Original paper

Quality of life in patients diagnosed with multiple myeloma: pain, depression and life satisfaction with gender and age differences

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Abstract

Introduction: Multiple myeloma is a clonal disease characterised by the proliferation of neoplastic plasmocytes, infiltrating the marrow or, less frequently, other tissues and producing monoclonal immunoglobulin or fragments thereof and a number of cytokines responsible for bone damage.
Aim of the research: The aim of the study was to analyse the mental state of multiple myeloma patients with a view to diagnosis for depression and to assess quality of life using appropriate survey tools.
Material and methods: Twenty-seven patients with a diagnosis of multiple myeloma participated in the study after giving informed, voluntary consent to participate in the study. They were outpatient haematology patients, aged between 48 and 79 years.
Results: The study group consisted of 12 women and 15 men. As part of the study, patients were given a set of questionnaires to complete, such as the Numerical Rating Scale (NRS), Beck Depression Inventory (BDI), Life Satisfaction Scale (SWLS) by Ed Diener, Robert A. Emmons, Randy J. Larsen, and Sharon Griffin. Depressive disorders are common in multiple myeloma patients. The co-occurrence of depressive-anxiety disorders in multiple myeloma reduces quality of life in haematology patients. A higher prevalence of major depression was found in the female group and a higher level of life satisfaction in the male group. Patients over 65 years of age with myeloma rated their overall health status better than younger patients.
Conclusions: The impact of pain, depression and life satisfaction in myeloma patients needs further and broader research.

Introduction

Multiple myeloma (MM) is an incurable disease, but in recent years, patients' life expectancy has increased significantly. Overall survival of 4 years now exceeds 80% [1–4].

MM accounts for more than 1–2% of all cancers and about 18% of haematological cancers. It is a disease of the elderly – the majority of patients are over 50 years old at the time of onset, with a peak incidence in the seventh decade of life [5–11]. The neoplasm originates from B cells, which secrete a monoclonal protein in typical cases. During the course of the disease, there is a proliferation of monoclonal, pathological plasmocytes, infiltrating the bone marrow or, less commonly, other tissues [12]. Recently, important advances in understanding the pathogenesis and biology of MM have been noted, mainly through genetic profiling and proteomics studies [5–11].

Long-term treatment of patients results in numerous complications and side effects, which affects the quality of life [1, 2, 13]. The burdensome nature of treatment affects many areas of life. Patients treated for MM are thought to have many more symptoms, and a poorer quality of life as a result, compared to other haematological cancers. Patients experience pain due to tumour changes in the bone, fatigue, shortness of breath, appetite and sleep problems, as well as gastrointestinal problems [2]. Osteolytic bone lesions are found in about 80%. MM pain is present in about two-thirds of patients at diagnosis and in almost all patients during the course of the disease. The implementation of psychotherapeutic techniques may play a role in alleviating these symptoms [5, 6, 12].

The problems of anxiety-depressive disorders associated with cancer are a well-known and well-described phenomenon [14–16]. In the case of multiple myeloma, distinct mental disorders are highlighted as a result of pain, sleep disturbances and ongoing treatment [5, 17, 18].

Psychiatry and psychology in haematology encompass a wide range of psychiatric and psychological interventions: elements of diagnosis, therapy – including psycho- and pharmacotherapy, psychosocial support directed at the patient him/herself/themselves, his/her/their family and carers. The psychological condi-

tion of the patient affects the quality of cooperation with the doctor, the effects of treatment, and the quality of life of the affected person [5, 18–20]. Contemporary global standards of oncological treatment assume simultaneous coverage of the patient with a broad spectrum of psychiatric and psychological support.

Information about the patient's mental state is drawn from both objective and subjective sources, with health-related quality of life analysed in physical, mental and social dimensions [21].

Aim of the research

The aim of our study was to analyse the mental state of patients with plasmocytic myeloma with a view to diagnosis for depression and to assess quality of life through the use of appropriate survey tools.

Material and methods

Twenty-seven patients with a diagnosis of plasmocytic myeloma participated in the study after giving informed, voluntary consent. Participants were haematological outpatients, aged between 48 and 79 years. The study group consisted of 12 women and 15 men. Patients in the study were given a set of questionnaires to complete such as:

Pain Scale – Numerical Rating Scale (NRS). The Numerical Rating Scale is easy to use and has also been shown to be highly sensitive and reliable compared to other pain measurement scales. The scale contains 11 levels of pain severity – from 0 to 10, where 0 represents no pain at all and 10 represents the worst imaginable pain. The scale has significant reproducibility of results and is useful for scientific applications. Due to its comprehensibility for patients and ease of use, it is currently recommended in clinical practice for both acute and chronic pain assessment. The NRS scale is not recommended for use in children under 9 years of age. 0-10 (no pain, moderate pain, strongest imaginable pain) [21].

Beck Depression Inventory (BDI) – a scale used in the diagnosis of depression, by Aaron Beck. The scale consists of 21 questions to which the patient provides their own answers. There are 4 possible answer variants, which are scored differently. Subsequent response variants correspond to increased symptom intensity and are therefore also appropriately scored in ascending order from 0 to 3 points. The level of depression is calculated from the score obtained after adding up the points. There are different standards, but the following scoring is generally accepted: 0–10 points – no depression or depressed mood; 11–27 – moderate depression; 28 and above – severe depression [21].

Life Satisfaction Scale – SWLS by Ed Diener, Robert A. Emmons, Randy J. Larsen, and Sharon Griffin, in the Polish adaptation by Zygfryd Juczyński. Subjective well-being consists of three components: level of life satisfaction, positive feelings and absence of negative feelings. The evaluation of life satisfaction is the result of comparing one's own situation with self-established standards. If the outcome of the comparison is satisfactory, the result is a feeling of satisfaction. The respondent indicates to what extent he or she agrees with each of the five statements. The scores are aggregated. Scores range from 5 to 35. The higher the score, the greater the feeling of satisfaction with life. Scores between 1 and 4 sten were taken as low scores, scores within 5 and 6 sten as average and scores within 7–10 sten as high. The above study was approved by the Bioethics Committee.

Results

The mean age in the study group was 64.7 years, of which there were 13 people under 65 years of age and 14 people over or equal to 65 years of age. Pain intensity in the study group ranged from 4 to 8, with a mean value of 3.4 on the NRS.

On the Beck depression scale, patients scored from 0 to 26 with a mean value of 13. On the SWLS scale, scores ranged from 9 to 26 with a mean value of 5 sten. The absence of depression was found in 13 patients, representing 48.1% of the study group. In the remaining (majority) patients, Beck scale scores confirmed mild (29.6%), moderate (14.8%) or severe (7.4%) depression.

The level of satisfaction with life based on SWLS scale scores was low in more than 29% of the study group, average in 51.9% and high in 18.5% (Table 1).

The environment used for statistical calculations was R 3.4.2 (Short Summer 2017-09-28). A significance level of $p < 0.05$ was adopted. The normality of the distribution was tested using the Shapiro-Wilk test. The Mann Whitney *U*-test (for dependent and independent samples/variables) was used for comparative tests. The effect of a factor of more than two levels on a numerical variable was tested with the Kruskal-Wallis test. Correlations between quantitative characteristics were tested using rho-Spearman. Relationships between categories were tested using the χ^2 test with Yates correction for continuity.

A higher prevalence of comorbid depressive disorders was observed in the female group and a higher severity of the depressive episode in this group. A major depressive episode was not observed in the male group. Depression of moderate severity was three times more frequent in the female group than in the male group (Figure 1).

The study found a higher overall level of life satisfaction in men than in women.

In the male plasmocytic myeloma group, more than 66% reported an average level of life satisfaction, whereas in the female group only 33.3% reported the same level. In the female group, low life satisfaction as measured by the SWLS prevailed (58.3%) (Figure 2).

Table 1. Study group characteristics divided by gender

Parameter	Level	Total	Female (*N* = 12)	Male (*N* = 15)	Test	*P*-value
Age	48–79	64.7 (7.2)	64.2 (5.7)	65.2 (8.4)	MWU: $z = -0.342$	0.751
Pain intensity	0–8	3.4 (2.5)	4.0 (2.4)	3.0 (2.6)	MWU: $z = 0.854$	0.399
BECK (raw result)	0–26	13.0 (8.1)	18.6 (6.4)	8.5 (6.5)	MWU: $z = 3.269$	0.001**
BECK (depression)	None	13 (48.1%)	2 (16.7%)	11 (73.3%)	$\chi^2 = 9.515$	0.023*
	Mild	8 (29.6%)	5 (41.7%)	3 (20.0%)		
	Average	4 (14.8%)	3 (25.0%)	1 (6.7%)		
	Severe	2 (7.4%)	2 (16.7%)	0 (0.0%)		
SWLS (raw result)	9–26	19.7 (4.5)	16.8 (4.4)	22.0 (3.0)	MWU: $z = -2.879$	0.004**
SWLS (sten)	1–7	5.1 (1.6)	4.1 (1.7)	5.9 (0.9)	MWU: $z = -2.855$	0.004**
SWLS (result)	Low	8 (29.6%)	7 (58.3%)	1 (6.7%)	$\chi^2 = 8.645$	0.013*
	Average	14 (51.9%)	4 (33.3%)	10 (66.7%)		
	High	5 (18.5%)	1 (8.3%)	4 (26.7%)		
How would you rate your (general health)	2–7	4.2 (1.1)	4.2 (0.8)	4.3 (1.2)	MWU: $z = -0.024$	1.000
How would you rate (your quality of life)	3–7	4.3 (0.9)	4.2 (0.7)	4.5 (1.0)	MWU: $z = -0.488$	0.607

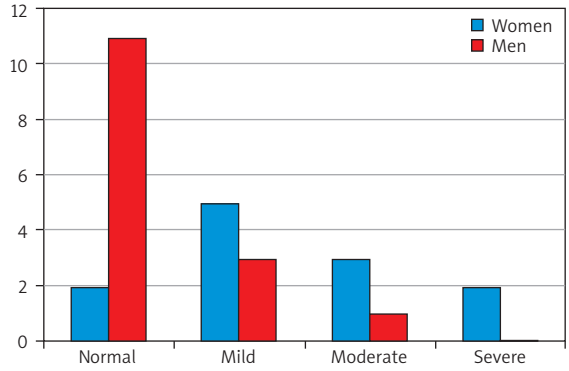

Figure 1. Depressive disorders in the group of women and men assessed in Beck's scale

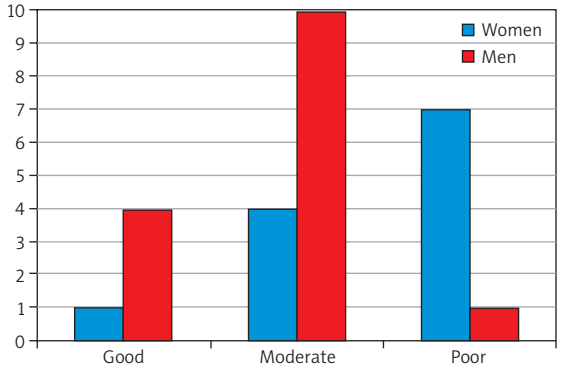

Figure 2. Quality of life in the group of women and men assessed in SWLS scale

The study showed that older patients (aged ≥ 65 years) rated their general health (Figure 3) and their quality of life (Figure 4, Table 2) higher.

Discussion

A diagnosis of multiple myeloma significantly affects a person's functioning. It has been shown that the most common symptoms reported by patients regarding physical functioning are eating disorders, problems with physical activity and mobility, fatigue, pain and sleep disturbances. Concerns about interpersonal and emotional functioning were observed in some patients. The most important symptoms reported by patients and found to be largely disruptive to daily life were bone pain, peripheral neuropathy, gastrointestinal problems or infections [9, 13, 20].

The impact of symptoms, fatigue, less control over side effects and willingness to cope were shown to be associated with the occurrence of increased depressive symptoms [13, 20].

Quality of life in plasmocytic myeloma patients

Patients with MM show a poorer quality of life [22, 23]. There is a need to assess their quality of life

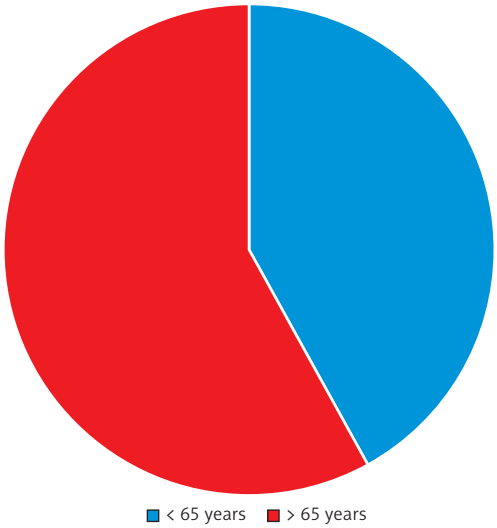

Figure 3. General health status assessed by the patient in groups divided by age

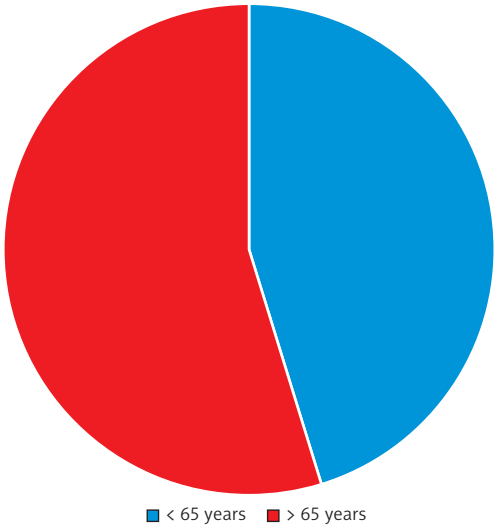

Figure 4. Quality of life assessed by the patient in groups divided by age

Table 2. Study group characteristics divided by age

Parameter	Level	Total	< 65 years (*N* = 13)	≥ 65 years (*N* = 14)	Test	*P*-value
Sex	Female	12 (44.4%)	6 (46.2%)	6 (42.9%)	$\chi^2 = 0.000$	1.000
	Male	15 (55.6%)	7 (53.8%)	8 (57.1%)		
Age	48–79	64.7 (7.2)	59.1 (4.4)	70.0 (4.9)	MWU: $z = -4.416$	< 0.001***
Pain intensity	0–8	3.4 (2.5)	3.0 (2.6)	3.9 (2.4)	MWU: $z = -0.679$	0.505
BECK (raw result)	0–26	13.0 (8.1)	12.8 (9.3)	13.2 (7.1)	MWU: $z = -0.267$	0.808
BECK (depression)	None	13 (48.1%)	6 (46.2%)	7 (50.0%)	$\chi^2 = 0.040$	0.998
	Mild	8 (29.6%)	4 (30.8%)	4 (28.6%)		
	Average	4 (14.8%)	2 (15.4%)	2 (14.3%)		
	Severe	2 (7.4%)	1 (7.7%)	1 (7.1%)		
SWLS (raw result)	9–26	19.7 (4.5)	18.2 (4.2)	21.1 (4.5)	MWU: $z = -1.868$	0.063
SWLS (sten)	1–7	5.1 (1.6)	4.6 (1.5)	5.5 (1.6)	MWU: $z = -1.771$	0.074.
SWLS (result)	Low	8 (29.6%)	6 (46.2%)	2 (14.3%)	$\chi^2 = 3.310$	0.191
	Average	14 (51.9%)	5 (38.5%)	9 (64.3%)		
	High	5 (18.5%)	2 (15.4%)	3 (21.4%)		
How would you rate your (general health)	2–7	4.2 (1.1)	3.7 (0.8)	4.7 (1.1)	MWU: $z = -2.499$	0.009**
How would you rate (your quality of life)	3–7	4.3 (0.9)	3.9 (0.5)	4.7 (1.0)	MWU: $z = -2.232$	0.014*

in the clinical management of patients in order to prevent possible consequences that burden patients during cancer diagnosis and treatment [24]. The term "quality of life" now refers to health-related quality of life (HRQoL). It is defined by assessing the satisfaction of individual needs important to the patient, taking into account the patient's psychological characteristics, environmental conditions and preferred values, which may evolve during the course of severe illness [15]. Previous research does not clearly identify the causes of deterioration in the quality of life of people with MM [2].

A UK study of middle-aged 60-year-old multiple myeloma patients undergoing further treatment after stem cell transplantation found 50% of patients had 'quite a lot/very much' disease fatigue, approx. 37% suffered from daytime sleepiness and insomnia at night, 44% described a problem with pain, 34% iden-

tified concerns about the long-term effects of cancer therapy, 28% of respondents were worried about their family, some felt their condition would affect their sex life, 25% reported a loss of independence and the need for support to perform basic activities [7].

A prospective, longitudinal cohort study conducted in 14 hospitals in England over an eight-month period involving 238 patients at different stages of diagnosis and treatment found that the most important predictors of patient deterioration in quality of life were symptom level, presence of pain and condition-related anxiety. The mean age of the patients was 68.5 years, 36% of them were female. In the initial phase of the study, more than half of the patients reported fatigue, more than 40% pain of varying severity, 1/3 anxiety, 1/4 had severe shortness of breath and drowsiness, tingling in the extremities, and sleep problems. The severity of these symptoms was less/lower with time [9].

In contrast, a multicentre UK study of 557 patients using a test to measure quality of life in patients with multiple myeloma (EORTC QLQ-C30, its myeloma module and EuroQoL EQ-5D) showed a different severity of variables. The study compared the severity of disease symptoms with quality of life at different stages of the disease. Patients' biggest concerns were fatigue (88%), pain (72%), and dyspnoea (61%). 50–70% of patients reported difficulty remembering, tingling in the limbs, and difficulty moving. Fewer (about 30%) reported constipation, oral problems, anxiety, and nausea. In relation to functioning, patients had difficulty performing the simplest activities (32%) and felt stress related to the possibility of disease progression [25].

It has been proven that in order to improve the quality of life of patients with MM, it is necessary to meet information and emotional needs, as well as support from medical staff and family [26, 27].

Social support had a direct impact on quality of life – patients with greater social support reported fewer unmet needs [28]. It is considered an important source of information for patients which directly affects their health [29]. In contrast, cancer stage significantly contributed to unmet information needs [27].

Studies on quality of life differ in their results. Mexican patients at an advanced clinical stage (aged 32–98 years) and with poor prognosis with comorbidities did not show a statistically significant association between reduced quality of life and their current health status [10]. Also, no significantly statistical parameters were found to confirm the severity of pain with patients' comorbidities [30].

Patients with MM show moderate levels of anxiety and depression, and poorer quality of life [22, 31].

When analyzing the relationship between treatment and health-related quality of life (HRQoL), it was noted that HRQoL decreased in inverse proportion to the number of subsequent lines of treatment administered to the patient. Patients had higher scores for treatment-free periods [32].

In addition, stress related to the living situation was shown to affect patients' quality of life. Those with more severe disease symptoms had higher levels of anxiety. At the same time, worse psychological symptoms were associated with younger patients. Psychological symptoms were reported more frequently by women. The level of psychological distress was also related to treatment outcome and MM case specificity [1].

In the 289 participants treated for an average of 4.4 years, the most common concerns were related to food and eating problems (61%), physical activity (59%), mobility (56%), fatigue (55%), pain (52%) and sleep disturbances (46%). 43% of respondents were worried about the future and 32% felt sad and depressed.

Among symptom burdens affecting quality of life, 22% of patients reported bone pain, 21% peripheral neuropathy, 16% gastrointestinal problems and 33% fatigue [13].

Patients who were married, working, had an active lifestyle and no chronic diseases rated their quality of life higher than others. Objective measurements showed that higher quality of life was associated with those aged > 65 years and those with lower education [33].

Pain in patients with multiple myeloma

A Palestinian study of 92 people with MM indicates that 54.3% reported bone pain, 47.8% had pain related to movement, 46.7% had back pain, 66.3% felt unwell, 46.7% observed hair loss and 46.7% felt anxious or agitated [34].

A randomised trial of 756 patients diagnosed with multiple myeloma over four years showed that patients' quality of life was most affected by malaise and emotional symptoms. Clusters of physical symptoms were of lesser importance. With the passage of time, these symptoms gradually resolved [35].

Participants in other studies indicated complaints such as lack of energy, sleep problems, pain, gastrointestinal problems, lack of appetite, memory problems, deteriorating vision, emotional problems (sadness and nervousness) [20, 35].

Among the 77 patients undergoing chemotherapy, nearly 98% suffered from multiple complaints including pain, psychological and gastrointestinal symptoms at the same time. These symptoms had an impact on the deterioration of quality of life. It has been shown that symptoms such as pain, lack of energy had the greatest impact on worsening quality of life [36].

It is noteworthy that male patients showed a higher HRQoL before treatment compared to females. They were observed to have less complaints in terms of mental as well as physical functioning [11]. In ad-

dition, some reports indicate higher pain intensity in women compared to men.

Improvements in quality of life during illness were considered by all patients experiencing pain (62%) to be a reduction in pain. 24.3% considered an improvement in quality of life to be an improvement in their condition, and 3.4% considered it to be effective treatment [30].

Another study of 330 patients conducted on patients aged (average age 70) confirmed that higher pain intensity was associated with poorer quality of life. The higher the pain level, the worse the physical, social and emotional functioning. The available literature does not clearly state whether the age of patients is related to pain sensitivity. It is suggested that women are more sensitive to pain [37].

One study found that predictors of poorer quality of life were female gender, older age, predisposition to mental illness and unmet emotional and financial needs [38].

Transplantation in patients with multiple myeloma

Patients with MM undergoing autologous stem cell transplantation have declines in quality of life that improve and subside over time depending on individual circumstances and the study methodology adopted [2].

This is confirmed by another study. It was observed that symptoms decreased over the course of a year. Quality of life improved most rapidly in those who had low symptom intensity, and this was also favoured by older age and work. Few patients showed a worsening of outcomes within the first year [39].

Another study that included 288 autologous stem cell transplant patients with relapsed MM focused on assessing quality of life and pain over 52 months.

Both transplant and non-transplant patients reported deterioration in quality of life at the same level [40].

Regardless of receiving maintenance treatment, gender or age, the most significant symptoms were fatigue, pain, numbness/tingling, bone pain and muscle weakness [41].

A number of studies that have focused on health-related quality of life during maintenance treatment after autologous cell transplantation have not shown that maintenance therapy after stem cell transplantation/that such a treatment ??????????????????reduces quality of life [42].

Different treatment modalities

Multiple myeloma has a negative impact on patients' quality of life and worsens with the need for subsequent lines of treatment. Patients undergoing oncological treatment at the time of the study showed worse outcomes than patients in the drug-free period [43, 44].

There are a number of studies comparing different treatment pathways for multiple myeloma and their impact on patients' quality of life. No differences were seen between the severity of pain and overall quality of life between different sets of drugs used. There were, however, time-related differences in quality of life improvement [26, 45].

Disease type and the type of therapeutic pathway chosen were shown to influence HRQoL. Those with the disease had lower overall quality of life scores. It was observed that, compared to the general population, patients diagnosed with multiple myeloma had higher scores for fatigue, pain, loss of appetite and financial difficulties [46].

Depression in the course of plasmocytic myeloma

Depressive and anxiety disorders, including borderline conditions, are common in patients diagnosed with cancer [47, 48].

Depression causes a significant reduction in the patient's quality of life, worsens the prognosis, and often leads to suicidal actions and abandonment of therapy [21, 22, 49–51]. In a study involving 79 patients with multiple myeloma, 10 patients experienced suicidal thoughts.

Predictors of the occurrence of such thoughts were being single, depression and a less advanced stage of disease [52, 53].

Patients with greater severity of depressive symptoms have more severe disease symptoms and more severe negative side effects of the treatment used [3, 5, 54].

It has also been noted that depressed multiple myeloma patients have difficulty adhering to treatment recommendations, and that this consequently leads to a worsening of their condition [19].

Meeting the needs of patients diagnosed with MM was related to their emotional state, and an individualised approach to each patient provided an opportunity to address anxiety and prevent depression. Information, psychological support, appropriate behaviour of medical staff were expected [8].

It was assessed that patients with negative side effects of MM treatment, with unmet information, relational and emotional needs, indirect effects of morbidity on disease symptoms and side effects of anti-cancer treatment were more likely to develop mental illness. Satisfaction with social support was shown to be a factor in the prevention of mental illness. In older patients, on the other hand, an indirect effect of psychological morbidity on disease symptoms and side effects of MM treatment was observed, while there was no association of an indirect effect of psychological morbidity on patients' future prospects, and the time to diagnosis influenced side effects of treatment [26].

In patients receiving first-line or recurrent treatment for severe or moderate psychological distress,

no significant difference was found for anxiety and depression [11].

Among psychological distress, feelings of sadness, nervousness, and worry were reported by patients receiving chemotherapy [36].

Increased physical pain resulted in 58% of patients experiencing emotional pain. Respondents in whom pain therapy was effective had slightly better scores on emotional pain than patients who were pain-free.

22% of respondents experienced social pain, which increased as physical pain increased [30].

It is noted that depressive symptoms occur among elderly patients, often accompanied by comorbid symptoms – this affects/results in lower quality of life but is not associated with higher mortality. Being married and higher education have been identified as factors preventing depression in older people with MM [55].

Psychological distress manifested as depression, anxiety and post-traumatic stress disorder did not differ between patients receiving different therapies [56].

The assessment of quality of life requires a comprehensive analysis with dedicated measurement tools [40]. For this reason, we used standardised forms completed directly by the study participants in our study, obtaining data with a high level of subjectivity.

Conclusions

Depressive disorders are common in patients with multiple myeloma. The co-occurrence of depressive and anxiety disorders in patients diagnosed with multiple myeloma reduces their quality of life. There is a higher incidence of major depression in the female group and a higher level of life satisfaction in the male group. Patients with myeloma aged 65 years and older rated their general health status higher than younger patients. The impact of pain, depression and life satisfaction in myeloma patients, taking into consideration differences according to age and gender, requires further, broader research, including in relation to stigma associated with myeloma. There is a need for further research into the actual quality of life in patients diagnosed with multiple myeloma. Identifying factors that significantly impact health-related quality of life in multiple myeloma patients can provide a foundation to help guide clinical management of patients.

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Ethical approval

Approval number: KE-0254/271/2016.

Conflict of interest

The authors declare no conflict of interest.

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