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Resilience as a mediator of quality of life in cancer patients in healthcare services

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Quality of life is a critical outcome in oncology, influencing treatment adherence and patient satisfaction. Haematology patients face psychological challenges, including emotional distress, depression and PTSD, which can affect their quality of life. Resilience and social support are protective factors that help patients cope with these challenges. This study aimed to assess the psychological adjustment of haematology patients by examining psychological outcomes (PTSD and depression), psychological resources (resilience and perceived social support), and quality of life. It also examined correlations between demographic variables, psychological outcomes and resources to identify predictors of quality of life and whether resilience mediates these effects. A sample of 110 haematology patients from three hospital centers in central/southern Italy participated. Data were collected using self-report questionnaires measuring PTSD, depression, resilience, social support and quality of life. Correlational analyses and hierarchical multiple regression were used to explore the relationships between variables, followed by a mediation analysis to examine the role of resilience. Results indicated that QOL was negatively associated with gender, age, PTSD and depression, but positively associated with resilience. Regression analyses showed that quality of life was significantly predicted by resilience, age, depressive symptoms and gender. The mediation model showed that resilience partially mediated the effects of age, gender and depression on QoL. These findings highlight the protective role of resilience in improving quality of life in haematology patients. Despite limitations related to sample size and the use of self-report questionnaires, this study provides valuable insights into the psychological adjustment of haematology patients and highlights the importance of considering psychological resources in oncology care.

Keywords Quality of life, Oncology, Resilience, Social support, Post Traumatic Stress Disorder, Depression

Quality of life (QOL), as defined by the World Health Organization (WHO), refers to an individual's perception of his or her living conditions in relation to the context, culture and value system in which he or she lives, and how these elements relate to personal goals, expectations and concerns[1]. Quality of life is a broad and multidimensional concept that encompasses a person's physical condition, psychological state, level of independence, social relationships, environment and spirituality[2]. It is possible to highlight a significant link between QOL and subjective well-being in that the aspects that are most likely to increase an individual's level of QOL focus mainly on those aspects that make life particularly pleasant, happy and worth living, such as meaningful work, self-fulfillment or a good standard of living[3], above those elements that guarantee mere subsistence, survival and longevity.

The concept of QOL is closely linked to that of health: 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (WHO, 1948).

In recent decades, studies on QOL in a health context have increased considerably in different contexts, such as health, organizational or educational contexts. In health context, it is possible to speak of Health Related Quality of Life (HR-QOL), which can encompass a wide range of aspects: from general health, physical symptoms, emotional well-being, cognitive functioning to existential and spiritual aspects[4].

In the health context, this growing scientific interest has been driven by a progressive evolution of the medical approach, which over time has broadened its focus to include not only quantitative aspects (years of survival, number of relapses, cure rates, etc.), but also the improvements that treatments can bring to the perception of

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QOL, recognizing the latter as one of the main factors determining the demand for treatment, adherence to treatment regimens and individual satisfaction with treatments[5]. Quality of life thus becomes a goal of medical interventions in general and rehabilitation programs in particular[6].

The most used method of assessing QOL in healthcare is closely linked to the clinical assessment of the patient and their health status, relating physical and mental well-being, disability and work capacity to QOL. However, this does not consider that QOL is not directly related to an individual's functional status: in fact, patients with the same clinical condition may perceive their QOL very differently, and the impact of care may vary subjectively from one patient to another[6]. For this reason, a way of assessing QOL that focuses on an individual's subjective perception of their life has recently been introduced[7–9]. This second approach approaches the concept of person-centered care rather than disease-centered care and allows for a better understanding of the individual patient, including their perceptions, intelligence, philosophy and emotional state[4,10].

For this modality to work, it is important that health professionals actively listen to patients' experiences, seek to understand their perspectives, and check that patients' self-assessments of their own health and life satisfaction do not differ from doctors' opinions[11].

Olsen et al.[12] investigated how QoL varies with gender and age in Europe. No overall gender difference in QoL was found in Northern Europe, but women had slightly lower QoL than men in the other European regions, with the gender difference being most pronounced in Southern Europe. Women's lower QoL was mainly due to lower control and autonomy. Women had more depressive symptoms than men in all age groups in the four European regions. The higher odds of depressive symptoms were mainly due to higher odds of 'tearfulness', 'depression' and 'sleep problems'. In addition, gender differences in QoL increase with age. This may be due to stressors that are more likely to occur in old age, such as widowhood/living alone, poor health, financial pressures and caring, where sex differences often exist to the detriment of women[13]. The widening gender gap in QoL with age may also be consistent with a survival effect, where healthier men survive into old age[14].

In the oncological context, physicians are beginning to recognise QOL as a critical aspect not only of tumor response, survival, time to progression and treatment toxicity, but also in guiding patients in treatment decisions themselves[15,16].

Despite the high level of patient interest in their treatment process and the increasing need for honest and considerate discussions about treatment choices and how they perceive life after diagnosis, there is still a reluctance to use QOL measurement tools in clinical practice, often perceived as too complicated, time-consuming or expensive[17].

Several studies have shown how the type of treatment chosen and the location of the tumor can alter a patient's quality of life[18,19]. However, as the number of people recovering from cancer increases, quality of life also becomes a crucial aspect of understanding the survivorship experience and the ongoing, often prolonged, impact of both the disease and its associated therapies. Indeed, the impact of cancer on a survivor's life does not end with the completion of primary treatment but can affect all aspects of life from 2 to 26 years after diagnosis[20,21], particularly physical health (ability to work and perform normal daily activities such as eating out, washing or dressing) and mental health[22].

The course of illness causes the person to experience a series of transformations that require the use of one's adaptive resources. The way in which the illness affects the patient, both physically and psychologically, is summarized in the concept of emotional distress. This condition involves severe emotional distress of a psychological, social and spiritual nature that can occur during or after treatment and can be chronic and long-term[23–25]. Examples of long-term effects include neuropathy with relative weakness, numbness or pain; fatigue; cognitive or sexual difficulties; high anxiety or depression[26]. Regardless of when they occur, the long-term and late effects of cancer can have a significant impact on patients' daily activities and therefore their quality of life[27].

Effects that directly affect the psychological sphere of patients include depressive episodes that can emerge and persist during treatment, placing an additional burden on disease management. This complicated picture makes disease control more difficult, compromises treatment adherence, prolongs hospital stays and may negatively affect survival[28–33]. Risk factors for depression in cancer patients include biological aspects such as cancer type, stage, and treatment-related factors; individual factors such as personal family and psychiatric history and personality traits; and social and interpersonal factors such as stressful life events, loneliness, social isolation, low socioeconomic status, and lack of social support[34]. Patients often tend to hide their feelings to protect themselves from states of distress that are too difficult for them and their loved ones to cope with. Anxiety and fear are common, often accompanied by feelings of anger, bitterness and despair. Symptoms associated with mood disorders and depressive states, such as sadness, emptiness and hopelessness, may be manifested by loss of interest in usual activities and significant people, reduced ability to think or concentrate, feelings of inadequacy, self-evaluation and guilt, and thoughts of death. These experiences are often expressed in behavior and demands that may appear contradictory and inconsistent. Since controlling such emotions requires a great deal of psychological energy, it is not uncommon for patients to find themselves lacking the necessary resources to cope with work and daily activities[35,36]. In this delicate phase, the factors that can trigger a crisis include the perception of vulnerability and threat to one's existence, combined with the fear of having to leave loved ones prematurely without having completed some basic life tasks[37].

One of the most common problems in cancer patients is Cancer-Related Fatigue (CRF), which is closely related to depression and quality of life. It is the most persistent symptom over time and the one with the greatest impact on daily life, perceived as worse than pain, nausea and depressive states. This condition has a negative impact on both the physical and psychological state of the patient, and its negative effects also extend to the social and economic sphere, significantly affecting the quality of life of the cancer patient and those around them. At the same time, patients perceive a lack of recognition of their condition by those around them and a lack of understanding of their difficulties, which can lead to feelings of detachment and inadequacy in family and social relationships[38].

As the number of cancer survivors increases, the long-term psychological effects of diagnosis and treatment are more pronounced than in the past. In response, in 1994 the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) expanded the criteria for post-traumatic stress disorder (PTSD) to include the diagnosis of a life-threatening illness as a traumatic event. Cancer, which is characterized by multiple and chronic stressors, is a significant threat, but in the fifth edition of the DSM (DSM-5) it is no longer considered a traumatic event warranting a diagnosis of PTSD unless the discovery of the disease is sudden and catastrophic. Despite this change in classification, the DSM-IV definition led to nearly two decades of research on PTSD in cancer patients from 1994 to 2013, and some researchers continue to use the DSM-IV criteria to study cancer populations[39].

Current research focuses on the personal strategies and resources that individuals use to cope with difficult and stressful situations such as illness, bereavement or major life changes. These elements, known as 'protective factors', help individuals to cope as well as possible with the difficulties associated with illness.

One of these protective factors is resilience, which is the combination of elements that help the individual to regain functioning after a damaging event or significant adversity[40]. Rutter[41] suggested that resilience is the result of protective processes that, while not eliminating risk or adversity, enable the individual to cope with it more effectively. In this view, illness can be seen as a potential catalyst for positive change, rather than simply leading to negative psychosocial outcomes.

Related to resilience is the concept of Post Traumatic Growth (PTG), defined as the positive psychological change that occurs as a result of coping with extremely challenging or traumatic life events[42,43]. A traumatic event creates an imbalance that activates a range of adaptive strategies, including the conscious processing of the experience, which in some cases allows a positive view of self, others and the world to develop. The main signs of this growth include increased personal resilience, improved ability to relate to others, openness to new opportunities, a deeper spiritual connection and a renewed appreciation of life[44].

Home environment and the quality of social relationships also play a crucial role in adaptation to illness, influencing how individuals perceive and cope with life events. This area includes concepts such as the exchange of supportive interactions, perceptions of support received, social integration and loneliness (understood as the discrepancy between desired and actual social relationships). Support from interpersonal relationships is crucial in counteracting the effects of stress, promoting physical and psychological well-being, and increasing self-esteem through the perception of a secure base both externally and internally[45,46].

In the oncology setting, social and family support is not limited to the provision of resources and services to the patient, but also includes the communication of care, love, appreciation and acceptance. This support makes the patient feel part of a community and mutual exchange, and acts as a buffer in crisis situations[47].

Objectives and hypotheses

The aims of the present study, within this research framework, were to:

(a) Assess the psychological adjustment of hematology patients using the following variables: psychological outcomes (PTSD and depression), psychological resources (resilience and perceived social support) and quality of life;
(b) To assess correlations between age variables (age, gender), psychological outcomes (depression symptoms; PTSD symptoms); psychological resources (perceived social support and resilience) and perceived quality of life in hematology patients;
(c) To assess which variable among: age variables (age, gender), psychological consequences (symptoms of depression; symptoms of PTSD), and psychological resources (perceived social support and resilience) predicts quality of life in hematology patients;
(d) To assess whether resilience mediates the effect of the predictors on perceived quality of life.

We hypothesized that:

(H1) Hematology patients will have high levels of PTSD symptoms and depression, low levels of resilience and social support, and low levels of quality of life.
(H2) Older patients and women will have lower levels of quality of life.
(H3) Patients with higher levels of depressive symptoms and PTSD have lower levels of QoL.
(H4) Patients with higher levels of social support and resilience have higher QoL.
(H5) Quality of life is predicted by both demographic variables, clinical symptoms and patient resources.
(H5) Resilience mediates the effect of demographic and clinical variables on QoL.

Method

Participants

The inclusion criteria were as follows: (1) Patients with hematological malignancies; (2) The diagnosis of cancer recived at least three months before the study; (3) life expectancy over 6 months; (4) Age over 18 years; (5) Primary school or above education level, able to correctly communicate and answer the questions included in the tests. The following exclusion criteria were applied: (1) Presence of psychiatric diseases; (2) Patients with cognitive or physical difficulties that prevented independent completion of the questionnaires (3) patients admitted for non-haematological conditions or with severe comorbidities unrelated to haematological cancer.

Of the 207 patients approached from three hospital centers in central/southern Italy, 82 declined to participate. 15 patients dropped out during the study. A total of 110 patients responded and provided written informed consent filled the questionnaires.

Participants had a mean age of 66.60 years (SD = 15.74), ranging from 22 to 98 years; they were predominantly male (59.1%), Italian (78%), married (70%), with children (77.27%), with a low to medium level of education (40.91% high school diploma), and employed (73.64%).

64.6% (n = 71) of the patients were admitted to medical wards, while the remaining 35.4% (n = 39) were treated in day hospitals. 70.9% received chemotherapy, while the remaining 29.1% received supportive therapies (hemotransfusion, nutritional therapies, etc.) (Table 1).

Instruments

Demographic characteristics: We recorded participants' age, ethnic background, level of education, number of children, marital/relationship status, kind of treatment and therapies received.

The Beck Depression Inventory (BDI-II)[48] Italian validation by Ghisi et al.[49]: Depressive symptoms were assessed using the BDI-II, a 21-item tool that covers the cognitive, affective, motivational and behavioral components of depression. Each item is rated on a four-point scale from 0 (never) to 3 (always). The total score (maximum 63 points) is the sum of the scores for the individual items. Based on the Italian validation study, a cut-off score of ≥ 12 was used to establish whether depression was present. Scores from 13 to 19 indicate mild depression; from 20 to 28, moderate depression; and from 29 to 63, severe depression. Cronbach's α coefficient has ranged from 0.80 to 0.87 in normative or clinical samples[48]. In this study, the α coefficient was 0.87.

Los Angeles Symptom Checklist (LASC)[50] The LASC is a 43-item self-report instrument. It provides a measure of global distress due to trauma exposure, severity of overall PTSD symptomology, and severity of individual PTSD symptoms (re-experiencing, avoidance/numbing, and hyperarousal). Previous studies found high internal consistency with α coefficients ranging from 0.88 to 0.95[50]. In the present study, the α coefficient was 0.89.

Resilience Scale for Adult[51] Was administered to assess resilience. It is a 33-item self-report scale for measuring protective resilience factors among adults. It applies a seven-point semantic differential scale in which each item has a positive and a negative attribute at each end of the scale continuum. To reduce acquiescence biases half of the items are reversely scored. Higher scores indicate higher levels of protective resilience factors. In the final version, it presents six factors associated with individual-familiar and social dimensions (Perception of self; Planned future; Social competence; Structured style; Family cohesion; Social resources). The RSA has proven to

Total number	110	
Age (years)		
Mean (SD)	66.60 (15.74)	
Min–max	22	98
Gender	Male	Female
% (n)	59.1% (65)	40.9 (45)
Nationality		
Italian	75	82.5%
Not Italian	35	38.5%
Education		
Primary school	25	22.72%
Middle school license	45	40.91%
Degree	23	20.91%
Post-graduate degree	17	15.46%
Occupational status		
Unemployed	29	26.36%
Employed	81	73.64%
Marital status		
Single	13	11.8%
Married or cohabiting	77	70%
Widower	16	14.5%
Divorced	4	3.6%
Children		
Children	85	77.27%
No children	25	22.73%
Health treatment		
Long hospital stay	71	64.6%
Day hospital treatment	39	35.4%
Type of treatment		
Chemotherapy	78	70.9%
Supportive therapies	32	29.1%

Table 1. Demographics.

be a reliable scale, with good internal consistency demonstrated by Cronbach's alpha values which in the various studies vary from 0.79 to 0.88. In our study coefficients were 0.82.

Multidimensional Scale of Perceived Social Support (MSPSS), Italian validation by Prezza and Principato[52,53] The MSPSS is a self-report instrument; it includes 12 items that converge in three dimensions: family, friends, and significant others. Each item is rated on a seven-point Likert-type response format (1 = very strongly disagree; 7 = very strongly agree). A total score is calculated by summing up all the answers. The possible score range is between 12 and 84, the higher the score the higher the perceived social support. The possible score range for the subscales/dimensions is between 4 and 28. Any mean scale score ranging from 1 to 2.9 could be considered low support; a score of 3–5 could be considered moderate support; a score from 5.1 to 7 could be considered high support. Cronbach's coefficients range from 0.85 to 0.91[52]. In this research coefficients were 0.89.

EQ-5D[54] is a standardized self-report questionnaire that measures health-related quality of life (HRQL). The descriptive system comprises five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension has 5 levels: no problems, slight problems, moderate problems, severe problems and extreme problems. The patient is asked to indicate his/her health state by ticking the box next to the most appropriate statement in each of the five dimensions. This decision results in a 1-digit number that expresses the level selected for that dimension. The digits for the five dimensions can be combined into a 5-digit number that describes the patient's health state. The EQ VAS records the patient's self-rated health on a vertical visual analogue scale where the endpoints are labeled 'The best health you can imagine' and 'The worst health you can imagine'. The VAS can be used as a quantitative measure of health outcome that reflects the patient's own judgment. Another method of assessing quality of life used in the present study is the application of an algorithm that allows the calculation of a synthetic score (EQ-5D index) of perceived health status. The implementation of this algorithm involves assigning a specific weight to each dimension of health status, which is calculated for a general population using cost-utility analysis techniques. The EQ-5D Index score is calculated by subtracting the relevant coefficients and constants per level of severity from 1000: the closer the score is to 1000, the better the perceived health status. (Table 2).

Procedure

Patients were recruited from three hospital facilities, from long stay wards and day hospital wards. This study was carried out in keeping with the Ethics Code of Italian Psychologists and approved by the Ethics Committee of eCampus University. Informed written consent was obtained from participants. The data were handled in keeping with General Data Protection Regulation (GDPR), RegulationUE2016/679. All participants received an envelope including the information about the aims of the study, consent forms, a socio-demographic questionnaire, and all the other study questionnaires. Long-term hospitalized patients completed the questionnaires independently and individually in hospital, while day hospital patients filled them at home. Data were collected from January 2023 to February 2024.

Statistical analysis

The descriptive analysis entailed computing participants' baseline scores for PTSD, depression, resilience, social support and quality of life. To investigate the association between demographics (age, gender), psychological impairments (PTSD and depression symptoms), psychological resources (social support and resilience) and quality of life correlational analysis were performed between all the variables studied. Finally, to examine the last hypothesis, hierarchical multiple regression analysis was conducted, following the mediational model by[55]. All statistical analyses were conducted using SPSS 21.

Results

Objective 1: Psychological adaptation of hematology patients

In terms of psychological outcomes, descriptive analyses (Table 3) show average levels of PTSD among study participants[50] and predominantly mild to moderate levels of depression symptoms[48]. In terms of resources, participants show moderate levels of perceived social support and resilience. Finally, they report low to moderate levels of quality of life.

	Power of items		
Dimension	1	2	3
Mobility	− 0.0	− 0.069	− 0.314
Self-care	− 0.0	− 0.104	− 0.214
Activities of daily living	− 0.0	− 0.036	− 0.094
Pain/discomfort	− 0.0	− 0.123	− 0.386
Anxiety/depression	− 0.0	− 0.071	− 0.236
Constants	− 0.0	− 0.081	− 0.269

Table 2. Coefficients of the three distinct gravity levels for each of the 5 dimensions and related constants for each level.

Variable	N	Mean	Std Dev	Minimum	Maximum
Reexperiencing	110	3.16	2.052	0	8
Avoidance	110	5.45	3.176	0	13
Hyperarousal	110	8.63	4.004	0	19
PTSD	110	17.28	7.776	0	37
Depression	110	14.65	8.478	1	32
Social support	110	57.54	10.511	12	72
Resilience	110	97.6636	21.13056	46	150
Quality of life	110	−0.4238	0.28078	−1.24	1
Minimal range of depression	34	30.9%			
Mild depression	41	37.3%			
Moderate depression	27	24.5%			
Severe depression	8	7.3%			

Table 3. Descriptives of psychological consequences; psychological resources; quality of life.

Variable	1	2	3	4	5	6	7
1. Gender	1	0.243*	0.121	0.146	0.226*	−0.239*	−0.268**
2. Age	0.243*	1	0.340**	0.370**	0.188*	−0.268**	−0.558**
3. PTSD	0.121	0.340**	1	0.561**	−0.108	−0.373**	−0.384**
4. Depression	0.146	0.370**	0.561**	1	−0.129	−0.452**	−0.575**
5. Social support	0.226*	0.188*	−0.108	−0.129	1	0.101	−0.066
6. Resilience	−0.239*	−0.268**	−0.373**	−0.452**	0.101	1	0.635**
7. Quality of life	−0.268**	−0.558**	−0.384**	−0.575**	−0.066	0.635**	1

Table 4. Correlational analysis between: demographic, psychological consequences, psychological resources and quality of life. *$p < 0.05$. **$p < 0.01$.

Predictors	β	t	Sig	R-square	F	Sig
Gender	−0.326	−4.646	0.0001	0.642	25.86	0.001
Age	−0.134	−2.136	0.035			
PTSD	0.059	0.784	0.435			
Depression	−0.271	−3.452	0.001			
Resilience	0.446	6.54	0.0001			

Table 5. Hierarchical multiple regression analysis: predictors of QoL.

Objective 2: Correlations between age variables, psychological outcomes, resources and quality of life

Correlational analyses show a negative relationship between QoL and gender, age, PTSD and depression. Specifically, it is female patients with higher age and higher levels of PTSD and depression symptoms who report lower levels of quality of life. In contrast, quality of life is positively correlated with resilience levels. No significant correlations between QoL and social support were found (Table 4).

Objective 3: Variables that predict quality of life

The hierarchical multiple regression analysis show that quality of life is firstly predicted by the level of resilience ($\beta = -0.446$; $t = 6.540$, $p = 0.001$), secondly by age ($\beta = -0.326$; $t = -4.646$, $p = 0.001$), depressive symptoms ($\beta = -0.271$; $t = -3.452$, $p = 0.001$) and finally by gender ($\beta = -0.134$; $t = -2.136$, $p = 0.03$) (Table 5).

Objective 4: Mediating effect of resilience

Based on the results of the hierarchical multiple regression analyses, a mediation model[55] was run, with age, gender and depression symptoms as predictors and level of resilience as a mediator.

The first model shows that age predicts QoL, with older patients perceiving a lower level of QoL. However, resilience partially mediates the effect of age.

Similarly, the second model shows that gender predicts QoL, with women reporting lower levels. However, resilience again acts as a protective factor, partially mediating the effect of gender on QoL.

Finally, the third model shows that depression predicts QoL, with resilience levels partially mediating.

Discussion

Contemporary oncology focuses not only on drug treatment, but also on a broader understanding of the experiences of patients and their families, prioritizing resource allocation, planning and delivery of holistic care that has a significant impact on quality of life. Many studies have highlighted how a patient's mental state changes with time, disease progression and treatment, and how a positive attitude plays an important role in the recovery process, highlighting the importance of psychological variables in facilitating or, conversely, hindering the care process[56,57].

In particular, the measurement of quality of life in cancer patients has been the subject of interest in many studies[58–60]. For example, Montazieri et al.[60] conducted a study of 129 lung cancer patients and highlighted that patients' overall quality of life prior to starting cancer treatment was an important predictor of survival. The study of more than 400 cancer patients by Li et al.[61] came to the same conclusion, finding that health-related quality of life was a strong and independent predictor of overall survival.

By specifically analyzing studies involving hematology patients[62,63], it becomes clear how certain characteristics of hematological malignancies, such as acute onset, rapid progression, easy recurrence, complex treatment methods and high treatment costs, can seriously affect the physical health, but also the mental health and quality of life of patients. Based on these considerations, our research aimed to assess the psychological adjustment of hematology patients, focusing on the psychological consequences of the disease in terms of depression and PTSD, psychological resources such as resilience and perceived social support, and their impact on perceived quality of life.

In addition, the aim was to assess which variables among demographics, clinical outcomes and psychological resources predict patients' quality of life and whether resilience plays a protective role.

About the first objective, our data confirm that hematological patients, like patients with other types of cancer, manifest significant levels of depression and PTSD, moderate levels of perceived resilience and social support, and a medium–low quality of life, in line with previous research[57,64,65].

Specifically, although not all cancers pose the same level of risk to life, the initial cancer diagnosis is interpreted as a life-threatening experience and may increase the risk of post-traumatic stress disorder and depression.

For example, Amir and Ramati[64] found significantly higher rates of PTSD in female breast cancer survivors compared with controls. Lewandowska et al.[57] conducted a large survey of 800 patients diagnosed with different types of cancer and found that 50 per cent of them showed symptoms of depression and 48 per cent showed fear and anxiety about the future. Similar findings were reported by Dehkordi et al.[66] who showed that the most common problems among cancer patients treated with chemotherapy were fear of the future (29%), thinking about the disease and its consequences (26.5%) and depression (17.5%). Similarly, Nayak et al.[67] surveyed more than 700 cancer patients and found that 54.4% of participants reported depression and the majority (98.3%) said they did not feel comfortable participating in social life.

Our data confirms a close relationship between quality of life, age variables, psychological outcomes and resources, in line with previous studies. In particular, we found that female gender, older age and high levels of depression are risk factors that negatively impact patients' quality of life.

Similarly, Geffen et al.[68] conducted a study of 44 patients with Hodgkin's disease and found that 32% of survivors had partial or complete PTSD and that the diagnosis of PTSD correlated with significantly lower quality of life than patients without PTSD. Similarly, in a large sample of 289 cancer patients, Gold et al.[65] found that 45% of the sample had a clinical score of PTSD, which was associated with higher mood disorder scores and lower quality of life scores.

Our results also suggest gender and age differences in QOL perceptions: in particular, female and older patients report lower QOL, confirming what previous research has documented.

For example, Modlinska et al.[69] showed that the anxious response to cancer significantly affects QoL in terminally ill patients under the age of 65, with more negative outcomes in older patients due to the greater impact of the disease on daily life and reduced autonomy.

In terms of gender, studies by Grassi et al.[46] had already found greater levels of psychological distress in female cancer patients than in men, associated with a higher incidence of depression, hopelessness and anxiety, which in turn negatively affect perceptions of quality of life. It is hypothesized that for women, the emotional burden is compounded by the sense of responsibility they feel for the impact of treatment and hospitalization on the management of their children and family.

Now that the negative impact of cancer has been widely documented, it is also interesting to analyze the psychological resources that may play a protective role in counteracting the impact of psychological distress on quality of life in cancer patients, as shown in previous studies.

In our study, quality of life appears to be correlated with levels of resilience, but not with perceived social support. In addition, the mediation model highlights a mediating role of resilience in counteracting the negative effects of age, gender and depression on QoL (Fig. 1).

Previously, Ristevska-Dimitrovska et al.[70] conducted a study with 218 consecutive breast cancer patients and found that overall quality of life was positively correlated with resilience levels. Specifically, all functional quality of life scales (physical, role, emotional, cognitive and social functioning) correlated positively to resilience, while symptom severity correlated negatively. The study also found that patients with higher levels of resilience had fewer symptoms of depression, confirming that resilience is a protective factor against depression and distress. Less resilient breast cancer patients reported poorer body image, were more pessimistic about their future prospects, and suffered more severe side effects from the treatments and therapies they received.

Wu et al.[71] also tested a mediation model on a sample of 40 adolescent cancer patients and found that distress symptoms had a negative impact on quality of life, but that resilience levels played a role in buffering the negative impact of symptoms.

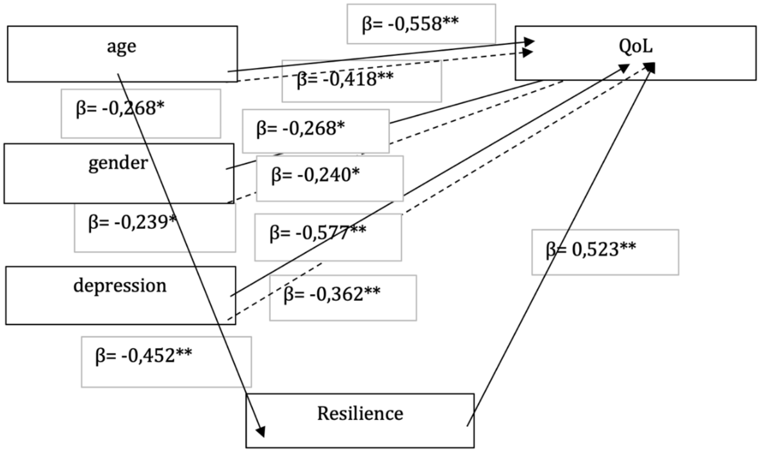

Fig. 1. Mediational model for age, gender, depression, resilience and QoL.

Focusing on hematology patients, other research had already highlighted[63] how hematological malignancies such as leukemia, lymphoma and myeloma usually involve complex and long-term treatment processes that pose considerable psychological and emotional challenges for patients and their families. Therefore, psychological resilience plays a crucial role in the study of patients with hematological malignancies, affecting not only their mental health but also treatment outcomes and quality of life. For example, Tian and Wang[63] recently conducted a study of 100 patients with hematological malignancies to assess the relationship between patient characteristics (age, gender, education level), fear of progression, resilience and sleep quality, a key aspect in patients' lives as it is closely related to mood and depression levels. The results suggest that fear of progression has a negative impact on sleep quality, but resilience plays a mediating role in mitigating its effects.

Contrary to expectations, we did not find a protective effect of social support on quality of life. However, this finding is consistent with previous studies that have found conflicting evidence in this regard.

For example, Lewandowska et al.[57] found a high percentage of patients who reported that the disease had brought them closer to family and friends. The authors therefore suggested that an extremely important aspect of cancer patients' quality of life was the impact of the disease on their marital, family and social relationships and the support they received.

Their study found that for 37% of respondents, relationships with family and friends had not been altered by the disease and remained satisfactory, while for 28% of patients, relationships with partners had actually improved.

Similarly, Gangane et al.[72] conducted a study of 208 female patients with infiltrating breast cancer and found that partner absence was negatively correlated with quality of life, mental health and social relationships.

In a study of cancer patients, Rodriguez et al.[73] found that social support, resilience and optimism were positively correlated with quality of life. Support from friends was the variable that most improved patients' overall health, while support from partners was the variable that best improved patients' coping with the disease. Similarly, emotional support from a partner, together with support from family, were the variables that most helped to reduce patients' symptoms. The research showed that both resilience and optimism improved overall health and functioning and reduced symptoms. Like our study, Rodriguez et al.[73] also found gender differences, with women having a lower quality of life than men, particularly in the way they coped with cancer.

However, findings on the role of social support are inconsistent: for example, Jacob et al.[74] found that unmarried patients reported higher social/family well-being than married patients, and married women reported lower social/family well-being than unmarried women.

In conclusion, this work has highlighted the importance of quality of life in hematology patients and the mediating role of resilience in counteracting the effects of variables such as age, gender and depression.

However, there are some limitations to this study: the sample size was relatively small, which may affect the generalizability of the results. Future studies with larger and more diverse samples may provide more robust results. Secondly, self-report questionnaires were used to measure the variables studied, which limits the measures to patients' perceptions of their level of depression, PTSD, resilience or quality of life. This approach introduces the possibility of response bias, and the lack of objective measures limits the accuracy of the assessments. The inclusion of clinical interviews or other objective methods in future research may provide a more comprehensive understanding of these psychological variables.

The cross-sectional design of this study provides a snapshot of the relationships between psychological outcomes, resources and quality of life. However, it does not allow for the exploration of causal relationships or how these variables interact over time. Longitudinal studies could provide deeper insights into the dynamic processes involved.

A further limitation consists in not having taken into consideration aspects of the illness, as the stage, the time since diagnosis and the severity of cancer that could impact on quality of life of the patient. This limit is mitigated by the fact that there was a certain homogeneity in the sample due to the inclusion criteria which required a diagnosis for at least three months and a life expectancy of at least six months, but a specific analysis of the role played by the duration and severity of illness could lead to more effective results.

Finally, resilience and quality of life are complex, multifaceted constructs that may not be adequately captured by quantitative questionnaires alone. The inclusion of qualitative interviews in future studies could enrich the findings by capturing patients' personal experiences and coping strategies.

Despite these limitations, the study provides useful guidance for clinical practice, suggesting that clinicians pay attention not only to the physical condition but also to the psychological state of patients and help them to develop an optimistic and self-reinforcing attitude and reduce negative psychological problems. In addition, he suggests implementing personalized intervention plans tailored to the specific needs of patients to improve psychological resilience more effectively.

Conclusion

The present study highlights the significant impact of haematological cancer on patients' mental health and quality of life. The results show that depression, PTSD and low resilience are prevalent in these patients, particularly in older individuals and women. Resilience emerged as an important protective factor, mediating the negative effects of age, gender and depression on quality of life. Although social support did not have a significant effect, these findings highlight the importance of psychological resilience in improving patient outcomes.

The importance of this study highlights the need for healthcare professionals to consider not only physical treatment, but also the psychological well-being of hematologists. Future research should explore more comprehensive and individualized interventions aimed at strengthening resilience. In addition, the use of more qualitative assessments could provide a deeper understanding of the complex factors that influence patients' quality of life. Such findings can guide the development of tailored psychological support programs that improve overall patient care.

Data availability

The raw data supporting the conclusions of this article will be made available by the authors (write to: Cristina Liviana Caldiroli, e-mail: cristina.caldiroli@unimib.it), without undue reservation.

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Author contributions

R.P. and C.L.C. contributed to the conception of the research; R.P., C.L.C., M.C. worked on the design of the work; R.P., C.L.C., M.C., S.S. worked on the acquisition and analysis of the data; R.P., C.L.C., S.S., M.T. contributed to the interpretation of the data; R.P, C.P., C.L.C., S.S. drafted the first version of the work; R.P., C.L.C., S.S., M.C., M.T., D.D. contributed to the final version of the work; R.P., C.L.C., S.S., M.C., M.T., D.D. substantially revised the final article. All authors read and approved the final manuscript.

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Declarations

Competing interests

The authors declare no competing interests.

Ethics approval

The study was conducted in accordance with the Declaration of Helsinki and approved by Ethics Committee of eCampus University. The patients/participants provided their written informed consent to participate in this study.

Additional information

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