



## Factors associated with depression in cancer patients during chemotherapy\*

Fatores associados à depressão em pacientes oncológicos durante quimioterapia

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**Objective:** to analyze the factors associated with depression in cancer patients during chemotherapy. **Methods:** a descriptive cross-sectional study of 208 patients undergoing chemotherapy. A general characterization questionnaire and the Beck Depression Inventory were used. **Results:** most were women, between 40 and 79 years old, married, Catholic, retired/housewives, with elementary school and had no depression (71.2%), while 17.3% had depression and 11.5% dysphoria. In the associations, it was found statistical significance in the associations of the Beck Depression Inventory with surgery ( $p=0.002$ ), time since surgery ( $p=0.014$ ), time since chemotherapy onset ( $p=0.030$ ), and side effects of chemotherapy ( $p=0.019$ ). **Conclusion:** there was a low incidence of depression, but the frequency was higher in patients who did not undergo concomitant surgery, who had started chemotherapy for up to six months and who reported more side effects during treatment.

**Descriptors:** Neoplasms; Depression; Drug Therapy; Oncology Nursing.

**Objetivo:** analisar os fatores associados à depressão, em pacientes oncológicos, durante quimioterapia. **Métodos:** estudo descritivo, transversal, realizado com 208 pacientes, durante quimioterapia. Utilizou-se de questionário para caracterização geral e Inventário de Depressão de Beck. **Resultados:** maioria era mulher, entre 40 e 79 anos, casadas, católicas, aposentadas/donas de casa, com ensino fundamental e encontrava-se sem depressão (71,2%); enquanto 17,3% apresentaram depressão e 11,5% disforia. Nas associações, encontrou-se significância estatística nas associações do Inventário de Depressão de Beck com realização de cirurgia ( $p=0,002$ ), tempo decorrido desde cirurgia ( $p=0,014$ ), tempo desde início da quimioterapia ( $p=0,030$ ) e efeitos colaterais da quimioterapia ( $p=0,019$ ). **Conclusão:** houve baixa incidência de depressão, contudo a frequência foi maior nos pacientes que não realizaram cirurgia concomitante, que tiveram quimioterapia iniciada até seis meses e que relataram mais efeitos colaterais durante o tratamento.

**Descritores:** Neoplasias; Depressão; Tratamento Farmacológico; Enfermagem Oncológica.

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## Introduction

Due to worldwide population growth, cancer has become a serious problem in the context of public health. The global estimate, made in 2018 by the World Health Organization's International Agency for Research on Cancer, estimated 18.1 million new occurrences of cancer, of which approximately 60.0% occurred in developing countries. By the year 2040, around 29.5 million new cases are expected, of which 80.0% will affect developing countries. In Brazil, there are still 600.000 new cancer incidences expected in 2019<sup>(1-2)</sup>.

Given this context, it is emphasized that patients may have difficulties in coping with diagnosis and antineoplastic therapy, as well as uncertainties, side effects and late complications resulting from treatment, causing psychological distress, such as anxiety and depression<sup>(3-4)</sup>.

The process of change in patients' lives, due to the pathology resulting from psycho-emotional alterations, leads them away from social and family life, as well as from the professional environment. Emotional alteration predisposes self-image distortion and, consequently, there is a reduction in personal satisfaction<sup>(5)</sup>.

Negative feelings related to the disease and personal predispositions to psychological changes have increased the risk of cancer patients developing anxiety and depression<sup>(6)</sup>. This has been pointed out as the most common psychological symptom in cancer patients, and the high prevalence may be caused by both the disease and the treatment performed<sup>(7)</sup>, especially chemotherapy<sup>(3)</sup>.

The burden of depression may influence the severity and number of adverse events of the treatment, increasing other symptoms resulting from chemotherapy, such as nausea and fatigue, compromising the performance of daily activities, social role, adherence and continuity of treatment, causing a decreased quality of life of patients<sup>(3,8-10)</sup>.

In this sense, it is essential that the nurse, when assisting the patient during chemotherapy, can identify the presence of depression symptoms and then develop strategies or interventions to assist the patient in coping, in order to minimize the presence of these symptoms and maximize overall well-being and quality of life.

Considering that the diagnosis and treatment of cancer are allied with negative emotions, the use of simple instruments to investigate the occurrence of symptoms of depression in these patients is justified. Given the above, the research aimed to analyze the factors associated with depression in cancer patients during chemotherapy.

## Methods

A descriptive, exploratory, cross-sectional study, developed in a teaching hospital that assists 27 municipalities in the southern triangle macroregion of the state of Minas Gerais, Brazil, being the only hospital that serves people in highly complex clinical conditions, exclusively by the health public system of Brazil.

The sampling used was purposeful, and then the participants considered typical of the researched population were selected<sup>(11)</sup>, that is, on the days when the researchers came to the chemotherapy center for data collection, they approached the patients, inviting them to participate in the study, by explaining the purpose of the research and applying the inclusion and exclusion criteria. The approved participants who agreed to participate were included in the sample, which consisted of 208 participants.

The inclusion criteria were the following: 18 years old or older, both sexes, a diagnostic of cancer and undergoing chemotherapy at the chemotherapy center of the teaching hospital. Participants who complied with the criteria were considered fit for research. Patients who had some difficulty in understanding simple questions that could compromise the answers of the questionnaires were excluded.

Data were collected between May 2016 and January 2018, on the day patients came for treatment, in a private or collective ward, with beds or armchairs separated by screens. Three undergraduate nursing students and co-authors of this study were trained by the project's advisor professor for standardization of interviews, which lasted about 20 minutes and were performed during the chemotherapy session.

Sociodemographic and clinical information was obtained from the available medical records and from the patient himself, through a semi-structured questionnaire, elaborated by the main researcher and previously tested for adequacy, which addressed the variables: gender, age, marital status, profession, city, educational level, religion, cancer type, chemotherapy regimen, time since onset and presence of side effects of chemotherapy, other treatments such as radiotherapy and surgery, type and time since surgery, if performed.

The Beck Depression Inventory (BDI) was employed to assess the presence of depression. The versions of this inventory are worldwide used in both diagnosed and undiagnosed samples with depression<sup>(12-13)</sup>, justifying its use in this research.

The BDI is considered safe and pertinent to assess the presence of depressive symptoms in the non-clinical population. It consists of 21 items related to feelings of melancholy, pessimism, defeat, dissatisfaction, remorse and punishment, discredit, self-blame, suicidal thoughts, crying spells, irritability, antisociality, doubt, body image misrepresentation, work blockage, irregular sleep, fatigue, loss of appetite and weight, somatic seizure and reduced libido. Each category is graded with statements from zero to three, where zero is considered absence and three the maximum presence of the symptom. The minimum score is zero and the maximum is 63. For analysis, the cutoff point was up to 15 for no depression; 16 to 20 to detect dysphoria; and from 21 to 63 for depression, according to guidelines for undiagnosed samples<sup>(12-13)</sup>.

The data obtained were organized by the Mic-

rosoft Excel software, version 2016, by double-typing. Subsequently, these data were transferred to the Statistical Package for Social Sciences 23.0 software for statistical analysis. For descriptive analysis of sample characterization, frequencies and percentages were calculated. Fisher's Exact Test was performed to investigate possible associations between variables, with a statistical significance limit of 0.05.

The research was submitted and approved by the Research Ethics Committee of the Federal University of Triângulo Mineiro, according to opinion nº 1,501,942/2016, and also according to the recommendations of Resolution nº 466/2012. The selected participants were informed about the research objectives and signed the informed consent form. For confidentiality, the questionnaires were identified by sequential numbers.

## Results

Two hundred and eight patients participated in the study. With regard to sociodemographic aspects the following predominated: Females, 113 (54.3%); age group between 40 and 79 years old, 178 (85.6%); married, 99 (47.6%); Catholics, 128 (61.5), retired, 52 (25.0%); and housewives 49 (23.6%); residents in the city where the chemotherapy center is located, 114 (54.8%); and with elementary education, 126 (60.6%) (Table 1).

Regarding clinical data, the most common types of cancer were: colon and rectum, in 38 patients (18.3%); breast in 21 (10.1%); cervix and lung in 13 (6.3%) each; stomach in 12 (5.8%); Hodgkin's lymphoma in 10 (4.8%); leukemia in 9 (4.3%); non-Hodgkin's lymphoma in 7 (3.4%); prostate in 6 (2.9%); esophagus in 3 (1.4%); and other types, with one to two patients for each cancer.

Regarding other treatments, more than half of the patients underwent surgery and less than one third, radiotherapy (Table 2).

**Table 1** – Characterization of participants regarding sociodemographic data (n=208)

Variables	n (%)
Gender	
Female	113 (54.3)
Male	95 (45.7)
Age group	
18 - 39	26 (12.5)
40 - 79	178 (85.6)
≥ 80	4 (1.9)
Marital status	
Married	99 (47.6)
Single	46 (22.1)
Widowed	32 (15.4)
Not informed	31 (14.9)
Profession/Occupation	
Retired	52 (25.0)
Housewife	49 (23.6)
Cleaning lady, day laborer	20 (9.6)
Trader, seller	11 (5.3)
Others	76 (36.5)
City/Origin	
Uberaba	114 (54.8)
Cities of the southern triangle macroregion of Minas Gerais	75 (36.1)
Other cities	19 (9.1)
Education level	
Elementary school	126 (60.6)
High school	67 (32.2)
Higher education	15 (7.2)
Religion	
Catholicism	128 (61.5)
Protestantism	33 (15.9)
Spiritist doctrine	27 (13.0)
No religion defined /Not informed	20 (9.6)

**Table 2** – Characterization of participants regarding clinical data (n=208)

Variables	(%)
Type of Surgery	
Did not undergo surgery	102 (49.0)
Partial withdrawal of affected organ	33 (15.9)
Tumor, nodule and/or adjacency removal	27 (13.0)
Biopsy	21 (10.1)
Total removal of the affected organ	14 (6.7)
Transplant	6 (2.9)
Unable to inform	5 (2.4)
Time elapsed since surgery (months)	
Did not undergo surgery	102 (49.0)
≤ 3	33 (15.9)
> 3	73 (35.1)
Radiotherapy	
Yes	63 (30.3)
No	145 (69.7)
Time elapsed since the start of chemotherapy (months)	
≤ 1	76 (36.5)
2 - 6	81 (39.0)
> 6	51 (24.5)

Regarding chemotherapy, 59 different regimens were found in 135 subjects. There was a loss of record of the chemotherapy regimen in 73 subjects, due to non-accessibility to medical prescription in the medical records at the time of the interview. Of these regimens, the most commonly used were: Fluorouracil associated with Leucovorine and Oxaliplatin, used in 26 (19.3%) patients; Cisplatin in 9 (6.7%) patients; Fluorouracil in 8 (5.9%) patients; Pamidronate in 7 (5.2%) patients; Carboplatin-associated Paclitaxel in 7 (5.2%) subjects.

Regarding the side effects of chemotherapy, 138 (66.4%) patients reported symptoms and 70 (33.7%) were asymptomatic. Among the reports, 78 (37.5%) patients had gastrointestinal symptoms

(nausea, vomiting or diarrhea) associated with physical symptoms (fatigue, sweating, weakness, drowsiness, insomnia or prostration), 30 (14.4%) individuals reported gastrointestinal symptoms, 28 (13.5%) patients identified physical symptoms, 1 (0.5%) reported emotional side effects (anxiety, distress, irritability or worry) and 1 (0.5%) had gastrointestinal symptoms associated with physical and emotional symptoms.

According to the BDI, for samples not clinically diagnosed, the mean score indicated that the majority, 148 (71.2%) patients, were without depression at the

time of the interview. However, 36 (17.3%) individuals presented depression and 24 (11.5%) dysphoria.

In the association of sociodemographic variables with the BDI scores, no significant associations were found. However, it was noted that, between genders, twice as many women presented depression ( $p=0.200$ ).

With the clinical variables, there were statistically significant associations ( $p<0.05$ ) of the BDI with the variables: surgery, time since surgery, time since chemotherapy onset (in months) and side effects of chemotherapy (Table 3).

**Table 3** – Association between BDI scores and clinical variables (n=208)

Clinical variables	Scores without depression	Dysphoria scores	Depression scores	Total	p*
	n (148)	n (24)	n (36)	n (208)	
Surgery					
Yes	84	13	9	106	0.002
No	64	11	27	102	
Time elapsed since surgery (months)					
Not realized	64	11	27	102	0.014
≤ 3	28	3	2	33	
> 3	56	10	7	73	
Time elapsed since the start of chemotherapy (months)					
≤ 1	62	3	11	76	0.030
1 - 6	51	12	18	81	
> 6	35	9	7	51	
Chemotherapy side effects					
Asymptomatic	57	6	7	70	0.019
Gastrointestinal and physical	52	10	16	78	
Gastrointestinal	19	2	9	30	
Physical	20	6	2	28	
Emotional	0	0	1	1	
Gastrointestinal, physical and emotional	0	0	1	1	

\*Fisher's exact test: significant  $p<0.05$

## Discussion

The study had limitations regarding the type of research, data collection and sample. This cross-sectional study did not make possible to assess changes in symptoms of depression during treatment. Regarding data collection, there was the entrance of companions and/or care professionals in the ward, which could influence the concentration of participants at the time of response, interrupting the inter-

view and resuming only after leaving them. As for the sample, due to the diversity of cancer types and chemotherapy protocols found.

It is believed that these results may contribute to nurses working in Oncology in the early identification of the presence of depression symptoms in these patients, then plan holistic care, propose interventions to improve them, and if deemed necessary, refer to other health professionals, as a doctor or psycholo-

gist, so that together take care of the cancer patient.

This research had a sample characterization similar to another investigation conducted with 15 participants who attended a cancer support institution, predominantly women, aged between 40 and 60 years, catholic and with low school level. It differed in relation to type of cancer found, which was, in descending order breast, ovarian and lung cancer<sup>(5)</sup>.

Another Brazilian study developed with 96 elderly with cancer presented 50.0% of women in the sample. Most of the interviewees were married, with a low level of education (up to four years of schooling), low income (less than one minimum wage), with advanced tumor and undergoing chemotherapy. As previous treatment, 51.0% had surgery and 35.4% had radiotherapy<sup>(9)</sup>, corroborating this study.

It is emphasized a significant variability regarding the presence of symptoms of depression, due to the different approaches (patients clinically diagnosed<sup>(6,14)</sup> or undiagnosed<sup>(4,8-9,15)</sup>) and instruments used, such as BDI<sup>(3,5,8,16-17)</sup>, Center for Epidemiologic Studies Depression Scale<sup>(7)</sup>, Geriatric Depression Scale<sup>(9)</sup>, Hospital Anxiety and Depression Scale<sup>(4,14-19)</sup>, Self-rating Depression Scale<sup>(20)</sup>.

A study of elderly with cancer found 17.7% presenting symptoms of depression<sup>(9)</sup>, supporting this study, but diverging from the study that evaluated 63 patients with breast cancer after chemotherapy, in which 46.0% of patients with depression were found<sup>(20)</sup>.

A retrospective study conducted in Taiwan with 36.586 women with breast cancer who received adjuvant treatment over six years, analyzed the subsequent risk of depressive disorders, finding an incidence rate of 5.3% of clinically diagnosed depressive disorders, the risk of which disorders were higher when patients were between 40 and 59 years old and received adjuvant therapies, including chemotherapy and radiotherapy<sup>(6)</sup>.

Still in relation to depression, patients under treatment who had anxiety also presented higher intensity of depression. Both disorders may come from

the medical diagnosis, the therapeutic method used and the realization or not of a surgical procedure<sup>(16)</sup>. In the present study, it was not possible to correlate the two disorders.

In the comparison between genders, studies<sup>(4,9,14,18)</sup> found that women had higher depression scores compared to men, meeting this study, but without statistical significance.

Given this, it can be observed that cancer treatment has caused manifestation of symptoms of depression and anxiety in patients. Factors such as age, gender, cancer, other therapies and treatment time may influence the intensity of symptoms.

A research conducted with Chinese people with cancer and their caregivers, found that nearly a third of participants reported anxiety and depression. Among adults with cancer interviewed, several factors influenced the presence of anxiety and depression, such as age, gender, marital status, being informed about the disease, different types of cancer and treatment<sup>(15)</sup>.

In a study of 3.370 cancer survivors in Germany, factors such as being unemployed, receiving little social support, being untreated, shorter time since diagnosis, impaired physical health, and belonging to a low-income family had statistically significant associations for higher scores of depression. It was found that women or men with genital organ cancer or hematologic cancer had statistically significant associations with higher depression scores compared with breast cancer survivors<sup>(19)</sup>.

A Taiwanese study found that colorectal cancer patients undergoing treatment had higher scores for depression and fatigue than those who completed treatment<sup>(7)</sup>.

A Brazilian study analyzed factors related to symptoms indicative of depression in women with breast cancer and found that age, education, diagnosis of other diseases, type of surgery, lymphedema, self-esteem and body image were factors associated with depressive symptomatology, even after cure of the malignancy<sup>(8)</sup>.

Over time and chemotherapy treatment, the previous severity of symptoms of depression, fatigue, and sleep disorders predicted the subsequent severity of the same symptom in two groups of women (pre- and postmenopausal). By relating symptoms, fatigue initially predicted depression during treatment in younger women in the premenopausal group<sup>(17)</sup>.

A study of 147 women with breast cancer in Croatia found that fatigue was positively related, while age and daily treatment at the hospital were negatively associated with depression measure by the BDI<sup>(3)</sup>.

It is observed that the chemotherapy treatment caused changes in patients, specially changes in lifestyle. Such changes interfere in the psychological status, promoting feelings of sadness, fear and anguish, and consequently, reflect the depressive symptoms present in the daily life of these patients.

## Conclusion

There was a low incidence of depression, but the frequency was higher in patients who did not undergo concomitant surgery, who had started chemotherapy for up to six months and who reported more side effects during treatment.

## Collaborations

Arantes TC contributed to the project design, interpretation and data organization. Martins VE and Mendes AS collaborated with the project design. Silva AMB contributed to the relevant critical review of intellectual content. Nicolussi AC collaborated on project design, data analysis and interpretation, critical review and final approval of the version to be published.

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