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ORIGINAL RESEARCH

Gender Differences in Psychological Distress in Patients with Colorectal Cancer and Its Correlates in the Northeast of Iran

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Abstract

Purpose Colorectal cancer has a significant impact on patients' physical, psychological, and social aspects. This study aimed to examine the gender difference in anxiety and depression and its relationship with some of the characteristics of the disease and demographic in the northeast of Iran.

Methods In this cross-sectional study, patients with colorectal cancer aged over 18 years who were admitted to hospitals, without considering the disease stage and type of treatment, were enrolled during 2014–2016. The Hospital Anxiety and Depression Scale (HADS) Questionnaire was completed via interview.

Results A total of 303 survivors of colorectal cancer were included in the current analysis, of whom 55.1% (167) were male. The overall frequency of depression was 44.9%, and it was 38.3% and 32.9% for men and women, respectively. The overall frequency of anxiety was 53.4% (50.3% and 57.4% for men and women, respectively). The results showed that compared to men, women (52%) were more likely to report depression (OR = 0.48, 95% CI = 0.22–1.04, $P = 0.065$); in contrast, men (12%) were less likely than women to report anxiety (OR = 0.88, 95% CI = 0.38–2.03, $P = 0.779$), which was less than 12% in men. Among other variables, education and employment were identified as independent and strong predictive variables for depression and anxiety.

Conclusions The frequency of anxiety and depression is high among colorectal cancer survivors, especially in women. Therefore, screening for psychological distress is recommended in clinical settings and there is a need to pay attention to women.

Keywords Anxiety · Depression · Sex · Cancer · Colorectal

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Introduction

Cancer is one of the significant causes of morbidity and mortality in the world [1]. Colorectal cancer (CRC) is the most common type of gastrointestinal cancers and the second leading cause of cancer death [2]. According to the latest information published by the International Cancer Research Agency of the World Health Organization (2018 Globocan IARC), 2018, colorectal cancer accounts for 10.2% of all cases of cancer and 9.2% of cancer deaths. In Iran, the age-standardized rates of incidence and mortality are 12.9 and 5.6 per 100,000 people [3].

As the population is aging, the incidence of cancer continues to rise [4]. In recent years, the incidence of CRC has been increasing, and it has been the most prominent cause of mortality from cancer in Asian countries [5]. In the recent decade, a significant increase in the rates of CRC has been reported in Iran [6]. Aging and advances in diagnostics of cancer, especially colorectal cancer and the overall care of

affected patients, have resulted in a doubling of 5-year survival and an increased number of CRC survivors [7]; however, geographical differences are apparent globally [8]. Besides an increase life expectancy of these patients has resulted in a consequent long-term treatment concern [9], together provides physical and mental problems for CRC survivors [10].

For most people, cancer diagnosis is a horrifying news which may cause a psychological breakdown [11]. Evidence indicates that psychological variables during diagnosis and treatment of cancer affect different dimensions of the patient's life [12]. Studies have shown that depression and anxiety are common among patients with cancer that may impede treatment adherence, recovery, and quality of life [13, 14]. In a review and meta-analysis study in Iran based on all articles published between 2000 and 2018, a total of 14 studies with 2831 patients were included, and the prevalence of depression was reported 35% (95% CI: 16–70%) [15].

Although there has been considerable attention to the physical side effects of colorectal cancer and its treatment [16], the psychological aspect of CRC survivors has received less attention [13, 17]. Therefore, considering the increasing number of CRC patients, and because depression and anxiety are more common in women than men, this study aimed to investigate the psychological distress in CRC patients in terms of gender and identification of related factors.

Materials and Methods

Sample and Setting

This cross-sectional study was conducted in Tabriz City, East Azerbaijan Province, northwest of Iran. Patients with colorectal cancer aged over 18 years who were admitted to hospitals during 2014–2016, without considering the disease stage and type of treatment, were included in the current study. Exclusion criteria were a history of other cancers and a lack of consent for participating in the study. Finally, a total of 303 patients were enrolled in our study.

Procedure and Measures

Data was collected using a two-part questionnaire; the first part of the questionnaire included gender (male/female), age (≤ 50/> 50), marital status (married/single), education (literate/illiterate), occupation (employed/unemployed), cancer stage (I, II/III, VI), duration of cancer after diagnosis (≤ 12/> 12 month), having associated diseases and auxiliary treatments (no/yes) and the second part of the questionnaire was patients' mental health conditions. The Hospital Anxiety and Depression Scale (HADS) questionnaire—a comprehensive tool for measuring psychological distress in patients with cancer—was utilized to measure depression and anxiety [18]. This questionnaire has 14 items, and two subscales for depression (HADS-D) and anxiety (HDS-A); each of the subscales consists of seven items with response scores ranging from 0 (no problems) to 3 (maximum distress) resulting in a sum score ranging from 0 to 21 for both anxiety and depression. "Cases" were defined based on a score of 11 and more in HADS-A, HADS-D, and HADS-T; "doubtful cases" were defined as those with a score of 8 to 10 [19]. Montazeri et al. reported the acceptable validity and reliability of the Persian version of the questionnaire in cancer patients [20]. A review study conducted in 2018 has documented that HADS is the highest valuable questionnaire used in the world for assessing mental health [4]. This questionnaire has been accepted in Iran as well [15]. The questionnaire was completed by two trained interviewers in hospitals by face-to-face interview in January 2018.

Statistical Analysis

In this study, the dependent variable was anxiety and depression, and gender was considered independent; also, other clinicoepidemiological variables in the study were considered as covariates.

Data were analyzed by SPSS 22 software. The mean average and the standard deviation were used to illustrate descriptive statistics for quantitative variables, and for qualitative variables, frequency and percentages were reported. For analytical statistics, independent T tests and chi-square tests were utilized. To further evaluate individual (raw effects) and simultaneous (adaptive effects) effects of gender with anxiety and depression in the presence of other variables and showing their relationship with each other, the binary logistic regression model was employed. Odds ratio and 95% confidence interval (95% CI) were presented, and P value under 0.05 was statistically significant.

Results

A total of 303 patients with colorectal cancer were enrolled in this study, of whom, 167 (55.1%) were male, and the rest were female. The mean age of the participants was 58.16 ± 13.58 years which was 59.29 ± 13.6 years and 56.77 ± 13.48 years in men and women, respectively (P = 0.108). The demographic and clinical characteristics of the patients are presented in Table 1.

The results of the study conferred that the overall frequency of depression in cancer survivors was 38.3%, which was 32.9% in men and 44.9% in women. In total, 53.4% of all patients, 50.3% of men and 57.4% of women, reported

Table 1 Demographic details of patients with colorectal cancer (n = 303)

Variables	Subgroup	Total number (%)	By gender, n (%)	
			Male	Female
Gender	Male	167 (55.1)	-	-
	Female	136 (44.9)	-	-
Age (years)	≤ 50	85 (28.1)	43 (25.7)	42 (30.9)
	> 50	218 (71.9)	124 (74.3)	94 (69.1)
Education	Literate	182 (60.2)	115 (68.8)	67 (49.6)
	Illiterate	121 (39.8)	52 (31.2)	69 (50.4)
Marital status	Married	252 (83.2)	152 (90.9)	100 (74.0)
	Single*	51 (16.8)	15 (9.1)	36 (26.0)
Employment status	Employed/self-employed	77 (25.4)	45 (26.7)	32 (23.6)
	Unemployed/retirement	226 (74.6)	122 (73.3)	104 (76.4)
Comorbidity**	No	125 (41.3)	74 (44.3)	51 (37.6)
	Yes	178 (58.7)	93 (55.7)	85 (62.4)
TNM staging	I, II	107 (35.3)	60 (35.9)	47 (34.4)
	III, VI	196 (64.7)	107 (64.1)	89 (65.6)
Duration of cancer after diagnosis (month)	≤ 12	171 (56.4)	90 (53.9)	81 (59.6)
	> 12	132 (43.6)	77 (46.1)	55 (40.4)
Adjuvant chemotherapy	Not performed	105 (34.6)	52 (31.1)	53 (39.0)
	Performed	198 (65.4)	115 (68.9)	83 (61.0)

*Single/divorced/widowed/separated; **have at least one underlying disease including other cancers, cardiovascular disease, lung disease, diabetes, hypertension, and osteoporosis

anxiety (Table 2). Finally, 100 (33%) patients had both depression and anxiety. The mean and standard deviation for a total score of the questionnaire for depression and anxiety were 20.14 ± 7.86, 9.61 ± 4.73, and 10.53 ± 3.71, respectively. The status of the mean of the scores for depression and anxiety is illustrated in Fig. 1.

In general, depression and anxiety were more frequent among illiterate individuals, unemployed individuals, those who had not received adjunctive treatments, patients with other medical conditions, and those with higher stages of cancer. On the other hand, for variables including, age at the time of diagnosis, marital status, and duration of cancer, the results were not the same as for anxiety and depression; to further explain, in older patients, single patients, and patients with a more extended period of illness, depression was noticed more, but younger and married patients with shorter periods of cancer time had more anxiety than depression.

To examine the association between depression and gender in the presence of the other mentioned variables in the study, the results were assessed based on the Hosmer-Lemeshow test (P = 0.09). It verified that our model had the necessary adequacy, and 68.8% of the patients were correctly predicted based on the variables in terms of depressive classifications. The results of regression analysis demonstrated that the frequency of depression in women was higher than that in men; it was 41% less in men compared to females (95% CI = 0.34–1.01, OR = 0.59, P = 0.057). After adjusting for other variables, there was no significant change. However, the

Table 2 Depression and anxiety in patients with colorectal cancer

	Group by HADS	Total number (%)	By gender, n (%)		P value
			Male (167)	Female (136)	
Depression	Normal	101 (33.3)	61 (36.5)	40 (29.4)	0.104
	Borderline	86 (28.4)	51 (30.5)	35 (25.7)	
	Abnormal	116 (38.3)	55 (32.9)	61 (44.9)	
Anxiety	Normal	62 (20.5)	34 (20.4)	28 (20.6)	0.329
	Borderline	79 (26.1)	49 (29.3)	30 (22.1)	
	Abnormal	162 (53.4)	84 (50.3)	78 (57.4)	

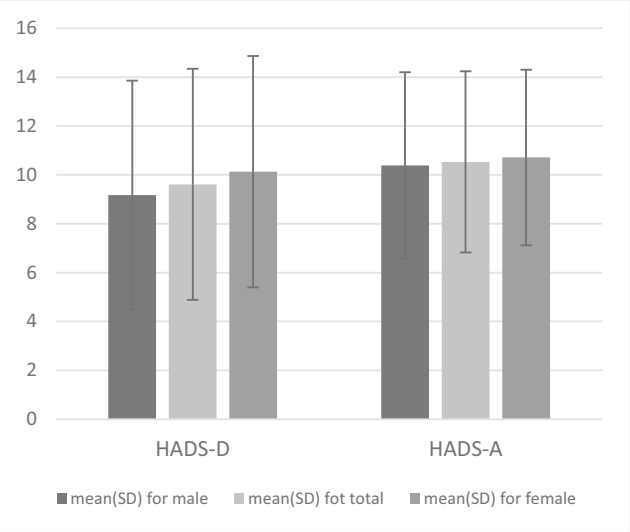

Fig. 1 The meam (standard deviation) of depression and anxiety by gender in patients with colorectal cancer

prevalence of depression in men was 52% less than the prevalence in women, but it was not statistically significant (95% CI = 0.22–1.04, OR = 0.48, P = 0.065). However, in both models, this relationship was close to a significant level. Results of the multivariable analysis showed that the frequency of depression in literate and employed patients was 62% and 64% less than illiterate or unemployed patients ($P < 0.05$) (Table 3).

To assess the gender differences in anxiety in the presence of other variables in the study, the results of our model based on the Hosmer-Lemeshow test (P = 0.274) verified that our model has the required adequacy and 79.1% of the patients were predicted justly in their anxiety classifications. The results of the regression analysis demonstrated that the frequency of anxiety in women was 12% higher than that in men (95% CI = 0.49–1.59, OR = 0.88, P = 0.689). After adjusting for other variables, there was no significant change. However, the prevalence of anxiety in men was 12% less than its prevalence in women, but it was not statistically significant (95% CI = 0.38–2.03, OR = 0.88, P = 0.779). Among other variables, only education, occupation, and assisted treatments were identified as independent and strong predictor variables for anxiety; to demonstrate this, the prevalence of anxiety in literate and employed individuals was 67% and 80% less, and in people who were not under treatment, these were more than 3.5 times. ($P < 0.05$) (Table 4).

Discussion

The results of our study showed that psychological distress in CRC survivors in the northeast of Iran is relatively high compared with other regions of Iran and other countries and is more common in women than in men. Besides, anxiety and depression are associated with many other demographic characteristics and many other aspects such as education, being employed, and receiving adjuvant therapy. The measurement of mental health will give us valuable information about the burden of the disease and treatment consequences [21]. The results of our study suggest that depression was present in one-third and anxiety in more than half of colorectal cancer patients, and both these conditions were more frequent among women than men.

Table 3 Relationship between depression and gender, including other variables

Variables	Subgroup	Unadjusted		Adjusted	
		OR (95%)*	P value	OR (95%)**	P value
Gender	Male/female (reference)	*0.59 (0.34–1.01)*	*0.057*	*0.48 (0.22–1.04)*	*0.065*
Age (years)	≤ 50/> 50 (reference)	0.90 (0.49–1.66)	0.757	1.79 (0.70–4.54)	0.217
Education	Literate/illiterate (reference)	0.41 (0.22–0.73)	0.003	0.38 (0.17–0.86)	0.020
Marital status	Married/single (reference)	0.91 (0.43–1.90)	0.801	1.24 (0.46–3.35)	0.668
Employment status	Employed/unemployed (reference)	0.22 (0.10–0.51)	0.000	0.36 (0.14–0.93)	0.036
Comorbidity	No/Yes (reference)	0.73 (0.41–1.28)	0.281	0.94 (0.43–2.04)	0.876
TNM staging	I, II/III, VI (reference)	0.63 (0.34–1.18)	0.153	0.74 (0.33–1.61)	0.451
Duration of cancer after diagnosis (month)	≤ 12/> 12 (reference)	0.89 (0.52–1.52)	0.673	0.66 (0.30–1.45)	0.304
Adjuvant chemotherapy	Not performed/performed (reference)	1.34 (0.76–2.37)	0.301	1.44 (0.62–3.37)	0.390

*Crude odds ratio; **fully adjusted odds ratio, adjusted for age, education, marital status, work status, comorbidities, stage, duration of disease, adjuvant chemotherapy. *OR*, odds ratio

Table 4 Relationship between anxiety and gender, including other variables

Variables	Subgroup	Unadjusted		Adjusted	
		OR (95%)*	*P* value	OR (95%)**	*P* value
Gender	Male/female (reference)	*0.88 (0.49–1.59)*	*0.689*	*0.88 (0.38–2.03)*	*0.779*
Age (years)	≤ 50/> 50 (reference)	1.14 (0.59–2.20)	0.678	3.12 (1.12–8.68)	0.029
Education	Literate/illiterate (reference)	0.40 (0.21–0.76)	0.006	0.33 (0.13–0.82)	0.018
Marital status	Married/single (reference)	1.43 (0.67–3.04)	0.348	1.62 (0.56–4.69)	0.367
Employment status	Employed/unemployed (reference)	0.18 (0.08–0.40)	0.000	0.20 (0.07–0.55)	0.002
Comorbidity	No/Yes (reference)	0.92 (0.50–1.69)	0.812	0.83 (0.36–1.94)	0.682
TNM staging	I, II/III, VI (reference)	0.65 (0.34–1.24)	0.200	1.31 (0.56–3.04)	0.531
Duration of cancer after diagnosis (month)	≤ 12/> 12 (reference)	2.42 (1.33–4.41)	0.004	1.73 (0.75–4.00)	0.196
Adjuvant chemotherapy	Not performed/performed (reference)	2.66 (1.36–5.22)	0.004	3.53 (1.31–9.45)	0.012

*Crude odds ratio; **fully adjusted odds ratio, adjusted for age, education, marital status, work status, comorbidities, stage, duration of disease, adjuvant chemotherapy. *OR*, odds ratio

Walker et al. reported that the frequency of depression in CRC patients was between 13 and 57% [22]. In a study by Marco et al. in Australia, 21% of 1183 CRC patients had anxiety, and 13% had depression [23]. Subramaniam et al. demonstrated that in their study in Malaysia, on 1490 patients, 54% of the CRC survivors were at least on the average level of anxiety, and 27% had at least a modest level of depression [24]. In total, 37% of CRC survivors had symptoms of depression, and 8% had symptoms of anxiety in a study conducted by Tsunoda et al. in Japan [25]. Studies from Turkey, India, Pakistan, and Iran showed that between 23 and 48% of CRC patients were suffering from depression [26–29]. Frequency of depression in our study was similar to that of reported in other studies from developing countries; however, anxiety was more frequent in our study than in other studies. The difference between our findings might be explained by the evaluation tools, sociocultural factors, types of cancer, stage, treatment approach, and elapsed time of diagnosis. Receiving mental health counselling might be another reason there is no routine counselling-defined cancer care in our region.

In this study, men had better mental health than women, which is consistent with most studies inside and outside of the country. In a study by Nikbakht et al. in northern Iran, the prevalence of depression and anxiety in women was higher than that in men [29]. In another study conducted by Khezri et al. in the south of Iran and another study by Musarezaie et al. in the center of Iran, there was no significant relationship between sex and depression [30, 31], although in all of these studies, mental health issues were higher in women. In the study of Gonzalez et al., male sex had less anxiety and depression [32]. In Akyol's study, the symptoms of anxiety and depression in women were significantly higher than those in men [26]. In the study of Braamse et al. in the Netherlands, female sex was associated with a level of high severity of depression, but not in anxiety [33]. In the study of Mols et al., men were associated with less anxiety and depression over time [13]. Another study did not see any gender differences in terms of depression [34].

Women after a cancer diagnosis are more influenced by mental and psychological problems, including anxiety and depression, and might be due to the limited activity of women outside of the house and their susceptibility to adverse events and stressful conditions. Therefore, it is recommended to consider the methods for mental improvement in women because the diagnosis and treatment of mental problems can have a positive effect on physical function and mental performance of all patients, especially women.

The prevalence of anxiety in our study was higher compared to depression such that half of the patients with cancer had anxiety, which is consistent with other studies as well [24, 35] In colorectal cancer patients, the prevalence of anxiety and depression can be seen as a result of the disease itself or the effect of the diverse treatments [26] In this case, patients are more influenced by anxiety. The fear of recurrence of the disease may be a major cause of anxiety. These effects have significant economic and social consequences on society and patients, so preventive measures should be taken to ameliorate the consequences [36]. Paying more attention to anxiety and depressive disorders seems to be a necessity.

In this study, employment was a strong and independent variable for depression and anxiety. Employed patients had

64% less depression and 80% less anxiety than unemployed individuals. In the Nikbakht study, although the patients who were employed had a 31% less prevalence of depression and 56% less anxiety, it was not statistically significant [29]. In the Khezri study, the rate of depression was lower in employees [30]; in the study, there was no relationship between employment status and anxiety and depression [31]. Obviously, being employed increases social connections and increases income, as well as social and economic situations, and make a more appropriate interaction with the environment. It is also possible to understand and observe the self-care principles in these patients, which will cause better mental health.

Also, education had an objective and robust predictive variable for depression and anxiety, and literate subjects were about 60% less with depression and anxiety than illiterate individuals. In the Nikbakht study, after matching other variables, the prevalence of anxiety in uneducated individuals was manifold compared to those with literate individuals [29]. In the Khezri study, the level of depression incidence was lower in comparison with subjects with higher education level [30]. In a cross-sectional study in the center of Iran, low education had more risk factors for depression [37] Mols et al. also confirmed that low education is associated with depression and anxiety [13]. But in the study of Mashhadi and associates, depression was more in individuals with higher education [38], and in the Musarezaie study, there was no relationship between education and anxiety and depression [31]. The relationship between education and lack of mental problems can have more social relations, more access to research resources, and more in society. More information and awareness and observance of self-care principles can be justified.

The point of reflection is that the identification of depression and anxiety is usually challenging because many of these symptoms can overlap with physical symptoms such as fatigue and pain, and diagnosing the problem may be difficult [4]. Therefore, health care providers should pay more attention to psychological issues in patients with somatic diseases, considering that identification of risk factors can magnificently help to identify patients at risk of depression and anxiety. As a result, supportive care sources can nourish these patients [33].

Using the standard questionnaire and in-person interviews with patients strengthened this study. However, the lack of collection or access to all patient information, asking questions of patients who may not be accurate, or less reporting are some limitations of the current study. Also, the absence of a comparison group (people without cancer) and the nature of this study being a cross-sectional study are the limitations of our research. It is suggested that other studies should be conducted with more samples, and as well as other cancers, as prospective studies.

Conclusions

Improving mental health is the primary goal of health care. The results of this study could be a general guide to policymakers and managers of health because mental problems lead to other illnesses and negative consequences, such as lack of motivation for treatment, prolonged treatment period, and burden of additional costs for the individuals and health systems. Therefore, we recommend the attention of the country's health system to empower employees to educate the necessary skills and targeted interventions to increase the awareness of patients and their families, reduce physical activity constraints, pay more attention to women, and empower patients to return to lively activities. All these actions can help mitigate the consequences of people having cancers under treatment to get back to healthy lives.

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Compliance with Ethical Standards

This study was conducted in compliance with the provisions of the Helsinki Declaration. The protocol was approved by the ethics committee of Shiraz University of Medical Sciences (TBZMED.REC.1394.704).

Conflict of Interest The authors declare that they have no conflict of interest.

Informed Consent All patients completed an informed consent form before the interview session.

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