Prevalence of traditional atherosclerotic risk factors in newly diagnosed colorectal and breast cancer patients

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Original Article

Abstract

Due to the shared risk factors between cardiovascular disease (CVD) and certain cancers such as breast cancer (BC) and colorectal cancer (CRC), our study aimed to assess the CVD risk factors among newly diagnosed patients with BC and CRC. The study utilized baseline data from the ongoing Cardiovascular Events in Breast and Colorectal Cancers (CIBC) cohort study conducted in Isfahan since 2019. Only patients who had recently been diagnosed with BC or CRC and had not undergone any treatment were included in the study. Trained interviewers administered questionnaires to collect information on the demographic, socioeconomic, and smoking status of the participants. Additionally, metabolic and physical factors were measured following established guidelines. A total of 542 patients were included in the study, with 394 (72.7%) diagnosed with BC, 147 (27.1%) with CRC, and one patient having both conditions. The average age of BC patients was 49.46±11.15 years, which was younger compared to CRC patients. The majority of patients (90.8%) were nonsmokers, and a significant proportion (91.2%) did not engage in sufficient physical activity. Less than half of the patients exhibited hypertension, while the prevalence of diabetes was comparatively lower. Obesity, particularly abdominal obesity, was more common among BC patients compared to CRC patients. In our population, we observed that patients with CRC had a higher mean age compared to those with BC, and they exhibited a higher prevalence of common metabolic risk factors. On the other hand, obesity was more prevalent among BC patients. In terms of the shared risk factors between CVD and BC, our population experienced menarche within the expected timeframe, and the mean age of menopause was also within the normal range.

Keywords: Brest Cancer, Colorectal Cancer, Risk Factor, Cardiovascular Disease, Cardiooncology

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Introduction

Cardiovascular diseases (CVD) and cancer are the leading causes of death in Iran, with CVD ranking first and cancer third[1]. Among cancers, breast cancer (BC) is the most frequently diagnosed malignancy in females worldwide, accounting for 30% of all newly diagnosed cancers among women in the United States[2]. Recent studies have revealed that breast cancer and CVD share several common, modifiable risk factors[3]. Moreover, emerging evidence suggests that women with a history of breast cancer face a higher risk of CVD-related mortality compared to those without cancer[4]. In fact, cardiovascular events are the primary cause of death among patients with breast cancer[5]. Additionally, certain medications used in the treatment of breast cancer can increase the risk of cardiotoxicity, particularly in patients who already have established risk factors for CVD[6].

Colorectal cancer (CRC) ranks as the third most prevalent cancer worldwide and is the second leading cause of cancer-related deaths. In 2018 alone, there were over 1.8 million new cases and 880,000 deaths attributed to CRC[7]. Recent research has uncovered potential links between the populations affected by CVD and CRC[8]. Studies have demonstrated a correlation between known CVD risk factors, such as elevated body mass index (BMI), type II diabetes mellitus (T2DM), unhealthy diet, smoking, and lack of physical activity, with the development of colorectal cancer[9–12]. Furthermore, CRC survivors face an increased risk of morbidity and mortality associated with CVD[13–15].

Given these findings, it is highly recommended to incorporate cardiovascular assessment into the management and treatment prognosis of newly diagnosed cancer patients. Therefore, the objective of this study is to evaluate the CVD risk factors among individuals newly diagnosed with both BC and CRC.

Materials and Methods

This study utilized the baseline data from the ongoing Cardiovascular Events in Breast and Colorectal Cancers study (CIBC), which is a cohort study focused on newly diagnosed patients with BC and CRC in Isfahan since 2019. The CIBC study received approval from the Ethics Committee of the National Institute for Medical Research Development (NIMAD) in Iran [IR.NIMAD.REC.1397.281], and all participating patients provided written consent. Non-random convenience sampling was employed to select cases from various locations within Isfahan city. To be eligible for inclusion, patients were required to have no history of cardiovascular disease. The exclusion criteria encompassed pregnancy and unwillingness to cooperate.

The questionnaires were administered by trained interviewers at the cardio-oncology clinic of the Isfahan Cardiovascular Research Institute (ICRI). To assess smoking status, a validated Smoking Assessment Questionnaire (SAQ) was utilized. Patient medical history and physical examinations were conducted by a trained general physician, with the information primarily relying on patient self-reporting. Standardized and internationally recognized physical activity questionnaires (IPAQ) were employed to gather data on lifestyle components[16].

Anthropometric measurements, including weight, height, waist circumference (WC), and hip circumference (HC), were obtained using established methods. Blood pressure measurements adhered to the standard protocol defined by the Joint National Committee (JNC)[17]. Fasting blood samples were collected to determine fasting blood glucose (FBG) levels and lipid profiles. These laboratory tests were performed in a certified laboratory that met the criteria of the National Reference Laboratory, recognized as a WHO collaborating center[18,19].

Results

A total of 542 patients were included in this study, with 394 (72.7%) diagnosed with BC and 147 (27.1%) diagnosed with CRC. Notably, only one individual had both BC and CRC. The mean age of BC patients was 49 years, which was approximately 9 years younger than the mean age of CRC patients. The vast majority of BC patients were women, and their mean age at menarche and menopause fell within the normal range. In contrast, women accounted for only half of the CRC patients. Among the study participants, 90.8% were non-smokers, and 91.2% did not engage in sufficient physical activity. Only two patients reported a history of peripheral vascular disease (PVD), while 3.6% of BC patients and 6.8% of CRC patients had

a prior history of CVD (Table 1).

Blood pressure and heart rate were within the normal range on average. The mean body mass index (BMI) of BC patients was approximately 3 units higher than that of CRC patients, placing both groups in the overweight range. WC was similar in both categories, while BC patients exhibited a higher average HC. All lipid profile indicators were higher in BC patients, whereas FBG levels were higher on average in CRC patients (Table 2).

The prevalence of hypertension was 42.6% among BC patients and 46.2% among CRC patients. Obesity, particularly abdominal obesity, was more prevalent in BC patients compared to CRC patients, with rates of 32.6% and 75.3% versus 15.8% and 46.3%, respectively (Table 3).

Discussion

In terms of common modifiable and non-modifiable risk factors for CVD and cancer, it is important to note that sex plays a significant role in BC, whereas the distribution of cases in CRC is more balanced in

Table 1: Basic characteristics and demographic information of patients with breast and colorectal cancers

Characteristics	Breast cancer	Colorectal cancer
Age (mean±SD)	49.46±11.15	58.96±13.00
Sex (Female) n (%)	393 (99.5)	74 (50.0)
Smoking n (%):		
Nonsmoker n (%)	374 (95.0)	117 (79.6)
Smoker n (%)	8 (2.0)	15 (10.2)
Former n (%)	12 (3.0)	15 (10.2)
Physical activity n (%):		
≤150 minutes per week	355 (90.1)	139 (93.9)
>150 minutes per week	39 (9.9)	9 (6.1)
History of PVD n (%)	1 (0.3)	1 (0.7)
History of CVD n (%)	14 (3.6)	10 (6.8)
History of stroke n (%)	4 (1.0)	3 (2.0)
Family history of premature CVD n (%)	42 (10.6)	11 (7.4)
Age of menarche* (Mean±SD)	13.19±1.55	ND
Age of menopause* (Mean±SD)	47.81±7.19	ND
Hormone replacement* therapy n (%)	9 (2.3)	ND
History of breastfeeding* n (%)	344 (87.1)	ND

PVD: peripheral vascular disease; CVD: Cardiovascular disease; SD: standard deviation; ND: not determined
*Among the female population

Table 2: The mean of physical and metabolic risk factors of cardiovascular disease in patients with breast and colorectal cancers

Factor	Breast cancer (Mean±SD)	Colorectal cancer (Mean±SD)
SBP (mmHg)	117.88±16.70	117.33±16.10
DBP (mmHg)	79.61±10.45	78.32±10.04
Heart rate (BPM)	84.96±11.66	86.36±16.06
BMI(kg/m^2)	28.21±4.98	25.17±5.53
HC (cm)	104.39±10.12	98.32±9.37
WC (cm)	95.83±12.55	93.14±12.19
FBG (mg/dL)	100.87±27.21	107.49±40.87
TC (mg/dL)	189.54±38.78	176.26±49.28
LDL-C (mg/dL)	111.73±31.75	102.10±33.08
HDL-C (mg/dL)	53.99±12.55	48.17±12.95
TG (mg/dL)	132.31±72.84	121.35±43.42

SBP: Systolic blood pressure; DBP: Diastolic blood pressure; BMI: Body mass index; HC: Hip circumference; WC: Waist circumference; FBG: Fasting blood glucose; TC: Total cholesterol; LDL-C: Low density lipoprotein cholesterol; HD-C High density lipoprotein cholesterol; TG: Triglyceride; SD: standard deviation

Table 3: The prevalence of physical and metabolic risk factors of cardiovascular disease in patients with breast and colorectal cancers

Factor	Breast cancer n (%)	Colorectal cancer n (%)	Both n (%)	Total n (%)
Hypertension	123 (42.6)	49 (46.2)	0 (0.0)	172 (43.4)
Diabetes mellitus	64 (25.4)	31 (32.0)	1 (100.0)	96 (27.4)
Hypercholesterolemia	73 (29.8)	29 (33.0)	0 (0.0)	102 (30.5)
High LDL-C	92 (34.6)	36 (36.4)	0 (0.0)	128 (35.0)
Low HDL-C	99 (37.9)	64 (56.6)	1 (100.0)	164 (43.7)
Hypertriglyceridemia	145 (50.2)	50 (49.0)	1 (100.0)	196 (50.0)
Underweight	6 (1.6)	10 (6.8)	0 (0.0)	16 (3.0)
Overweight	155 (40.3)	44 (30.1)	0 (0.0)	199 (37.4)
General obesity	126 (32.6)	23 (15.8)	0 (0.0)	149 (28.0)
Abdominal obesity	293 (75.3)	68 (46.3)	0 (0.0)	361 (67.2)

LDL-C: Low density lipoprotein cholesterol; HD-C High density lipoprotein cholesterol

terms of gender. The patients' past medical history is also an important consideration; albeit with a relatively low prevalence, it should be taken into account in their management. Among the modifiable factors, our study found a significantly higher prevalence of sedentary lifestyle, which aligns with the results obtained from weight-related indices. Additionally, the majority of patients in our study were non-smokers. A study conducted in Ireland involving 102 BC patients reported significantly higher mean age and smoking rates. The findings regarding obesity were similar to our study[6.]

A systematic review reported a mean age of 46.6 years for CRC patients. The prevalence of smoking and overweight individuals was lower, but obesity was more common[20]. Another study with over 160,000 participants reported a significantly higher mean age and a gender distribution similar to our study[21].

In the Irish study on BC patients and another study, a higher frequency of hypercholesterolemia was observed, while the prevalence of T2DM was lower among BC patients. Both studies reported a lower prevalence of HTN[6,22]. Among our CRC patients, 33% had hypercholesterolemia, 32% were diabetic, and 46% suffered from HTN. In the aforementioned meta-analysis, hypercholesterolemia and T2DM were less common; however, the prevalence of HTN was similar to our study. Notably, in our study, high levels of low-density lipoprotein (LDL) were 36 times more prevalent, indicating a significant difference[20]. There are common risk factors shared between BC and CVD. Several studies have reported early menarche and hormone replacement therapy as

risk factors for both conditions. However, latent menopause is a risk factor for BC, while preterm menopause is associated with CVD[23–26].

Conclusion

Our findings revealed that in our population, patients with CRC had a higher mean age compared to those with BC. The prevalence of common metabolic risk factors, except for hypertriglyceridemia, was higher among CRC patients. Unlike BC, the distribution of cases in CRC was balanced in terms of gender. Obesity was found to be more prevalent in the BC population. In terms of specific CVD and BC common risk factors, our population experienced timely menarche, and the mean age of menopause fell within the normal range.

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Conflict of Interest

The authors declare no conflict of interest.

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Author's Contributions

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