed by the mortality rate for malignant tumors of the intestine and other tumors of the lymphatic tissue and hematopoietic organs, all with rates higher than 11 per 100 000 inhabitants.[7]

In Cuba, the third cause of death by cancer in both sexes is colon cancer, after lung neoplasia in men and breast cancer in women; it causes 9 % of the total number of deaths by malignant tumors in this century, with predominance in women. The incidence of this disease, observed in the female sex in Cuba, is similar to that of the Caribbean and South America, higher than that of Central America and lower than that reported by the United States and Canada.[8]

Aging in Cuba constitutes the main demographic problem, with a figure that reaches 21,2 % of the population aged 60 years and over; it is expected that by 2025 this group will reach more than 25 % of the total population, it will be one of the most aged countries in Latin America, it is also estimated that in 2050 the proportion of the world population over 60 years will double, it is expected that the number of people aged 60 years and over will increase from 605 million to 2 billion in the same period.[9]

Population aging, together with other factors, is one of the causes of the increase in the occurrence of CRC. The demographic phenomenon of an aging population worldwide is also seen in Cuba, which is considered to have the largest population over 60 years of age in Latin America by 2025.

Self-care of older adults is considered a coherent element in the treatment of colorectal cancer. This perspective helps older adults become aware of their conditions by improving their information and skills and allowing them to perform adequate self-care actions.

In this sense, the authors consider that new assistance and research challenges are approaching for the Family Physician and Nurse from the Cuban Public Health paradigm, given the role played by the Medical staff within the basic health team, as the need to sustain community health practices with a focus on the care of individuals, families, and communities is greater, in order to ensure that people who are moving towards old age enjoy a healthy and happy aging with a better quality of life.

Health personnel must be prepared to face this situation, with adequate information for the management of chronic noncommunicable and oncologic diseases.

This article aims to provide updated information on the risk factors of colorectal cancer and its prevention from primary health care.

METHOD

A review of the national and international literature was carried out, consulting a total of 48 original scientific articles, theses, and documents from health organizations related to the subject. These were obtained from the databases PubMed, Medline, Scielo, and Google Scholar. With the information obtained, an exhaustive selection was made of the articles that provided updated information on colorectal cancer, of which 19 articles were used as bibliographies, with a predominance of articles published during the last five years and others due to their relevance.

Inclusion criteria: we considered scientific articles, theses, and documents from health organizations in English and Spanish that were freely available and showed the complete texts. Articles published during the last five years, from 2018 to 2023, provided updated information on colorectal cancer.

RESULTS AND DISCUSSION

Colorectal cancer is a type of gastrointestinal pathology that begins in the colon or rectum. Adenocarcinoma

is the most common colorectal malignancy. Unfortunately, colorectal cancer can remain silent for a long time, at least until it grows and spreads substantially, which adversely affects prognosis. Well-established risk factors include male gender, smoking, excessive alcohol consumption, physical inactivity, high consumption of red and processed meat, overweight, and family history of CRC. The latest scientific research considers that between 30 % and 40 % of cancer prevalence could be preventable with various prevention factors, such as diet, body weight control, and increased physical activity.[10]

International organizations dedicated to the study of cancer have described for some time that between 30 and 40 % of all cancer cases are preventable through healthy diets, physical activity, and maintaining adequate body weight.[11]

The lifetime probability of acquiring CRC is four to six percent. Approximately 80 % of cases are sporadic, but 22 % are genetically influenced. Currently, CRC is mostly detected in the symptomatic stage, so it is estimated that 50 % of these patients with late diagnosis are in an advanced stage of the tumor.[12] Hence, the idea is not to wait for the disease to produce symptoms but to look for its presence before it happens.[13]

Lifestyle is the set of habits and behavior patterns of each individual. Presenting constant conditions can constitute dimensions of risk or safety. Colorectal cancer is closely related to current lifestyles.

Unhealthy eating habits, sedentary lifestyles, and stress are frequent in the lifestyles

of societies exposed to modern conditions without sufficient protection and education to protect health.

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These conditions are recognized as risk factors for chronic noncommunicable diseases, among which is colorectal cancer.[14]

Modifiable factors, such as smoking, obesity, excessive consumption of alcohol, red meat, and processed foods, imply a risk for the development of colorectal cancer. The most important risk factor for colorectal cancer is advanced age; the vast majority are diagnosed in adults over 50 years of age, with a mean age of 68 years. Along with age, non-modifiable factors such as inflammatory bowel disease, previous radiation, and genetic factors are described. [15]

The authors found in the literature studied an inclination to point out age as one of the non-controllable or modifiable factors that play an important role in the evolution of patients with CRC. In this aspect, the diagnosis-age-stage relationship is valid; this disease generally evolves for a long time without symptoms and is diagnosed in 85 % of the cases in ages that exceed 60 years, which results in clinical findings in stages III-IV.[16,17]

Other authors suggest that age is related to the loss of intestinal motility in older adults; the older the age, the easier it is for a cell to malign due to the decrease in the activity of the immune system and the accumulated damage caused by inadequate habits and lifestyles. Women tend to refined diets, whose fecal volume is smaller, the fecal waste remains longer in contact with the colonic mucosa, and the intestinal transit time is longer, as well as the action of substances that favor the disease.[12]

The family history of colorectal cancer has also been related to a higher incidence of this pathology, mainly in patients with first-degree relatives with adenomas identified in colonoscopies and those presented at an early age. There are factors, such as diet and lifestyle characteristics, that could establish primary prevention in colorectal cancer. An inverse relationship has been described between the consumption of fiber, especially fruits, and vegetables, with a 40 % to 50 % reduction in the occurrence of colorectal tumors, mainly attributable to the absorption of carcinogens from fecal matter, the modulation of colonic transit time, the increase in the production of short-chain fatty acids and the reduction of colonic pH. Body weight maintenance and physical activity have shown a protective effect, with a 20 % to 30 % decrease in the occurrence of adenomas and advanced colorectal neoplastic lesions.[15]

Related to diet, it has been described that frequent consumption of meats, in the long term, has shown an increased risk of CRC, especially red meats (beef, pork, lamb), even stronger than processed meats (sausages, hamburgers, smoked and canned meats). This is mainly due to high-temperature cooking methods that may influence the production of carcinogenic compounds (heterocyclic amines, polyaromatic hydrocarbons) on the surface of meats cooked for long periods. Among the proposed mechanisms are that fiber favors the decrease of intraluminal pH, decreasing the mutagenicity of secondary bile acids, and the dilution of carcinogens gives rise to the formation of short-chain fatty acids through bacterial fermentation. It induces the fixation of bile acids, increasing their excretion, decreasing their incidence, and acting as a protective factor for the decrease of CRC.[18]

The consumption of high fats in the diet generates several alterations, for example, the alteration of tumor-promoting bile acid that induces cell proliferation and acts to promote CRC by enhancing the activity of the colon's epithelial ornithine decarboxylase.[20] On the intestinal mucosa of the colon, the increase of bile acids derived from cholesterol and metalloproteins have an aggressive action, generating a chronic irritative process damaging the cellular DNA, originating polyps, and being a main risk factor for triggering colorectal cancer.[18,19]

The ingestion of alcoholic beverages is considered a possible contributor to carcinogenesis even when its consumption is moderate due to the harmful action on the colon microbiota and the formation of aldehydes and

other metabolites that promote cancer through oxidative stress, lipid peroxidation, epigenetic alterations, and dysfunction of the epithelial barrier, among other processes. In addition to the aforementioned toxic effects, the habit of drinking alcohol facilitates the consumption of unhealthy diets and loss of folate and dietary fiber, among other disorders, which increase the risk of colorectal cancer.[14]

Cigarette smoking has been associated with increased CRC incidence and mortality and is also a risk factor for virtually all types of colonic polyps. In addition, smoking may increase the risk of CRC in patients with Lynch syndrome.[19]

An association between alcohol consumption and an increased risk of CRC has been observed in several studies. Excessive alcohol consumption is an established and potentially modifiable risk factor for several other malignancies in addition to CRC. Also, it complicates treatment and treatment outcomes by contributing to longer hospitalizations, prolonged recovery, and higher healthcare costs.[19]

International literature describes that physical inactivity presents a high mortality worldwide and is associated with the development of neoplasms such as CRC in up to 25 %; in addition, sedentary behavior is associated with an increased risk of developing this cancer, as it has been shown that physical activity performed in an age range between 30 to 50 years of age and vigorous physical activity reduces the risk of its development.[14]

Inflammatory bowel diseases are mainly composed of two disorders: Crohn's disease (CD) and ulcerative colitis (UC), generating inflammation of the digestive tract and serious complications that trigger this neoplasm; it presents a relatively low risk only during the first 10 years of the disease, but after this time the risk of presenting CRC increases from 0,5 to 1,5 % per year.[18]

It is important to emphasize that the factors above influence individuals in complex processes and interactions that need to be better explained. However, it should be understood that none of these act independently to be the cause of colorectal cancer or to be sufficient protection against it. This definition corresponds to the concept of homeostasis. It should be considered with an integrative approach more frequently in the scientific literature by researchers and health personnel in dealing with this health problem.

Being active, eating healthy, and mastering stress are strengths to prevent, face, and overcome colorectal cancer, although each of them has specificities to be considered to achieve the required effectiveness. These are challenges that can be interpreted in scientific publications on this subject. Avoiding a sedentary lifestyle, eating healthy, and not being affected by stress makes it easier to face oncogenesis processes and medical treatments that are frequently applied against this disease. In order to overcome these two problems, it is necessary to stimulate healthy lifestyles, specifically for individuals at risk and also for the population in general, in order to increase the effectiveness of this type of prevention.

CONCLUSIONS

The scientific literature identifies the promotion of healthy eating, physical activity, and stress control as preventive measures that contribute to a decrease in the occurrence and development of colorectal cancer.

Knowing the risk factors for colon and rectal cancer allows for modifications in some of them, screening, early diagnosis, and thus improving the quality of life and mortality from this cause.

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