

Evaluation of Depression and Anxiety in Chemotherapy Patients

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Abstract

Background: Cancer patients often suffer from psychiatric disorders as a result of their illness and its treatment. Past research suggests that major depression and anxiety in these patients is underdiagnosed and most often inadequately treated. There is a strong need to investigate if depression and anxiety are influenced by the treatment phase in order for identified patients to benefit from early recognition and intervention.

Purpose: The aim of this study is to examine the existence and severity of depression and anxiety in patients undergoing chemotherapy at the Richmond University Medical Center (RUMC). Patients currently undergoing an initial chemotherapy cycle will be compared to patients undergoing a subsequent chemotherapy cycle along with analysis based on age and gender. Data will then be collected using standardized depression and anxiety scales to assess if these conditions exist and if so, to which degree of severity.

Methods: This descriptive retrospective study was performed by reviewing medical records of 79 eligible patients who were receiving chemotherapy at RUMC between 2017 and 2019. The study forms included a brief survey consisting of the participants' sociodemographic characteristics, receiving chemotherapy for the first time, Patient Health Questionnaire-9 (PHQ-9), and Generalized Anxiety Disorder 7-item scale (GAD-7). Participants completed the forms before starting the chemotherapy cycle for which they were present. Statistical analysis was carried out using a two-tailed t-test to evaluate the p-values and a value of <0.05 was considered to be statistically significant.

Results: Forty-three (54.4%) participants were females and thirty-six (45.6%) were males. Thirty-four (43.0%) participants were under the age of 65, and forty-five (57.0%) participants were at the age of 65 or above. Forty-two (53.2%) participants were undergoing their first cycle of chemotherapy, out of which 39 (92.9%) patients had some form of depression and 33 (78.6%) patients had some form of anxiety. Thirty-seven (46.8%) patients were undergoing a subsequent cycle of chemotherapy, out of which 27 (72.9%) patients had some form of depression and 19 (51.4%) patients had some form of anxiety. There were significant relationships between anxiety, depression, and the age group of the patients with higher frequency in younger ages.

Conclusion: The results of this study show that patients receiving their first cycle of chemotherapy have significantly higher levels of depression and anxiety as compared to patients receiving subsequent cycles of

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chemotherapy (p-value 0.0136). Higher frequency of anxiety and depression were noted in females and patients <65 years of age.

Introduction

The prevalence of depression and anxiety among patients with cancer has been universally studied in numerous settings. However, there is insufficient attention given to the idea that the level of depression and anxiety may differ based on the stage of treatment the patient may be at. The purpose of this study was to determine if there is a significant difference in the severity of depression and anxiety amongst patients undergoing their first chemotherapy cycle *vs.* patients undergoing subsequent cycles of chemotherapy. The hypothesis was that patients receiving their first cycle of chemotherapy in the infusion unit would have a lower incidence of anxiety and depression and be more optimistic about being cured than patients with subsequent cycles of chemotherapy due to the occurrence of metastasis of the tumor.

Methods

The study was conducted in the ambulatory chemotherapy/infusion unit at Richmond University Medical Center (RUMC) in Staten Island, NY. Participants were enrolled through verbal consent from the patients who came to the Ambulatory Infusion Center for chemotherapy sessions from 2017-2019. The inclusion criteria were the following: (1) patients \geq 18 years of age, (2) patients with a confirmed diagnosis of a solid tumor or hematologic cancer, (3) patients who can understand the study and read the self-administered metrics. As the consent was waived, patients were given a description of the study and asked if they were interested in participating in a study that focuses on the mental stresses experienced by patients diagnosed with cancer or hematological conditions. Participants were provided with a brief 20-minute self-administered questionnaire. Questions in this survey included: (1) A demographic survey consisting of questions regarding sociodemographic (age, ethnicity, gender, socioeconomic), highest level of education and medical comorbidities, (2) Receiving chemotherapy for the first time and site of tumor, (3) Generalized Anxiety Disorder 7-item Scale (GAD-7), (4) Patient Health Questionnaire (PHQ-9). The study was executed following the principles of confidentiality, anonymity, and informed consent.

The total scores from PHQ-9 and GAD-7 were interpreted to determine the severity of each condition. The depression severity cut-offs for the scores of PHQ-9 are as follows: 0 none, 1-4 minimal, 5-9 mild, 10-14 moderate, 15-19 moderately severe, and 20-27 severe. The anxiety severity cut-offs for the scores of GAD-7 are as follows: 0 none, 1-4 minimal, 5-9 mild, 10-14 moderate, and 15-21 severe. The collected data can show the importance of screening chemotherapy patients since identified patients may potentially benefit from recognition and intervention.

The research data was processed with Microsoft Excel and analyzed using a t-test. The reported p-values were two-tailed and considered statistically significant when under 0.05.

Results

During the retrospective study, 86 participants gave verbal consent to proceed with the research. The following cancer diagnoses were noted amongst these patients: lung, colorectal, liver, breast, ovarian, uterus, cervical, brain, head/neck, pancreas, adrenal gland, bone, esophagus, stomach, urinary tract, appendix, hematological,

and lymph nodes. Out of 86 patients, 7 participants were eliminated from the study due to inadequate data (Figure 1).

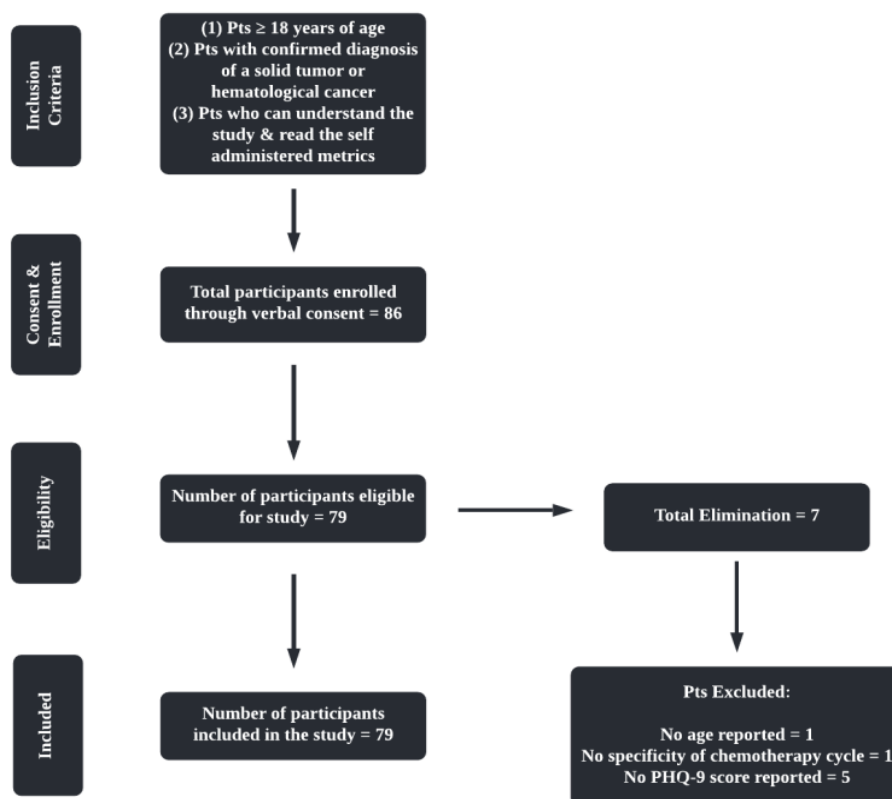


Figure 1: Flow diagram of the number of patients that were enrolled, excluded, and ultimately included in the study. The selection criteria are described in the results section.

Amongst the 79 participants that were deemed eligible for analysis, forty-two (53.2%) participants were undergoing their first cycle of chemotherapy and thirty-seven (46.8%) patients were undergoing a subsequent cycle. Forty-three (54.4%) participants were females and thirty-six (45.6%) were males. Thirty-four (43.0%) participants were under the age of 65, and forty-five (57.0%) participants were at the age of 65 or above. Patients' distribution amongst the classifications of depression and anxiety are shown in Table 1.

Table 1: Severity of Depression and Anxiety in 79 Patients.

	Severity	# of pts (out of 79)
Depression	None (0)	13 (16.5%)
	Minimal (1-4)	32 (40.5%)
	Mild (5-9)	15 (18.9%)
	Moderate (10-14)	11 (13.9%)
	Mod-severe (15-19)	8 (10.1%)
	Severe (>20)	0 (0%)
Anxiety	None (0)	27 (34.2%)
	Minimal (1-4)	24 (30.4%)
	Mild (5-9)	17 (21.5%)
	Moderate (10-14)	6 (7.6%)
	Severe (>15)	5 (6.3%)

From the 42 participants receiving their initial cycle of chemotherapy, 39 (92.9%) and 33 (78.6%) displayed symptoms of depression and anxiety, respectively. In the group of 37 participants undergoing subsequent chemotherapy cycles, 27 (73.0%) and 19 (51.4%) expressed symptoms of depression and anxiety, respectively (Table 2). The results show a significant difference in the scores for depression in initial cycle of chemotherapy (M= 6.762, SD = 5.53) and subsequent cycles of chemotherapy (M= 3.865, SD = 4.66); $t(77) = 2.52, p = 0.014$. The percentage of participants undergoing initial and subsequent cycles of chemotherapy with any level of depression was 92.8% and 72.9% respectively. However, there was no significant difference in anxiety levels between initial cycles of chemotherapy and subsequent cycles ($p = 0.18$).

Table 2: Severity of Depression and Anxiety in Initial/Subsequent Cycles of Chemotherapy.

Initial Cycle	Severity	# of pts
Depression (42 pts)	None (0)	3 (7.1%)
	Minimal (1-4)	16 (38.1%)
	Mild (5-9)	9 (21.4%)
	Moderate (10-14)	8 (19.0%)
	Mod-severe (15-19)	6 (14.3%)
	Severe (>20)	0 (0%)
Anxiety (42 pts)	None (0)	9 (21.4%)
	Minimal (1-4)	15 (35.7%)
	Mild (5-9)	11 (26.2%)
	Moderate (10-14)	4 (9.5%)
	Severe (>15)	3 (7.1%)

Subsequent Cycle	Severity	# of pts
Depression (37 pts)	None (0)	10 (27.0%)
	Minimal (1-4)	16 (43.2%)
	Mild (5-9)	6 (16.2%)
	Moderate (10-14)	3 (8.1%)
	Mod-severe (15-19)	2 (5.4%)
	Severe (>20)	0 (0%)
Anxiety (37 pts)	None (0)	18 (48.6%)
	Minimal (1-4)	9 (24.3%)
	Mild (5-9)	6 (16.2%)
	Moderate (10-14)	2 (5.4%)
	Severe (>15)	2 (5.4%)

The following tables list the number of patients receiving an initial or subsequent cycle of chemotherapy, and the associated levels of severity of depression and anxiety noted in each patient.

Amongst the 34 participants under the age of 65, 27 (79.4%) and 29 (85.3%) demonstrated some level of depression and anxiety, respectively. From the 45 participants 65 years of age and over, 35 (77.8%) and 23 (51.1%) demonstrated some certain level of depression and anxiety, respectively (Table 3). There was a significant difference in the scores for depression in patients under 65 (M = 6.971, SD = 5.828) and pts ≥ 65 (M = 4.22, SD = 4.61); $t(61) = 2.27, p = 0.0270$. The percentage of participants under <65 and ≥ 65 with any level of depression was 79.4% and 77.8%, respectively. There was a significant difference in the scores for anxiety in pts <65 (M= 6, SD= 5.42) and pts ≥ 65 (M= 2.689, SD= 4.68); $t(65) = 2.85, p = 0.0059$. The percentage of participants under <65 and ≥ 65 with any level of anxiety was 85.3% and 51.1%, respectively. Results represent higher frequency of depression and anxiety in participants <65 years of age.

Table 3: Severity of Depression and Anxiety in ages <65 and ≥ 65.

<65 years of age	Severity	# of pts
Depression (34 pts)	None (0)	7 (20.6%)
	Minimal (1-4)	7 (20.6%)
	Mild (5-9)	7 (20.6%)
	Moderate (10-14)	7 (20.6%)
	Mod-severe (15-19)	6 (17.6%)
	Severe (>20)	0 (0%)
Anxiety (34 pts)	None (0)	5 (14.7%)
	Minimal (1-4)	11(32.4%)
	Mild (5-9)	10 (29.4%)
	Moderate (10-14)	5 (14.7%)
	Severe (>15)	3 (8.8%)

≥ 65 years of age	Severity	# of pts
Depression (45 pts)	None (0)	10 (22.2%)
	Minimal (1-4)	20 (44.4%)
	Mild (5-9)	8 (17.8%)
	Moderate (10-14)	5 (11.1%)
	Mod-severe (15-19)	2 (4.4%)
	Severe (>20)	0 (0%)
Anxiety (45 pts)	None (0)	22 (48.9%)
	Minimal (1-4)	13 (28.9%)
	Mild (5-9)	7 (15.6%)
	Moderate (10-14)	1 (2.2%)
	Severe (>15)	2 (4.4%)

The following tables list the number of patients categorized into their respective age groups (<65 years or ≥ 65 years), along with the levels of severity of depression and anxiety noted in each patient.

Out of the 43 females in study, 20 (46.5%) and 32 (74.4%) had some level of depression and anxiety, respectively. From the 36 males in the study, 27 (75.0%) and 20 (55.6%) had certain levels of depression and anxiety, respectively. There was no significant difference in the scores for depression in females (M= 5.744, SD= 5.57) and males (M= 5, SD= 5.04); $t(77) = 0.62, p = 0.54$. There was no significant difference in the scores for anxiety in females (M= 4.581, SD = 5.75) and males (M= 3.556, SD = 4.61); $t(77) = 0.88, p = 0.38$.

Discussion

A cancer diagnosis is one of the most difficult and life-changing events that an individual may undergo. Such a traumatic and challenging event can trigger mental health issues such as psychological suffering, depression, and anxiety. A significant proportion of persons with cancer at various stages of severity develop mental health disorders (i.e., anxiety disorders).[1] Psychiatric disorders such as major depressive disorder, adjustment disorder and generalized anxiety disorder, are reported to occur in 30% to 40% of patients in the oncological setting.[2] The pathophysiology of depressive symptoms in cancer patients stems from cytokine-mediated inflammation that dysregulates the hypothalamic-pituitary–adrenal axis activity and can result in depression-like presentation.[3]

A study that focuses on the severity of depression and anxiety in individuals who have just begun chemotherapy *vs.* individuals who have previously undergone chemotherapy sessions for their condition, can provide a better understanding of the effect of treatment on the person’s mental health and their outlook toward their illness and

prognosis. Though a diagnosis of cancer along with its treatment and psychological burden seemingly go hand-in-hand, it is important to account for an individual's overall biopsychosocial dynamic in order to accurately treat and possibly halt progression of mental instability. Pre-existing comorbidities may cause a patient to succumb to depression and anxiety more intensely than someone without these conditions. The increase of these psychological disorders amongst patients with cancer may also depend on structural factors, which may include the cost of healthcare along with its access, as well as welfare support since cancer can have a detrimental monetary impact. Furthermore, there are age and gender differences influencing the PHQ-9 and GAD-7 scores in the general population.[4] These differences were taken into account when we compared mental health in cancer patients as treatment and prognosis may vary for each individual.

In this study, there was a significant difference in the depression scale between an initial cycle *vs.* a subsequent cycle of chemotherapy sessions. Contrary to our hypothesis, the results reflected that the participants in the initial cycle group had a higher incidence of depression than the subsequent cycle group. The subsequent cycle group participants had a higher percentage of individuals who did not have any depression symptoms (initial 7.1%, subsequent 27.0%). A reason for such a finding can stem from the effects of recent diagnoses of a malignancy becoming a major stressor in the person's life. An initial reaction to a cancer diagnosis includes shock and disbelief, in addition to symptoms such as dysphoria, irritability, insomnia, and loss of appetite. Furthermore, patients with cancer who undergo their first intensive chemotherapy feel fatigued and have a loss of appetite and often wonder if they will feel like this for the entire duration of treatment. In addition, an apparent fear would be how to adequately manage expectations of the treatment plan that would prevent overestimating or underestimating treatment efficacy including responsiveness to the chemotherapy itself, and its related side effects. While it will never feel routine to receive chemotherapy, in time, the process may become less scary and more familiar, which can be reflected in the lower depression scales in the patients receiving subsequent infusions in this study.

The study shows a significantly higher incidence of depression and anxiety in participants younger than 65. This event is supported by previous studies that have shown that younger patients with clinical diagnoses of malignancy were more likely to have depression.[5,6] Younger patients may face greater negative psychosocial consequences and emotional distress due to their cancer diagnoses, making them more vulnerable to experience mental health issues.[6] The psychosocial stressors may range from disruption of routine, burden on caregivers, to financial responsibilities, including medical expenses. Older patients may have fewer obligations at their stage of life and more available assistance from their partners who may not be involved in full-time employment. Younger patients with malignancy may experience the burden of multiple responsibilities in midlife, such as having dependent growing children and spouses who may be employed full-time, thus unavailable to provide constant familial support. In a young family, the diagnosis of cancer on a homemaker or breadwinner can have devastating social and economic consequences on the patient and the entire family. Parents or caregivers diagnosed with malignancy are often burdened by concern about how their illness will affect their young children,[7] and depression is common among parents with cancer.[8] The younger patients may experience loss of employment due to their cancer diagnosis leading to an inability to manage expenses and the potential of losing health insurance. Comparatively, the elderly would have mainly fulfilled their financial responsibilities, such as purchasing a house, retiring, and can rely on Medicare for medical expenses.

The study supports and emphasizes the importance early of psycho-oncological interventions in oncology patients because of their vulnerability to experience mental health issues such as affective disorders (depression and anxiety). Interventions such as cognitive behavioral therapy, psychoeducation, counseling, and group therapy should be available to patients at the facilities they are undergoing chemotherapy. The goal of these interventions would be to provide patients with techniques to better adapt to their individual situations and provide social resources to improve their overall well-being.[9] The introduction of such interventions should be implemented early in the cancer diagnosis; therefore, the individuals can benefit from the resources and do not succumb to the aftermath of their psychological conditions. During the evaluation for affective disorders in patients undergoing chemotherapy, prompt attention should be given to younger individuals. As supported by our study, they can be at a higher risk of developing symptoms of depression and anxiety due to their numerous psychosocial stressors.

Limitations

A weakness of the research was the absence of specificity of chemotherapy sessions in the patients undergoing a subsequent cycle. Knowing the exact number of sessions each participant has undergone would have provided information about the disease's stage of treatment and prognosis. It would have provided a more holistic understanding of the symptomology experienced by the patient. No detailed analysis of previous psychological disorders was undertaken. As a result, this could have falsely elevated the levels of anxiety and depression. For a clear association, participants with previous psychological disorder diagnoses should be excluded as they are not representative of the study population.

Conclusion

This study highlights psychological morbidity of cancer patients receiving chemotherapy and the influence of gender and age on depression and anxiety. We were able to conclude that patients that received their initial cycle of chemotherapy had more depression in comparison to those receiving subsequent cycles of treatment, therefore, giving insight into the importance of early introduction of psycho-oncological interventions. Moreover, our study supports the increased incidence of depression and anxiety in younger individuals highlighting the significance of prioritizing this population group in terms of support and resources. Symptoms of depression and anxiety are commonly experienced by cancer patients undergoing treatment. Understanding the etiology of these disorders and how to manage them symptomatically, can effectively improve their outlook towards the prognosis and lead to an increase in the quality of life.

References

1. Meyerowitz BE, Oh S. Book Handbook of behavioral science and cancer: Psychosocial response to cancer diagnosis and treatment. Washington DC: American Psychological Association; 2009.
2. [Mitchell AJ, Chan M, Bhatti H, Halton M, Grassi L, Johansen C, et al. Prevalence of depression, anxiety, and adjustment disorder in oncological, haematological, and palliative-care settings: a meta-analysis of 94 interview-based studies. Lancet Oncol. 2011;12\(2\):160-74.](#)

3. [Ahmad MH, Rizvi MA, Fatima M, Mondal AC. Pathophysiological implications of neuroinflammation mediated HPA axis dysregulation in the prognosis of cancer and depression. Mol Cell Endocrinol. 2021;520:111093.](#)
4. [Kocalevent RD, Hinz A, Brähler E. Standardization of the depression screener patient health questionnaire \(PHQ-9\) in the general population. Gen Hosp Psychiatry. 2013;35\(5\):551-5.](#)
5. [Lloyd-Williams M, Friedman T. Depression in palliative care patients - a prospective study. Eur J Cancer Care \(Engl\). 2001;10\(4\):270-4.](#)
6. [Mor V, Allen S, Malin M. The psychosocial impact of cancer on older versus younger patients and their families. Cancer. 1994;74\(7 Suppl\):2118-27.](#)
7. [Muriel AC, Moore CW, Baer L, Park ER, Kornblith AB, Pirl W, et al. Measuring psychosocial distress and parenting concerns among adults with cancer: the parenting concerns questionnaire. Cancer. 2012;118\(22\):5671-8.](#)
8. [Schmitt F, Piha J, Helenius H, Baldus C, Kienbacher C, Steck B, et al. Multinational study of cancer patients and their children: factors associated with family functioning. J Clin Oncol. 2008;26\(36\):5877-83.](#)
9. [Javaloyes N, Crespo A, Redal MC, Brugarolas A, Botella L, Escudero-Ortiz V, et al. Psycho-oncological intervention through counseling in patients with differentiated thyroid cancer in treatment with radioiodine \(COUNTRY, NCT05054634\): a non-randomized controlled study. Front Psychol. 2022;13:767093.](#)