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Trend of depression and its association with sociodemographic and clinical factors among multiple myeloma hospitalizations – a Portuguese nationwide study from 2000 to 2015

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Trend of depression and its association with sociodemographic and clinical factors among multiple myeloma hospitalizations – a Portuguese nationwide study from 2000 to 2015

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Trend of depression and its association with sociodemographic and clinical factors among multiple myeloma hospitalizations – a Portuguese nationwide study from 2000 to 2015

Running Head: Depression in multiple myeloma hospitalizations

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Ethical Approval Statement

Authority for Health Services of the Portuguese Ministry of Health (ACSS) provided an anonymized administrative database regarding mainland Portuguese hospitalizations to CINTESIS/FMUP and approved its use for research purposes.

Patient Consent Statement

Being an anonymized secondary dataset, an informed consent was not obtained.

Data Availability Statement

The data that support the findings of this study are available from ACSS. Restrictions apply to the availability of these data, which were used under license for this study. Data was made available for the authors (from CINTESIS/FMUP) with the permission of ACSS.

Abstract

Objective: Patients hospitalized with multiple myeloma (MM) are particularly vulnerable to depression. The present study aims to determine the frequency of depression among MM hospitalized patients, in order to assess the possible differences between those with and without depression in relation to sociodemographic and clinical variables and to measure the impact of depression on hospitalization outcomes.

Methods: An observational retrospective study was performed using an administrative data set of all hospitalizations with a primary diagnosis of MM between 2000 and 2015 in Portuguese mainland public hospitals. Codes related to depressive disorders were grouped to generate the dichotomous variable of depression (yes/no). A multivariate analysis was conducted and adjusted odd ratios (aOR) calculated between different variables and depression.

Results: Of a total of 14.575 MM hospitalizations studied, a concurrent code of depression was registered in 666 patients (4.6%). A greater odds of depression was observed in female patients (aOR=2.26; 95%CI=1.91-2.66), transplanted patients (aOR=1.78; 95%CI=1.44-2.20), patients with plasma cell leukemia (aOR=1.79; 95%CI=1.22-2.64) and patients with a higher Charlson Comorbidity Index (CCI) (aOR=1.10; 95%CI=1.05-1.15). Length of stay was longer in patients with a registered diagnosis of depression (aOR=1.01; 95%CI=1.01-1.02) while the odds of in-hospital mortality were lower in these patients (aOR=0.53; 95%CI=0.41-0.68).

Conclusions: These results may help identify MM inpatients at higher risk of presenting depression (female gender, younger age, high CCI, plasma cell leukemia, transplant procedure). This will enable timely psychological assessment and treatment in order to prevent worse outcomes and higher healthcare costs associated with depression.

KEYWORDS: administrative data, cancer, depression, hospitalization, inpatient, multiple myeloma, oncology

1. Background

Multiple myeloma (MM) is a type of hematologic cancer characterized by bone marrow infiltration of plasma cells and monoclonal protein in the serum and/or urine(1), with estimated 32,110 new cases in 2019 in USA(2). According to the last available data, in Portugal there was 1,034 new cases and 708 deaths in 2018(3).

Patients with cancer experience high psychological and physical burden, and are more prone to suffer from depression than the general population(4). Hematologic cancer is highly associated with depression when compared to other types of malignancies(5). Myeloma is no exception, a meta-analysis of 11 different studies shows that the pooled prevalence of depression among patients with MM was around 22.3%(6). Another study, with more than 36,000 MM patients, reported depression in 23.4% of the sample(7). Notwithstanding, this psychiatric disorder is frequently overlooked and underdiagnosed in the clinical practice(8).

Both the use of Hematopoietic Stem Cell Transplantation (HSCT) and novel drugs such as proteasome inhibitors and immunomodulatory agents (joining the corticosteroids, alkylating agents and anthracyclines arsenal) together with improved supportive care, have substantially increased response rates and survival of MM patients in the past several years(1, 9, 10). On the other hand, treatments such as long-term corticosteroids and HSCT have proven association with psychological distress and depression(11, 12). Considering MM patients are living longer with their disease and are exposed to cumulative toxicities of these lines of treatment since MM diagnosis throughout disease relapses, we are witnessing an increase number of MM patients at risk of develop depression. Moreover, the stress of a cancer diagnosis can be a trigger for depression(8) and one may not forget that depression could have been present before cancer diagnosis.

In literature, studies that measure the impact of depression on MM hospitalizations outcomes are scarce even though depression has proved association with lower quality of life, decreased compliance to treatments, higher mortality, longer hospitalizations and higher costs for health care systems(13-17). To conclude, understanding the patient experience of living with MM and the treatment risks associated is paramount to increase physician´s awareness to the importance of depression and to provide effective patient-centered care.

The present study aims to determine the frequency and registry of a depression diagnosis among MM hospitalized patients, in order to describe and assess the possible differences of those with and without depression regarding sociodemographic and clinical variables and to measure the impact that depression may have on hospitalization outcomes of these patients.

2. Methods

A retrospective observational study was conducted with anonymized administrative data provided by the Authority for Health Services of the Portuguese Ministry of Health (ACSS) regarding MM hospitalizations. Hospitalizations from public mainland hospitals of patients ≥18 years old, discharged between 2000 and 2015, with MM as primary diagnosis were selected and analyzed. International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes were used to select the diagnosis of interest, comorbidities and procedures. The codes 203.0X (multiple myeloma) and 203.1X (plasma cell leukemia) were used to select MM cases. The primary outcome was the diagnosis of depression identified by the ICD-9-CM codes 296.2X and 296.3X (Major depressive disorder, single episode and recurrent episode, respectively), 300.4 (Dysthymic disorder), 301.12 (Chronic depressive personality disorder), 309.0 and 309.1 (Adjustment reaction associated with depression), and 311 (Depression disorder non elsewhere specified). These codes were grouped to generate the dichotomous variable of depression ("yes", if at least one of the diagnostic codes was registered; "no", if none of the previous codes have been registered). Any bipolar or maniac disorder codes were excluded from this study.

Sociodemographic variables examined included age (studied as a continuous variable and as subgroups: ≤50, 51-60, 61-70, 71-80, >80 years old), gender and patient residence. Residence was coded using NUTS II (Nomenclature of Territorial Units for Statistics) which divides Portugal into 7 regions, namely North, Center, Lisbon metropolitan area, Alentejo, Algarve and Madeira and Açores Islands. In this study, patients outside the mainland regions were grouped, and residence was entered as a categorical variable. Regarding patient comorbidity profile, a group of specific secondary diagnosis codes of comorbidities were selected from the database to compute the clinical variable Charlson Comorbidity Index (CCI) for each patient (analyzed as a ordinal variable)(18). Other clinical variables included the presence of plasma cell leukemia (dichotomous variable – yes/no) and Hemopoietic Stem Cell transplantation (HSCT) procedure during hospitalization (dichotomous variable – yes/no). The latter variable was created by using ICD-9-CM procedure code 41.0X (Bone marrow or hematopoietic stem cell transplant) to identify transplant cases. The hospitalization outcomes Length of Stay (LoS) (continuous variable) and in-hospital mortality (dichotomous variable – yes/no) were defined as secondary outcomes.

2.1 Statistical methods

To assess patients´ characteristics, descriptive statistics were performed. Temporal trends in the number of hospitalizations with depression and transplant procedure, between 2000 and 2015, were determined by regression models. Moreover, binary logistic regression was used to calculate crude odds ratio (OR) and to assess possible associations between all variables and the outcome depression. Additionally, a multivariate model was performed and adjusted odd ratios (aOR) were calculated. A p value < 0.01 was used to determine the statistical significance of the test results. All analyses were performed with the SPSS IBM v24®.

3. Results

A total of 14.575 hospitalizations with a primary diagnosis of MM were retrieved from the national database between 2000 and 2015. Concurrent depression was registered in 666 of these hospitalizations (4.6%).

Throughout the analyzed years there was roughly the same number of MM hospitalizations with a mild increase in most recent years (table I). On the other hand, both the hospitalizations with associated depression and transplant increased in number between 2000 and 2015. An increase from 1.9% to 8.6% of discharges with concurrent depression (R=0.89; B=5.73 95% CI [4.02, 7.43]) and a steady increase from 4.5% to 20.8% of the discharges related to transplant (R=0.97; B=14.18 95% CI [12.21, 16.16]) were observed.

3.1 Sociodemographic variables

Regarding patients' characteristics (table II), the mean and median (P25 - P75) age was approximately 66 and 67 (58-75) years old, respectively. At the multivariate logistic regression analysis, after adjusting for all variables (gender, CCI, plasma cell leukemia, transplant, LoS and in-hospital mortality), adjusted odd ratios showed no statistical significant association between age (as continuous variable) and depression (aOR=0.994; 95% CI=0.987-1.001) (table lll). Nevertheless, when age was entered by subgroups (≤50, 51-60, 61-70, 71-80, >80 years old) an association was found between two subgroups, with those >80 presenting less depression when compared to the ≤50 year old group (aOR=0.58; 95% CI=0.38-0.88; p=0.010).

A higher proportion of males were observed in this cohort (52.0%), with female gender having greater odds of being associated with depression (aOR=2.255; 95% CI=1.912-2.660). Regarding patient's residence, a higher representation was found for the North region with 4,530 patients (31.1%), followed by Lisbon with 4,412 patients (30.3%) and Center with 3,915 patients (26.9%). No significative association between patient residence and the frequency of registered depression was observed (table lll).

3.2 Clinical Variables

Transplant related hospitalization accounted for 1,877 cases (12.9%) being one of the clinical factors that contributed to the presence of depression diagnosis (aOR=1.78; 95% CI=1.44-2.20). Also, when a higher number of comorbidities was present (measured through CCI), a rise in depression diagnosis was also found (aOR=1.10; 95% CI=1.05-1.15). Plasma cell leukemia diagnosis was present in 380 patients (2.6%). This aggressive stage of the MM spectrum of disease was related to a higher proportion of depression comorbid diagnosis (aOR=1.79; 95% CI=1.22-2.64).

3.3 Hospitalization outcomes

Length of stay and mortality varies significantly whether transplantation was the reason of hospitalization or not. A median LoS (P25 – P75) of 20 days (17-23) was seen in transplant related hospitalizations, whereas a lower LoS was observed in non-transplant cases, with 10 (4-20) days. In-hospital mortality reached a total of 2,714 cases (18.7%) with only 18 cases related to the sub-group of hospitalizations where the HSCT procedure was performed.

In general, a higher LoS was observed among patients with depression (aOR=1.011; 95% CI=1.007-1.015), while a lower in-hospital mortality was found in patients with a registry of depression when compared to those without depression (aOR=0.526; 95% CI=0.406-0.680).

4. Discussion

In the present study, MM patients with depression were majorly women, had higher comorbidity profile and were more likely to present with plasma cell leukemia. A steady rise in the number of transplants was seen during the study period and the prevalence of depression was significantly higher in these transplanted patients. Moreover, those with any depression code were more likely to stay longer periods at the hospital, but on other hand died less during hospitalization.

Regarding the proportion of registered depression in this study (4.6%), it was quite lower than expected when compared to MM population-based prevalence reported in literature, which is around 23%(6, 7). Our study may be underestimating the real number of patients with depression due to the underdiagnose and lack of registry of depression in the context of an acute hospitalization. These constraints have also been identified in previous studies using similar methodologies and settings(19-21). Additionally, diagnostic coding using ICD can be stringent and often fail to identify patients who present subclinical symptoms(4).

Moreover, an increase of registered depression was found throughout the study period. The increased quality of hospital-coded data throughout the years may explain this results(22). Notwithstanding, there was a real increased in the prevalence of depression in the last decade(23), including in Portugal where the prevalence of depression in primary health care increased from 5.34% in 2011 to 9.32% in 2016(24). These factors together, may explain the rise of depression registry among MM hospitalizations.

4.1 Sociodemographic variables

Available evidence states that the median age at diagnosis of MM is comprised between 67 and 70 years old(25). Even though we could not discriminate the newly diagnosed MM patients, during the study period a median age of 67 years old was found among all hospitalizations which is in accordance with the existent literature. Association of age with depression remains controversial in cancer patients. Nonetheless, a relation is described in literature with older patients showing lower levels of depression when compared to the younger population, in samples of cancer patients(26), including one study where this relation was more pronounced in the sub-group of hematological malignancies(5). In the present study, when age was approached by subgroups, an association in registered depression was also found among patients with >80 years old. This subgroup had lower prevalence of depression when compared with younger patients (≤50 years old) (aOR=0.580; 95% CI=0.382-0.879; p=0.010). Older patients might be better prepared emotionally to face a cancer diagnosis with an already debilitated physical function, whereas younger patients may have their daily life more disrupted with cancer diagnosis(5).

Depression prevalence was two times more frequent among females than male patients (aOR=2.255; 95% =1.912-2.660). Similar findings were reported by Linden and cols among a sample of more than 10.000 cancer patients(5). Also, these results are in concordance with the higher prevalence of depression in women in the general population(27). This might be explained by the fact that women tend to report more depressive symptoms and seek medical help more often when compared to men(28), and this pattern should be no different in MM patients.

Regarding patient residence, we could not find association with any given region and the prevalence of depression. In Portugal, depending on the region, depression prevalence in primary care range from 6,79% to 11,14%(24). However, a Portuguese large study that measured the prevalence of depression in elderly patients (>65 years) did not found any significant association between NUTS ll regions and the prevalence of depression(29).

4.2 Clinical Variables

Multiple myeloma is a common indication for HSCT. A steady increase in the number of this type of transplant was also in the present study since 2000 (table 1). This result is congruent with the findings of D´Souza and cols in the United states(30), probably because of an increase in older recipients. A HSCT hospitalization is long and usually ends around day 14-20(31), explaining the increased LoS compared to hospitalizations without transplantation. Moreover, psychological distress has been reported at all stages of HSCT transplantation process(32). This is in line with the results of our study, with registered depression demonstrating a clear association with HSCT hospitalization (aOR=1.78; 95% CI=1.44-2.20). The HSCT hospitalization starts with a conditioning regimen with high-dose chemotherapy. The combination of increased physical symptoms, including pain, fatigue, anorexia, mucositis, diarrhea, fever and sleep disturbances, with the continued isolation recommended (at least 100 days after the procedure) can be emotionally challenging and lead to a higher prevalence of depression(31, 32). As a result, the associated risks inherent to transplantation and the increasing numbers of transplanted patients make this specific population a major concern regarding depression comorbidity. Preventive measures, routine screening and timely and adequate treatment should be part of standard clinical practice with this vulnerable group.

Regarding patients comorbidity profiles, and in accordance with the results of the present study, in a sample of patients with hematologic malignancies Shreders and cols found that those with depression had a significantly higher CCI compared to non-depressed MM patients(33). The same association was obtained by Niazi and in a large sample of MM patients(7). Thus, multi-morbid patients (presenting two or more chronic physical conditions) with comorbid depressive symptoms tend to attribute these symptoms to important life events, many of which related to their physical health that led to loss of functionality and resulted in changes to their sense of identity(34).

Plasma cell leukemia has a more aggressive clinical course due to its extramedullary nature and presents itself with a higher tumor burden and a dismal prognosis(35). To our knowledge, this is the first study that demonstrates the increase rate of depression among patients with plasma cell leukemia vs MM patients (aOR=1.79; 95% CI=1.22-2.64).

4.3 Hospitalization outcomes

A longer LoS was observed in depressive patients subgroup (aOR=1.01; 95% CI=1.01-1.02), which is congruent with the findings of a previous study conducted with a sample of depressive inpatients with sickle cell disease(19). Similarly, another study found that depressed hospitalized patients had stays that were 30% longer than non-depressed patients(36). Thus, depression has the potential to increase healthcare utilization and consequently, increase costs for the healthcare system(7, 17).

One large meta-analysis defined a clear association between depression and increased mortality in cancer patients(15). Nonetheless, and in accordance with our data, several studies found a lower in-hospital mortality, also based upon inpatient administrative data, among depressed hospitalized patients vs non-depressed patients(21, 37), including one study with breast cancer patients. The reasons underlying these results are uncertain, but in the present study this might be explained by the fact that those who die during hospitalization are likely to be more ill and/or admitted due to an acute myeloma-related event. In this context, a mood disorder may be underdiagnosed explaining the numbers found. Because of this, depression can be overlooked and consequently less registered and coded among hospital discharges in which the patient had died.

5. Limitations

Our study presents some limitations. First, being a retrospective study, the major limitation is the use of secondary data, i.e. data not primarily intended for our investigation. An administrative data set of hospital discharges was used, being hospital reimbursements its main objective. Both diagnosis and procedures coded are dependent on the quality of medical reports and physicians coding. Thus, we did not have access to patients detailed information and some data could be less accurate or incomplete. Second, we were not able to verify which diagnostic tool was used to assess depression nor how severe the mood disorder was. Third, despite using the well-known CCI, this measure only includes a limited number of comorbidities, which may have limited the possible associations. Finally, depression could appear before or after the diagnosis of MM. It can also develop some days or even months after the treatment of this malignancy. Due to the limitations of a cross-sectional study we could not define the temporal aspect of the diagnosis of this psychiatric disorder nor inform about trajectories through disease periods.

6. Strengths

To our knowledge, beside its large sample and long study period, this is the first nationwide study of MM hospitalizations. Additionally, as far as we are aware, this is the first study to demonstrate increase rate of depression among patients with plasma cell leukemia vs MM patients in literature. Moreover, this study assessed a very broad population served by the National health System which provides universal coverage to the Portuguese population in contrast to other studies that selected patients based on health insurance coverage. Finally, in Portugal codification is made by trained and qualified medical doctors, being the use of administrative data significantly robust and valid for investigational purposes(38). Indeed, similar methodologies have already lead to important results in different health contexts which can reinforce the pertinence of the present study(39, 40).

7. Clinical Implications

Despite some limitations, we were able to find factors that were significantly more common among depressive MM patients such as female gender, younger age, higher comorbidity profile, plasma cell leukemia, presence of a transplant procedure and longer hospital stay. These results may help identify MM inpatients at higher risk of presenting with depression and thus, enable timely psychological assessment and treatment in order to prevent worse outcomes and higher healthcare costs associated with this comorbidity.

8. Conclusions

Further investigation is necessary to clarify the association between these specific sociodemographic and clinical variables and their relationship with depression. It would be of interest to compare the present results with those of other countries, as some associations remain controversial. Despite this, the present study reinforces the importance of increasing detail of clinical coding in administrative data bases as this will allow researchers to have available cost-effective and representative data of a specific population of interest.

In conclusion, depression remains largely disregarded in cancer setting despite its influence on worse outcomes and increased costs. Efforts must be made to mitigate this and increase physician's awareness to depression among MM inpatients and the related risk factors.

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Conflict of Interest Statement

The authors declare no conflict of interest.

1. Röllig C, Knop S, Bornhäuser M. Multiple myeloma. The Lancet. 2015;385(9983):2197-208.
2. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2019. CA Cancer J Clin. 2019;69(1):7-34.
3. Ferlay J EM, Lam F, Colombet M, Mery L, Piñeros M, Znaor A, Soerjomataram I, Bray F. Global Cancer Observatory: Cancer Today, Lyon, France: International Agency for Research on Cancer; 2018 [Accessed 19/03/2020]. Available from: https://gco.iarc.fr/today.
4. Krebber AM, Buffart LM, Kleijn G, Riepma IC, de Bree R, Leemans CR, et al. Prevalence of depression in cancer patients: a meta-analysis of diagnostic interviews and self-report instruments. Psychooncology. 2014;23(2):121-30.
5. Linden W, Vodermaier A, Mackenzie R, Greig D. Anxiety and depression after cancer diagnosis: prevalence rates by cancer type, gender, and age. Journal of affective disorders. 2012;141(2-3):343-51.
6. Ramsenthaler C, Kane P, Gao W, Siegert RJ, Edmonds PM, Schey SA, et al. Prevalence of symptoms in patients with multiple myeloma: a systematic review and meta-analysis. Eur J Haematol. 2016;97(5):416-29.
7. Niazi S, Frank RD, Sharma M, Roy V, Ames S, Rummans T, et al. Impact of psychiatric comorbidities on health care utilization and cost of care in multiple myeloma. Blood Adv. 2018;2(10):1120-8.
8. Chochinov HM. Depression in cancer patients. The Lancet Oncology. 2001;2(8):499-505.
9. Kumar SK, Rajkumar V, Kyle RA, van Duin M, Sonneveld P, Mateos MV, et al. Multiple myeloma. Nature reviews Disease primers. 2017;3:17046.
10. Palumbo A, Attal M, Roussel M. Shifts in the therapeutic paradigm for patients newly diagnosed with multiple myeloma: maintenance therapy and overall survival. Clin Cancer Res. 2011;17(6):1253-63.

11. Sherman AC, Simonton S, Latif U, Plante TG, Anaissie EJ. Changes in quality-of-life and psychosocial adjustment among multiple myeloma patients treated with high-dose melphalan and autologous stem cell transplantation. Biol Blood Marrow Transplant. 2009;15(1):12-20.
12. Dubovsky AN, Arvikar S, Stern TA, Axelrod L. The neuropsychiatric complications of glucocorticoid use: steroid psychosis revisited. Psychosomatics. 2012;53(2):103-15.
13. Kang HY, Choi EY. Factors influencing quality of life in patients with multiple myeloma. Contemp Nurse. 2019;55(2-3):109-21.
14. DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. Arch Intern Med. 2000;160(14):2101-7.
15. Satin JR, Linden W, Phillips MJ. Depression as a predictor of disease progression and mortality in cancer patients: a meta-analysis. Cancer. 2009;115(22):5349-61.
16. Prieto JM, Blanch J, Atala J, Carreras E, Rovira M, Cirera E, et al. Psychiatric morbidity and impact on hospital length of stay among hematologic cancer patients receiving stem-cell transplantation. Journal of clinical oncology : official journal of the American Society of Clinical Oncology. 2002;20(7):1907-17.
17. Mausbach BT, Yeung P, Bos T, Irwin SA. Health care costs of depression in patients diagnosed with cancer. Psychooncology. 2018;27(7):1735-41.
18. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis. 1987;40(5):373-83.
19. Onyeaka HK, Queeneth U, Rashid W, Ahmad N, Rajan SK, Jaladi PR, et al. Impact of Depression in Sickle Cell Disease Hospitalization-Related Outcomes: An Analysis of the National Inpatient Sample (NIS). Medicina (Kaunas). 2019;55(7).
20. Rohde RL, Adjei Boakye E, Challapalli SD, Patel SH, Geneus CJ, Tobo BB, et al. Prevalence and sociodemographic factors associated with depression among hospitalized patients with head and neck cancer-Results from a national study. Psychooncology. 2018;27(12):2809-14.
21. Chan L, Tummalapalli SL, Ferrandino R, Poojary P, Saha A, Chauhan K, et al. The Effect of Depression in Chronic Hemodialysis Patients on Inpatient Hospitalization Outcomes. Blood Purif. 2017;43(1-3):226-34.
22. Freitas A, Lema I, da Costa-Pereira A. Comorbidity Coding Trends in Hospital Administrative Databases. New Advances in Information Systems and Technologies. Advances in Intelligent Systems and Computing2016. p. 609-17.
23. Weinberger AH, Gbedemah M, Martinez AM, Nash D, Galea S, Goodwin RD. Trends in depression prevalence in the USA from 2005 to 2015: widening disparities in vulnerable groups. Psychol Med. 2018;48(8):1308-15.
24. Direção-Geral da Saúde. Programa Nacional para a Saúde Mental. 2017.
25. Kazandjian D. Multiple myeloma epidemiology and survival: A unique malignancy. Semin Oncol. 2016;43(6):676-81.
26. Hinz A, Herzberg PY, Lordick F, Weis J, Faller H, Brahler E, et al. Age and gender differences in anxiety and depression in cancer patients compared with the general population. Eur J Cancer Care (Engl). 2019;28(5):e13129.
27. Weissman MM, Bland R, Joyce PR, Newman S, Wells JE, Wittchen HU. Sex differences in rates of depression: cross-national perspectives. Journal of affective disorders. 1993;29(2-3):77-84.
28. Piccinelli M, Wilkinson G. Gender differences in depression. Critical review. Br J Psychiatry. 2000;177:486-92.
29. de Sousa RD, Rodrigues AM, Gregorio MJ, Branco JDC, Gouveia MJ, Canhao H, et al. Anxiety and Depression in the Portuguese Older Adults: Prevalence and Associated Factors. Front Med (Lausanne). 2017;4:196.

30. D'Souza A, Lee S, Zhu X, Pasquini M. Current Use and Trends in Hematopoietic Cell Transplantation in the United States. Biol Blood Marrow Transplant. 2017;23(9):1417-21.
31. Amonoo HL, Massey CN, Freedman ME, El-Jawahri A, Vitagliano HL, Pirl WF, et al. Psychological Considerations in Hematopoietic Stem Cell Transplantation. Psychosomatics. 2019;60(4):331-42.
32. Rueda-Lara M, Lopez-Patton MR. Psychiatric and psychosocial challenges in patients undergoing haematopoietic stem cell transplants. International review of psychiatry (Abingdon, England). 2014;26(1):74-86.
33. Shreders AJ, Niazi SK, Hodge DO, Chimato NT, Kureti M, Kirla N, et al. Correlation of sociodemographic and clinical parameters with depression and distress in patients with hematologic malignancies. Ann Hematol. 2018;97(3):519-28.
34. Stanners MN, Barton CA, Shakib S, Winefield HR. Depression diagnosis and treatment amongst multimorbid patients: a thematic analysis. BMC Fam Pract. 2014;15:124.
35. Mina R, D'Agostino M, Cerrato C, Gay F, Palumbo A. Plasma cell leukemia: update on biology and therapy. Leuk Lymphoma. 2017;58(7):1538-47.
36. Mausbach BT, Irwin SA. Depression and healthcare service utilization in patients with cancer. Psychooncology. 2017;26(8):1133-9.
37. Vin-Raviv N, Akinyemiju TF, Galea S, Bovbjerg DH. Depression and Anxiety Disorders among Hospitalized Women with Breast Cancer. PLoS One. 2015;10(6):e0129169.
38. Sinha S, Peach G, Poloniecki JD, Thompson MM, Holt PJ. Studies using English administrative data (Hospital Episode Statistics) to assess health-care outcomes--systematic review and recommendations for reporting. Eur J Public Health. 2013;23(1):86-92.
39. Brandao D, Freitas A, Paul C, Ribeiro O. Psychiatric disorders as main discharge diagnosis by the Portuguese oldest old from 2000 to 2014: exploring national acute inpatient admissions. International psychogeriatrics. 2018;30(5):685-94.
40. Bernardes C, Massano J, Freitas A. Hospital admissions 2000-2014: A retrospective analysis of 288 096 events in patients with dementia. Arch Gerontol Geriatr. 2018;77:150-7.

Table I: Number of Multiple myeloma hospitalizations per year

Ano	Number of MM hospitalizations(n=)	Number of MM hospitalizations w/depression (%)	Number of MM hospitalizations w/transplant (%)
2000	889	17 (1.9)	40 (4.5)
2001	890	12 (1.3)	40 (4.5)
2002	859	21 (2.4)	32 (3.7)
2003	820	19 (2.3)	36 (4.4)
2004	815	20 (2.5)	48 (5.9)
2005	802	22 (2.7)	65 (8.1)
2006	817	19 (2.3)	77 (9.4)
2007	817	18 (2.2)	131 (16.0)
2008	810	33 (4.1)	128 (15.8)
2009	883	36 (4.1)	154 (17.4)
2010	856	40 (4.7)	137 (16.0)
2011	1038	73 (7.0)	175 (16.9)
2012	950	59 (6.2)	182 (19.2)
2013	1037	72 6.9)	177 (17.1)
2014	1177	109 (9.3)	223 (18.9)
2015	1115	96 (8.6)	232 (20.8)
Total	14575	666	1877

Table ll: Patients Characteristics (N=14575)

Variables		**Total hospitalizations**	Hospitalizations w/ depression
Depression [Number(%)]	Yes	666 (4.6)	
	No	13909 (95.4)	
Gender [N(%)]	Male	7578 (52.0)	227 (3.0)
	Female	6997 (48.0)	439 (6.3)
Age (mean ± SD)		65.97 ± 11.96	64.23 ± 10.69
Charlson Index (mean ± SD)		1.09 ± 1.71	1.28 ± 1.93
Plasma cell leukemia [N(%)]	No	14195 (97.4)	636 (4.48)
	Yes	380 (2.6)	30 (7.89)
Transplant [N(%)]	No	12698 (87.1)	521 (4.1)
	Yes	1877 (12.9)	145 (7.7)
Length of Stay [median (P25-P75)]		13.00 (5-21)	17 (9-24)
In-hospital mortality [N(%)]	No	11861 (81.5)	595 (5.0)
	Yes	2714 (18.7)	71 (2.6)
Residence (NUTS ll) [N(%)]†	North	4530 (31.1)	224 (4.9)
	Center	3915 (26.9	175 (4.5)
	Lisbon	4412 (30.3)	201 (4.6)
	Alentejo	939 (6.4)	43 (4.6)
	Algarve	458 (3.1)	12 (12.6)
	islands	103 (0.7)	7 (6.8)
	Missing	218 (1.5)	—

† This variable refers to the place of patient residence and not the location where the hospitalization took place. It was only studied mainland Portuguese hospitalizations.

Table lll: Variables associated with depression among hospitalized patients with Multiple myeloma

Variables		Crude OR(IC95%)	P value	Adjusted OR(IC95%)	P value
Age		0.99 (0.98-0.99)	0.000	0.994 (0.987-1.001)	0.091
Gender	Male	Reference (Ref)	Ref	Ref	Ref
	Female	2.12 (1.84-2.55)	0.000	2.255 (1.912-2.660)	0.000
Charlson Index		1.07 (1.02-1.11)	0.002	1.10 (1.05-1.15)	0.000
Plasma cell leukemia	No	Ref	Ref	Ref	Ref
	Yes	1.83 (1.25-2.68)	0.002	1.79 (1.22-2.64)	0.003
Transplant	No	Ref	Ref	Ref	Ref
	Yes	1.96 (1.61-2.37)	0.000	1.78 (1.44-2.20)	0.000
Length of Stay		1.01 (1.01-1.02)	0.000	1.01 (1.01-1.02)	0.000
In-hospital mortality	No	Ref	Ref	Ref	Ref
	Yes	0.51 (0.40-0.65)	0.000	0.53 (0.41-0.68)	0.000
Residence (NUTS ll)	Algarve	Ref	Ref	‡	—
	Islands	0.71 (0.33-1.6)	0.40		
	North	0.64 (0.29-1.4)	0.27		
	Center	0.66 (0.30-1.42)	0.29		
	Lisbon	0.66 (0.30-1.50)	0.32		
	Alentejo	0.37 (0.14-0.96)	0.04		

‡ Because of lack of statistical significance, the variable “residence (NUTS ll)” did not enter the multivariate model.

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