Marzorati *et al.*
Health and Quality of Life Outcomes (2025) 23:31
https://doi.org/10.1186/s12955-025-02357-z

Health and Quality
of Life Outcomes

REVIEW **Open Access**

Psychosocial factors associated with quality of life in cancer patients undergoing treatment: an umbrella review

Chiara Marzorati[1,2*], Viktorya Voskanyan[1,2], Diana Sala[1], Roberto Grasso[2], Federico Borgogni[1], Ricardo Pietrobon[3], Iris van der Heide[4], Merel Engelaar[4], Nanne Bos[4], Augusto Caraceni[5], Norbert Couspel[6], Montse Ferrer[7,17], Mogens Groenvold[8], Stein Kaasa[9], Claudio Lombardo[10], Aude Sirven[11], Hugo Vachon[12], Alexandra Gilbert[13,15], Cinzia Brunelli[16], Giovanni Apolone[14] and Gabriella Pravettoni[1,2] on behalf of EUonQoL Consortium

Abstract

Background Cancer treatment greatly impacts physical and psychological functioning of cancer patients, negatively affecting their quality of life (QoL). This Umbrella Review (UR) aims to systematically summarize psychological and social factors positively or negatively associated with QoL in cancer patients undergoing treatment.

Method Four scientific databases (PubMed, Embase, Scopus, and PsycInfo) were searched to identify systematic reviews between 2012 and 2023 analyzing the relationship between QoL and psychosocial factors in cancer patients in treatment. The UR was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Joanna Briggs Institute (JBI) review guidelines. The methodological quality of the included studies was evaluated using Assessment of Multiple Systematic Reviews 2 (AMSTAR2).

Results Eighteen systematic reviews were included. The major psychological factors influencing QoL are depression, coping strategies, anxiety, and distress. Results also demonstrate the significant impact of social factors on QoL: perceived social support has a positive influence on QoL of cancer patients, while lowered social support, impaired social functioning, interactions, and role limitations worsen their QoL and overall well-being.

Conclusion This UR provides a comprehensive overview of the psychosocial factors impacting QoL of cancer patients and serves as a prominent base for developing questionnaires and policies aimed at measuring QoL in cancer patients undergoing treatment. Moreover, the findings of the study can guide future research or the development of personalized clinical interventions aimed at improving QoL for this cancer population group.

Keywords Cancer, Quality of Life, Cancer Patients, Umbrella Review, Psychosocial factors

---

*Correspondence:
Chiara Marzorati
chiara.marzorati@ieo.it
Full list of author information is available at the end of the article

Introduction

Cancer represents a major threat to global health, with roughly twenty million new cases reported in 2022 [1]. Indeed, cancer is the second biggest cause of death worldwide, with one of the highest rates of mortality [2]. Nonetheless, the number of cancer survivors is still rising due to breakthroughs in early detection and advancements in cancer treatments [3]. Cancer diagnosis is a traumatic experience for individuals facing it since it determines several challenges such as emotional and psychosocial problems, physical dysfunctions, and financial difficulties [4]. Indeed, many psychological and physical factors experienced by cancer patients, such as fatigue, decreased self-esteem, anxiety, emotional distress, and depression have a huge impact on their overall well-being [5]. Furthermore, all the negative consequences of cancer could in turn heighten vulnerability and depression, raising the importance of timely addressing and managing the faced challenges [6]. Thus, cancer disease and treatment symptoms may negatively affect patients' life lowering their Quality of Life (QoL) [4]. Although QoL represents a self-perceived complex and dynamic construct, several authors define it using objective descriptors such as physical, psychological, and social well-being [7, 8]. The World Health Organization (WHO) defines QoL as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" [9]. Hence, QoL is a multidimensional construct involving various domains and representing an individual's own perceptions and needs. Scientific literature highlights that a lower QoL is associated with patient-perceived unmet needs [10], mostly shared within the cancer community. Indeed, information and communication about the disease, physical symptom management, psychological support, spiritual concerns, family and social challenges, and purpose of life, which are reported as the primary needs of cancer patients, are highlighted in the literature as common necessities to all cancer population groups [11].

On the other hand, QoL perception may vary along the cancer pathway, according to patients' clinical condition and personal challenges: a recent study found that individuals undergoing cancer treatment report lower QoL than patients in survivorship [12]. At this time cancer patients not only struggle with the physical consequences of their therapy, but also with the psychosocial features, as the severity of the symptoms, the uncertainty, and the unpredictability of the treatment have a significant impact on the mental state of the patients. All these aforementioned side effects and consequences enhance cancer patients' negative experiences, constantly lowering their social and psychological well-being. Patients in treatment report experiencing a lack of emotional and social support, which can negatively impact their QoL considering its correlations with psychological changes and the risk of developing depressive symptoms [13, 14]. This goes in line with findings reporting social support as a recognized protective factor for cancer-related distress, thus enhancing QoL and patient's ability to develop coping strategies [15].

Consequences of oncological disease may have a negative effect on cancer patients' well-being, thus strengthening the importance of identifying the essential determinants responsible for increasing or worsening QoL and developing individual interventions. The identification of QoL-related traits may help tailor interventions targeted at improving individuals' overall well-being, allowing people to fulfil their own unmet needs.

Hence, given the importance of ensuring greater levels of QoL, the present work aims to summarize possible factors related to cancer patients' well-being, providing a deeper overview of the potential variables that may impact on QoL. Moreover, despite the significant number of scientific works focusing on this topic, to our knowledge, this is the first umbrella review (UR) synthetizing the scientific evidence of systematic reviews (SR) analysing current psychosocial variables affecting QoL in patients undergoing cancer treatments. The scientific importance of the study is also determined by its wide population range, i.e., including various cancer types and stages, while most of the studies focus on a specific cancer. Indeed, the broad range of population we explored allowed us to collect an extensive framework of prominent QoL determinants critical for scientific research. Thus, this UR contributes to the scientific literature as a unique work providing a complete overview of the main factors impacting QoL in various cancer patients undergoing treatment.

Material and methods

An UR, defined as a work integrating consolidated findings from various SRs to comprehensively explore research evidences related to a specific topic, was conducted [16]. Specifically, SRs on psychosocial factors affecting the QoL in adult cancer patients with ongoing treatments were systematically synthesized. To provide a more complete overview, some major clinical factors that have been multiply reported in the included systematic reviews were collected.

Data sources and search strategy

Three psychologist researchers developed the search strategy, which was subsequently modified by a research librarian (A. V. A.) to suit the specific requirements of four electronic scientific databases: PubMed, Embase, Scopus, and PsycInfo. Specific search strings were optimized using a combination of various search terms related to “Cancer”, “Quality of Life”, “Factors”, “Psychosocial Impact”, and “Ongoing treatment” (Full search strings and the related themes with the keywords are presented in Supplemental Tables 1 and 2).

The UR was conducted following the guidelines provided by the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis [17].

The results were reported in accordance with Preferred Reporting Items for Systematic reviews and Meta-Analyses (see PRISMA flowchart in the results section) [18].

Furthermore, the protocol of the study was registered in the International Prospective Register of Systematic Reviews (PROSPERO, identifier: CRD42023413899) [19]. A narrative synthesis was performed to report the results.

Inclusion and exclusion criteria

For the present UR clear exclusion and inclusion criteria were established to avoid biases that could impact the quality of the research itself. The following eligibility criteria were established according to the research question (PICO questions; Population/Problem: ongoing treatment adult cancer patients; Intervention: not applicable; Comparison: not applicable; Outcome: factors affecting QoL and type of association).

Hence, the research was limited to (a) systematic reviews, (b) without geographical restrictions, (c) conducted from 1st January 2012 to January 2023, (d) including adult cancer patients (> 18 years), (e) undergoing treatments and (f) investigating the relationship between quality of life and psychosocial factors.

Studies investigating (a) non-psychosocial factors associated with QoL (e.g. economic, cultural, interventional outcomes), (b) non-in-treatment adult cancer patients (e.g. survivors, end of life patients, other diseases aside from cancer, caregivers, families of end-of-life cancer patients, children, etc.), and (c) written in other languages than English were excluded.

Literature search and data selection

Starting from the presented search strategy, search results were imported into the online software Rayyan and duplicates were identified and removed. The preliminary screening was independently conducted by two researchers (D. S. and V. V.) using the blinded mode. Data selection was based on the titles, abstracts, and keywords and was organized by labelling each article. Any disagreement concerning the eligibility of studies was resolved involving a third researcher (C. M.), through group discussion and full-text review, until a total consensus was reached. The reference lists of the included articles were also screened to find any other relevant articles that were not identified during the automatic search.

Consequently, an Excel© worksheet designed by the research team with registered included articles was organized as follow: publication data (title, authors, year, study origin), study characteristics (number of studies included in each review, study design, year of publication and country origin of included articles), aim of the review, participants’ details (i.e. total number and sociodemographic characteristics, if included in the reviews), cancer group, and psychological, social, and clinical factors associated with QoL.

Assessment of methodological quality and risks of bias

An assessment of the methodological quality of included studies was independently conducted using A MeaSurement Tool to Assess systematic Reviews (AMSTAR2) Checklist by two reviewers [20]. This instrument includes 16 items evaluating the quality and the risk of bias of the selected studies. Selected articles received a single-item score based on positive/partial positive/negative/not applicable (Yes/Partial Yes/No/N/A) responses, thus identifying high, moderate, low, and critically low ratings.

For this UR, the scoring system of AMSTAR 2 was slightly modified: researchers added “partial yes” to the sixteen questions if the review did not meet one of the criteria for rating “Yes”. The same modification was applied to question N1 following the present criterion: non-interventional reviews with a clear and predefined research question, but *only* reporting population and outcomes were rated as “Yes”.

Results

Data extraction and analysis

Through the scientific database research, 2872 potentially relevant references were found in four different scientific databases: PubMed, Embase, Scopus, and PsycInfo (See Fig. 1 PRISMA Flowchart); after the detection of duplicates, 1952 reviews remained for the screening of titles and available abstracts. Successively, 1899 articles were excluded and a total number of 53 reviews remained for the full-text screening. Of these, 3 papers were excluded because the full-text was not available, while 32 other studies were excluded due to the pre-established exclusion criteria. The most common reasons for exclusion were: wrong outcome or population and absence of psychological factors related to QoL.

Finally, 18 SRs were included in the present UR.

Study characteristics

The articles included in each SR spanned from 2015 to 2022 in terms of their publication years. The number of studies included in each review ranged from 11 to 59.

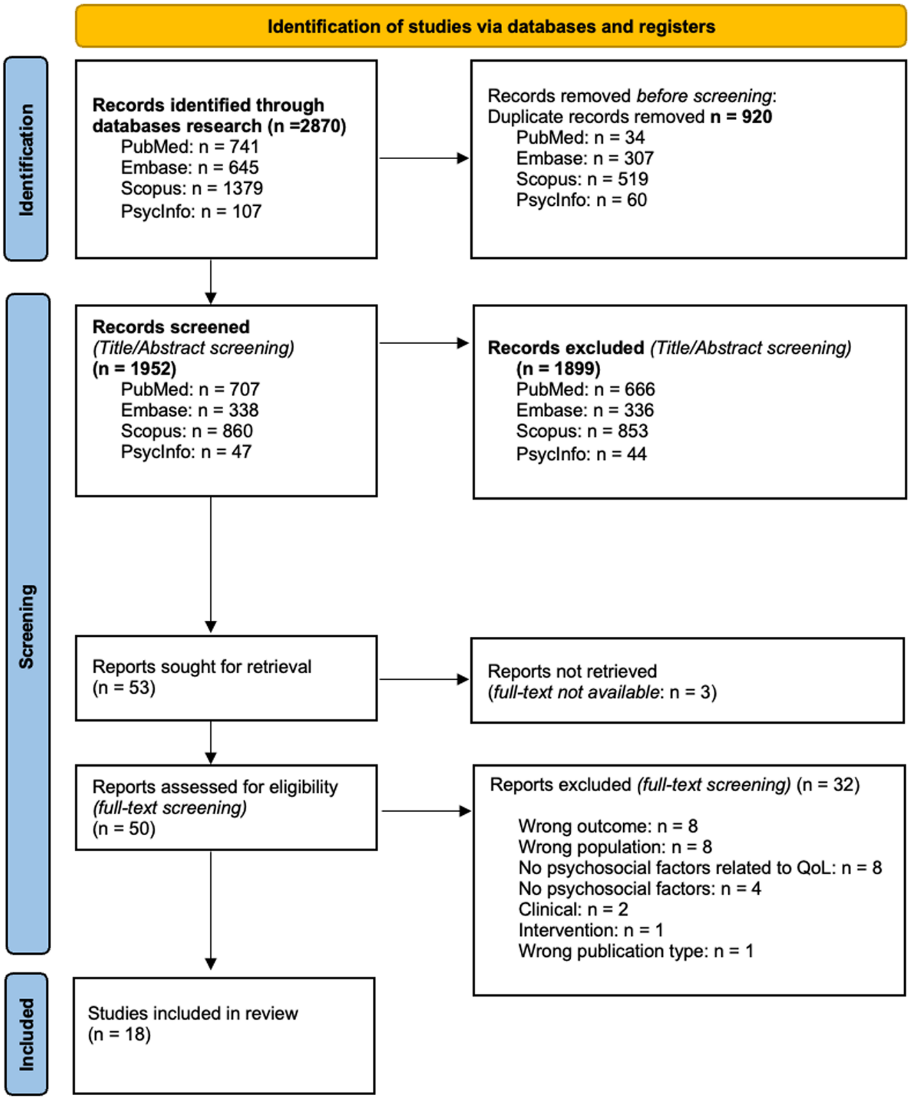

Fig. 1 PRISMA Flowchart of the study selection process

The included SRs cover different study designs: most frequent types are cross-sectional studies ($n=277$), longitudinal studies ($n=88$), clinical trials ($n=59$), cohort studies ($n=34$), and retrospective cross-sectional studies ($n=31$). The psychosocial factors have been mostly investigated in breast (9 SRs), prostate (2 SRs), and gastric (1 SR with a large number of participants) cancer types. The total number of subjects is 275.855, of which 75.733 included gastric cancer, followed by 71.865 breast cancer patients, 54.571 DTC (i.e. differentiated thyroid carcinoma) patients, 27.849 hepatocellular cancer patients, and 22.769 all cancer types. The summarized articles focused on specific cancer populations (e.g. gastric cancer, breast cancer, DTC, etc.), except for two articles that included different cancer populations without specific distinctions. The details of the study characteristics are presented in Table 1. Furthermore, the population also varies in number of patients included in the summarized articles (with a total sample range between 10–3294), sex, age (ranging from 18–90 years old), and country. Eleven studies were published by European institutions, 3 were conducted in America, 2 in Asia, and the remaining 2 were conducted in Africa.

QoL and associated psychosocial factors

The results of the present UR reported that the main psychological factors associated with QoL are depression, coping strategies, anxiety and distress (See Table 2). Depression was significantly associated with lower QoL in all the studies in which it was analyzed [22, 24–26, 29–32, 34, 36]. Another

Table 1 Characteristics of the included studies

Author, year of Publication	Study origin	Studies included				Participants		Cancer Group	
		Number of studies included	Type of studies included	Years of published included articles	Country of origin of included studies	Number	Socio-demographic characteristics	Cancer type	
James et al. (2022) [21]	London	32	18 longitudinal studies, 14 a cross-sectional study	2003 - 2021	Europe (*n*=13), North America (*n*=11), Australia (*n*=6), Asia (*n*=2)	9953	Males	Prostate cancer	
Landry et al. (2022) [22]	Canada	25	16 cross-sectional, 4 cohort studies, 5 mixed methods or qualitative studies	2003 - 2022	Asia (*n*=9), Europe (*n*= 8), America (*n*=6), Africa (*n*=1), Oceania *n*=1)	54571	NA	DTC (differentiated thyroid carcinoma) patients	54571
Wintraecken et al. (2022) [23]	Netherlands	12	6 cohort studies, 6 cross-sectional studies	2004 - 2020	China (*n*=1), Germany (*n*=1), Italy (*n*=1), Netherlands (*n*=1), Serbia (*n*=1), USA (*n*=7)	2729	≥18 years	Breast cancer	2729
Rimmer et al. (2023) [24]	England	29	13 cross-sectional studies, 9 longitudinal studies	2001 - 2021	Netherlands (*n*=3), USA (*n*=3), China (*n*=2), Italy (*n*=2), India (*n*=2), Japan (*n*=2), Norway (*n*=2), Australia (*n*=1), Finland (*n*=1), Germany (*n*=1), South Korea (*n*=1), Sweden (*n*=1), Turkey (*n*=1)	2093	Mean age range 35.8 - 49.5 years. Sex range 24 – 73 % female.	Low-grade glioma	2093
Zou et al. (2022) [25]	China	27	2 retrospective cohort studies, 1 retrospective case-control study, 11 cross-sectional, 11 prospective cohort studies, 1 interrupted time series, 1 case-control study	Before April 2021	Asia (27)	20861	>18 years	Hepatocellular carcinoma	20861
Baba et al. (2021) [26]	Morocco	13	13 cross-sectional observational studies	2009 - 2020	Italy (*n*=9), France (*n*=2), Egypt (*n*=1), Turkish (*n*=1)	617	>18 years Min-max: 19 - 85	Glioblastoma	617

Table 1 (continued)

Author, year of Publication	Study origin	Studies included				Participants		Cancer Group	
		Number of studies included	Type of studies included	Years of published included articles	Country of origin of included studies	Number	Socio-demographic characteristics	Cancer type	
Rupp et al. (2021) [27]	Germany	59	Clinical trials, registry-based studies, cohort studies, population-based studies	1998 - 2020	Canada (n=1), China (n=13), France (n=1), Germany (n=4), Iran (n=2), Israel (n=1), Japan (n=1), Korea (n=18), Portugal (n=1), Sweden (n=3), Taiwan (n=1), Turkey (n=1), United Kingdom (n=4), Vietnam (n=1)	75733	>18 years	Gastric cancer	75733
Sihvola et al. (2022) [28]	Finland	11	9 cross-sectional, 2 intervention (RCT)	2014 - 2021	Brazil (n=2), China (n=5), Israel (n=3), Turkey (n=1)	1553	≥18 years Mean age: 59 years Range age: 18 - 87 941: male; 623: female	Colorectal cancer	1553
Aizpurua-Perez et al. (2020) [29]	Spain	39	30 cross-sectional studies, 8 intervention study, 1 longitudinal study	2011 - 2020	Asia (n = 16), Europe (n = 14), America (n = 8), Oceania (n = 1)	6189	Age range 18 - 90 years.	Breast cancer	6189
El Haidari et al. (2020) [30]	France	33	28 cross-sectional, 3 case control, 2 longitudinal	2004 - 2018	Iran (n=15), Turkey (n=9), Saudi Arabia (n=3), Jordan (n=2), Lebanon (n=1), Kuwait (n=1), Bahrain (n=1), Yemen (n=1)	9323	Middle east countries Age range: 25 - 60	Breast cancer	9323
Kang et al. (2020) [31]	Korea	45	23 cohort studies, 13 cross-sectional studies, 9 intervention studies	2010 - 2018	China (n=11), USA (n=10), Taiwan (n=6), France (n=4), UK (n=2), Japan (n=5), Germany (n=2), Italy (n=2), Singapore (n=2), Hong Kong (n=1)	6988	Mean age 58.9 years.	Hepatocellular carcinoma	6988

Table 1 (continued)

Author, year of Publication	Study origin	Studies included				Participants		Cancer Group	
		Number of studies included	Type of studies included	Years of published included articles	Country of origin of included studies	Number	Socio-demographic characteristics	Cancer type	
Odeo et al. (2020) [32]	Kenya	54	21 cross-sectional studies, 13 prospective Studies, 5 prospective cohort study, 4 prospective studies, 3 retrospective studies, 2 longitudinal prospective studies, 1 longitudinal, observational study, 1 multicentre, prospective, non-Interventional trial study, 1 Phase III, RCT, 1 prospective longitudinal study, 1 cohort study, 1 longitudinal study	2000 - 2020	N/A	7394	Most participants were from Europe and America, one few studies involved participants from Asia.	Prostate cancer	7394
Nierop-Van Baalen et al. (2020) [33]	Netherlands/Belgium	33	28 cross-sectional, 2 prospective cohort, 2 randomized controlled trial, 1 longitudinal	2009 - 2019	Asia (n=14), America (n=10), Europe (n=8), Australia (n=1)	6275	> 18 years, under treatment	All cancer types	3821
								Bladder	78
								Breast cancer	996
								Central nervous system	269
								Cervical cancer	480
								Colorectal	429
								Leukemia	70
								Lung	132

Table 1 (continued)

Author, year of Publication	Study origin	Studies included				Participants		Cancer Group	
		Number of studies included	Type of studies included	Years of published included articles	Country of origin of included studies	Number	Socio-demographic characteristics	Cancer type	
Sousa et al. (2019) [34]	Portugal	44	31 retrospective cross-sectional studies, 12 prospective studies, 1 ambispective study	2000 - 2018	USA (n=8), UK (n=5), Canada & USA (n=4), The Netherlands (n=3), Sweden (n=3), Canada (n=2), Korea (n=2), Ireland (n=2), Germany (n=2), Spain (n=2), France (n=2), Australia (n=2), Turkey (n=1), Poland (n=1), Norway (n=1), Italy (n=1), Denmark (n=1), Czech Republic (n=1), Brazil (n=1)	16683	Mean age 50.9 years.	Breast cancer	16683
Ho P.J. et al. (2018) [35]	Singapore/ Netherlands	57	43 cross-sectional studies and 14 longitudinal studies	2005 - 2017	Korea (n=17), China (n=14), India (n=8), Taiwan (n=6), Malaysia (n=6), Japan (n=5) and Thailand (n=1)	24538	Womenliving in Eastern Asia, South Central Asia and Southeast Asia	Breast cancer	24538
Brandão et al. (2017) [36]	Portugal	41	41 longitudinal studies	2000 - 2015	USA (n = 10), the Netherlands (n = 8), Australia (n=1), Canada(n=1), Denmark (n=1), France (n=1), Greece (n=1), Hong Kong (n=3), Iran (n=2), Japan (n=1), Norway (n=1), Portugal (n=2), Spain (n=2), South Korea (n=1), Sweden (n=2), Taiwan (n=2), United Kingdom (n=2)	9361Sample size range 50 - 763	Mean age 53.7 years.	Breast cancer	9361,00

Table 1 (continued)

Author, year of Publication	Study origin	Studies included				Participants		Cancer Group	
		Number of studies included	Type of studies included	Years of published included articles	Country of origin of included studies	Number	Socio-demographic characteristics	Cancer type	
Razdan et al. (2016) [37]	New York, USA	22	18 Case Series, 4 Prospective Cohort	1995 - 2014	Canada (*n*=3), Netherlands (*n*=3), Norway (*n*=1), Sweden (*n*=8), Turkey (*n*=1), UK (*n*=1), USA (*n*=5)	2046	Women	Breast	2046
Bai et al. (2015) [38]	USA	36	32 cross-sectional studies, 4 longitudinal studies	1996 - 2014	USA (*n*=27), Jordan (*n*=2), Australia (*n*=2), The Netherlands (*n*=1), Canada (*n*=1), Iran (*n*=1), Italy (*n*=1), Japan (*n*=1)	18948	N/A	All cancer types (8 studies targeted breast cancer, prostate or colorectal)	18948

Table 2 Results of the included studies

Author, year of Publication	Factors		Association with QoL	Outcomes
	Psychological factors	Social factors		
James et al. (2022) [21]	fear of cancer recurrence		Negative association⟶QoL	higher fear of cancer recurrence is associated with lower QoL
Landry et al. (2022) [22]	mental health		negative association⟶QoL	mental health is associated with lower QoL
	mental fatigue		negative association⟶QoL	mental fatigue is associated with lower QoL
	reduced motivation		negative association⟶QoL	reduced motivation is associated with lower QoL
	distress		negative association⟶QoL	distress is associated with lower QoL
	anxiety		negative association⟶QoL	anxiety is associated with lower QoL
	depression		negative association⟶QoL	depression is associated with lower QoL
	somatization		negative association⟶QoL	somatization is associated with lower QoL
		social functioning and interactions	negative association⟶QoL	impaired social functioning and interactions are associated with lower QoL
		role limitations	negative association⟶QoL	impaired role limitations are associated with lower QoL
Wintraecken et al. (2022) [23]	optimism		positive association⟶QoL	optimism is associated with higher QoL
	self-efficacy		positive association⟶QoL	self-efficacy is associated with higher QoL
	trait anxiety		negative association⟶QoL	trait anxiety is associated with lower QoL
	extraversion		positive association⟶QoL	extraversion is associated with higher QoL
Rimmer et al. (2023) [24]	coping		Negative association⟶QoL	higher levels of avoidant coping are associated with lower QoL
	depression		Negative association⟶QoL	higher level of depression is associated with lower QoL
	post-traumatic stress disorder		Negative association⟶QoL	post-traumatic stress disorder is associated with lower QoL
	post-traumatic growth		Positive association⟶QoL	post-traumatic growth is associated with better QoL
Zou et al. (2022) [25]	depression		negative associated⟶QoL	depression is associated with lower QoL
	resilience		positive association⟶QoL	psychological resilience is associated with better QoL
	positive illness perception		positive association⟶QoL	positive illness perception is associated with better QoL
	coping		negative associated⟶QoL	more emotion-oriented coping is associated with lower QoL
Baba et al. (2021) [26]	coping strategies (problem solving and positive thinking, avoidance)		positive association⟶QoL	coping strategies (problem solving and positive thinking) are associated with better QoL
	coping strategies based on social support		negative association⟶QoL	coping strategies based on social support are associated with lower QoL
	avoidance		positive association⟶QoL	avoidance is associated with higher QoL score
	anxiety		negative association⟶QoL	anxiety is associated with lower QoL
	depression		negative association⟶QoL	depression is associated with lower QoL
Rupp et al. (2021) [27]	personality type D		negative association⟶QoL	type D personality is associated with lower QoL
	tolerant personality type		positive association⟶QoL	tolerant personality is associated with better QoL
			positive association⟶QoL	nanomedicine is associated with higher QoL

Table 2 (continued)

Author, year of Publication	Factors		Association with QoL	Outcomes
	Psychological factors	Social factors		
Sihvola et al. (2022) [28]	resilience		positive association⟶QoL	resilience is associated with higher QoL
Aizpurua-Perez et al. (2020) [29]	resilience		Positive association⟶QoL	resilience is associated with higher QoL
	coping strategies		Positive association⟶QoL	appropriate coping strategies is associated with higher QoL
	anxiety		Negative association⟶QoL	anxiety is associated with lower QoL
	depression		Negative association⟶QoL	depression is associated with lower QoL
		social support	Positive association⟶QoL	social support is associated with higher QoL
El Haidari et al. (2020) [30]	religiosity		positive association⟶QoL	religiosity is associated with better QoL
	spiritual well-being		positive association⟶QoL	spiritual well-being is associated with better QoL
	depression		negative association⟶QoL	depression is associated with lower QoL
	anxiety		negative association⟶QoL	anxiety is associated with lower QoL
	psychological symptoms		negative association⟶QoL	psychological symptoms are associated with lower QoL
	emotional functioning		negative association⟶QoL	emotional functioning is associated with lower QoL
	helplessness coping		negative association⟶QoL	helplessness is associated with lower QoL
	unmet needs		negative association⟶QoL	unmet needs are associated with lower QoL
	self-efficacy		positive association⟶QoL	self-efficacy is associated with better QoL
	self-regulation		positive association⟶QoL	self-regulation is associated with better QoL
	sense of coherence		positive association⟶QoL	sense of coherence is associated with better QoL
	emotion focus coping strategies		positive association⟶QoL	emotion focus coping strategies are associated with better QoL
		social support	positive association⟶QoL	social support is associated with better QoL
Kang et al. (2020) [31]	distress		Negative association⟶QoL	distress is associated with lower QoL
	sadness		Negative association⟶QoL	sadness is associated with lower QoL
	depression		Negative association⟶QoL	depression is associated with lower QoL
	illness perception		Positive association⟶QoL	illness perception is associated with higher QoL
	personal control over the patients' own disease		Positive association⟶QoL	personal control over the patients' own disease is associated with higher QoL
		social functioning	Negative association⟶QoL	poor social functioning is associated with lower QoL
Odeo et al. (2020) [32]	depression		Negative association⟶QoL	depression is associated with lower QoL
	impaired mental health		Negative association⟶QoL	impaired mental health is associated with lower QoL
Nierop-Van Baalen et al. (2020) [33]	hope		positive association⟶QoL	hope is associated with better QoL

Table 2 (continued)

Author, year of Publication	**Factors**		**Association with QoL**	**Outcomes**
	Psychological factors	**Social factors**		
Sousa et al. (2019) [34]	depression		Negative association⟶QoL	depression is associated with lower QoL
	harm avoidance		Positive association⟶QoL	higher level of harm avoidances associated with higher QoL
	neuroticism		Negative association⟶QoL	neuroticism is associated with lower QoL
	openness		Negative association⟶QoL	higher level of openness is associated with lower QoL
	satisfaction with esthetic outcome		Positive association⟶QoL	higher level of satisfaction with esthetic outcome is associated with higher QoL
Ho P.J. et al. (2018) [35]		lower social support	Negative association⟶HRQL	lower social support is associated with lower HRQL
	unmet sexuality needs		Negative association ->	unmet sexuality needs are associated with lower HRQL
	self-efficiency		Negative association ->	lower self-efficiency is associated with lower QoL
	religiosity		Positive association ->	higher religiosity is associated with better HRQOL
	distress		Negative association ->	symptom of distress is associated with poorer HRQOL
	optimism		Positive association ->	optimism is associated with better HRQOL
	positive mood		Positive association ->	positive mood is associated with better HRQOL
	boredom		Negative association ->	higher levels of boredom are associated with poorer HRQOL
	internal locus of control		positive association ->	internal locus of control is associated with better QoL
	external locus of control		negative association ->	external locus of control is associated with lower QoL
	coping mode		Positive association ->	active emotional coping is associated with better HRQOL
	empowerment		Positive association ->	presence of empowerment is associated with better HRQOL
	family harmony status		Positive association ->	good family harmony status is associated with better HRQOL
Brandão et al. [36]		social support	Positive association ->	social support is associated with higher QoL
	anxiety		Negative association ->	anxiety is associated with lower QoL
	depression		Negative association ->	depression is associated with lower QoL
	psychological well-being		Positive association ->	psychological well-being is associated with higher QoL
	optimism		Positive association ->	optimism is associated with higher QoL
	neuroticism		Negative association ->	neuroticism is associated with lower QoL
	a sense of self-efficacy		Positive association ->	a sense of self-efficacy is associated with better QoL
	confidence about remaining cancer		Positive association ->	confidence about remaining cancer free is associated with better QoL
	coping strategies		Positive association ->	appropriate coping strategies are associated with higher QoL
	body image		Positive association -> QoL / no association	contradictory results are found concerning the correlation between body image and QoL: 1) 2 studies found that better body

Table 2 (continued)

Author, year of Publication	Factors		Association with QoL	Outcomes
	Psychological factors	Social factors		
Razdan et al. [37]	distress		Negative association ->	distress is associated with lower QoL
	body Image		Negative association ->	negative change in body image is associated with lower QoL
Bai et al. [38]	spiritual well-being		Positive association ->	spiritual well-being is associated with higher QoL.
	faith		Positive association ->	faith is associated with higher QoL.

prominent factor significantly associated with QoL is coping strategies: both positive and negative impacts on QoL were identified [24–26, 29, 35, 36]. Specifically, active coping strategies (such as problem-solving, emotion-focused strategies, and adaptation) were associated with better QoL, while maladaptive behaviors (e.g. avoidance and isolation) correlated with lower QoL.

Anxiety was reported as a factor negatively impacting QoL[22, 23, 26, 29, 30, 36]. Symptoms of distress were always related to lower QoL in all the four SRs where distress was analyzed[22, 31, 35, 37].

Our results also demonstrate the significant impact of optimism, resilience, and unmet needs on QoL of cancer patients in treatment [23, 25, 28–30, 35, 36]. Also, one study reported an association between locus of control and QoL: internal locus of control was associated with better QoL, while external one had a negative impact on QoL [35].

Other factors negatively associated with QoL in cancer patients undergoing treatment were: negative change in body image, neuroticism, fear of cancer recurrence, mental fatigue, post-traumatic stress disorder and impaired mental health [21, 22, 24, 32, 34, 36, 37].

Besides negative factors, this UR also identify factors that had a positive impact on QoL of cancer patients undergoing treatment: self-efficacy, tolerant personality type, self-regulation, sense of coherence, faith, spiritual well-being, and hope [23, 27, 30, 33, 35, 36, 38].

Regarding the social factors identified in this UR, our finding report that perceived social support had a positive impact on QoL of cancer patients [29, 30, 36]. Lower social support, impaired social functioning, interactions and role limitations worsened QoL as well as the overall well-being of cancer patients in treatment [22, 31, 35].

Clinical factors

Though this UR was aimed at the identification of psychosocial factors associated with QoL, clinical factors mentioned in the included reviews were also extracted. Indeed, clinical factors play a significant role in the development of psychosocial factors impacting the QoL of cancer patients undergoing treatment. The severity of symptoms and their impact on the mental state of patients were discussed in the introduction.

Our findings report that the main clinical factors that have a great impact on QoL of patients undergoing treatment are cancer stage, cancer severity, time since diagnosis, type of surgery, cancer-specific symptoms (e.g. fatigue, pain), chemotherapy, comorbidities with other diseases (e.g. hypertension, arthritis, diabetes), hormone and immune therapy, radiotherapy and higher symptom score [24, 25, 30–32, 34–36]. Advanced cancer stages were associated with lower QoL, while early cancer stage and early treatment were associated with better QoL [30, 35, 36]. Strong negative associations were also found between chemotherapy, comorbidities, and QoL [30, 31, 34, 35]. Comorbidities with other diseases such as hypertension, arthritis, and diabetes significantly decreased QoL and the overall well-being of cancer patients [32, 35]. The type of treatment has also been found to influence QoL. More specifically, immune therapy, hormone therapy and radiotherapy are reported to positively influence QoL of cancer patients [30, 35]. Results also show that breast reconstruction surgery, timing of reconstruction, complementary alternative medicine, and nanomedicine played an important role in increasing QoL of cancer patients [27, 30, 34].

Quality assessment

Although all eighteen included articles featured an explicit search strategy, study selection methodology, and PRISMA flowchart, only eight studies explicitly declare having followed a protocol previously registered on PROSPERO, whereas seven declared not having registered their protocol on PROSPERO. Results of the quality assessment demonstrate that most of the SRs included in this UR show low scores mostly for the following questions: “N3. Did the review authors explain their selection of the study designs for inclusion in the review?”, “N7. Did the review authors provide a list of excluded studies and justify the exclusions?”, and “N10. Did the review authors report on the sources of funding for the studies

Table 3 AMSTAR quality assessment

Author, year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
James et al. (2022) [21]	Y	Y	N	P Y	Y	Y	Y	P Y	Y	N	N/A	N/A	Y	Y	N/A	Y
Landry et al. (2022) [22]	P Y	Y	N	P Y	Y	Y	N	P Y	N	N	N/A	N/A	N	Y	N/A	Y
Wintraecken et al. (2022) [23]	Y	Y	Y	Y	Y	Y	N	P Y	Y	N	N/A	N/A	Y	Y	N/A	Y
Rimmer et al. (2023) [24]	Y	Y	N	P Y	Y	Y	N	Y	P Y	N	N/A	N/A	Y	Y	N/A	Y
Zou et al. (2022) [25]	Y	Y	N	P Y	Y	Y	N	P Y	Y	N	N/A	N/A	N	Y	N/A	Y
Baba et al. (2021) [26]	Y	Y	N	P Y	Y	Y	N	P Y	Y	N	N/A	N/A	N	Y	N/A	Y
Rupp et al. (2021) [27]	Y	P Y	N	P Y	N	N	N	P Y	Y	N	N/A	N/A	Y	Y	N/A	Y
Sihvola et al. (2022) [28]	Y	Y	N	P Y	Y	Y	N	P Y	Y	N	N/A	N/A	N	N	N/A	Y
Aizpurua-Perez et al. (2020) [29]	Y	N	N	P Y	Y	Y	N	P Y	N	N	N/A	N/A	Y	Y	N/A	Y
El Haidari et al. (2020) [30]	Y	N	N	P Y	Y	Y	N	P Y	Y	N	N/A	N/A	Y	Y	N/A	Y
Kang et al. (2020) [31]	Y	N	N	P Y	Y	Y	N	P Y	P Y	N	N/A	N/A	Y	Y	N/A	Y
Odeo et al. (2020) [32]	Y	P Y	N	P Y	Y	Y	N	P Y	P Y	N	N/A	N/A	N	Y	N/A	Y
Nierop-Van Baalen et al. (2020) [33]	P Y	N	N	P Y	Y	Y	N	P Y	Y	N	N/A	N/A	N	Y	N/A	Y
Sousa et al. (2019) [34]	Y	N	N	P Y	Y	Y	N	Y	Y	N	N/A	N/A	Y	Y	N/A	Y
Ho P.J. et al. (2018) [35]	P Y	P Y	N	P Y	Y	Y	N	P Y	N	N	N/A	N/A	Y	Y	N/A	Y
Brandão et al. (2017) [36]	Y	N	N	P Y	Y	N	N	P Y	N	N	N/A	N/A	N	Y	N/A	Y
Razdan et al. (2016) [37]	Y	Y	N	P Y	Y	Y	N	P Y	Y	N	N/A	N/A	Y	Y	N/A	Y
Bai et al. (2015) [38]	Y	P Y	N	P Y	Y	Y	N	P Y	N	N	N/A	N/A	N	N	N/A	Y

Y Yes, *P Y* Partial Yes, *N* No, *N/A* Not applicable

included in the review?". The details of the quality assessment results are shown in Table 3.

Discussion

This UR investigated the association between psychosocial factors and QoL in cancer patients undergoing treatment in order to highlight the impact of these determinants on increasing or worsening QoL.

Analyzing the findings from 18 systematic reviews included in this UR, our results identified various psychosocial factors that are responsible for higher or lower levels of QoL and the overall well-being of cancer patients undergoing treatments. The major factors that have a profound impact on the QoL of cancer patients are depression, coping strategies, social support/functioning/interaction, anxiety, distress, faith/religiosity, optimism, resilience, and unmet needs [22–26, 28–32, 34–38], showing a great diversity of the psychosocial factors associated with the QoL in this cancer phase. The specific treatment that cancer patients are going through may lead to a great variety of factors impacting QoL, according to the high vulnerability these patients may face in this period of the cancer trajectory. Indeed, research highlights that more than 70% of cancer patients in treatment experience treatment side effects, which leave a trace on their QoL: treatment symptoms impact not only the physical but also the mental state of patients, who in addition to physiological issues (e.g. pain, appetite loss, nausea), are facing psychological challenges like depression, anxiety or distress [39, 40].

The significance of the correlation between physical and psychological symptoms has also been confirmed in the scientific literature by a number of studies that demonstrate the association between treatment-related side effects and mental issues experienced by cancer patients. Niedzwiedz et al. and Smith et al. highlighted that treatment symptoms could impact the development and even the level of depression [41, 42]. This is also confirmed by our results mentioning depression as the main factor negatively impacting QoL of cancer patients [22, 24–26, 29–32, 34, 36]. However, the correlation between physical and psychological symptoms is even more profound: not only may side effects lead to depression, but also depression may in turn influence the intensity of treatment symptoms and outcomes, thus worsening the overall physical state of cancer patients [43]. Along with depression, our findings show that QoL in cancer patients undergoing treatment has been impacted by a complex interplay of various factors. Evidence here summarized demonstrate a great negative impact of anxiety, distress, and unmet needs on QoL in cancer patients [22, 23, 26, 29–31, 35–37]. These factors significantly influence cancer patients' recovery outcomes, as the literature highlights a great association between anxiety and distress and treatment outcomes [44, 45]. Research shows that high levels of distress may influence treatment adherence and increase the possibility of hospitalization

[46]. Moreover, it may worsen cancer patients' emotional health, eventually leading to hopelessness and an even increased suicide risk, which is almost four times higher for certain cancer types (e.g., head and neck cancer) compared with people without cancer [47]. Unmet needs, in health and information domains, as well as physical, psychological, and daily life needs, are reported to contribute to reduced QoL, to increase psychological distress and significantly impact on high symptom burden [48–50].

On the other hand, our results also found some major psychosocial factors positively associated with QoL, such as appropriate coping strategies, social support, and resilience [25, 26, 28–30, 35, 36]. Obviously, to overcome all the above-mentioned cancer-related issues, patients need to adopt appropriate coping strategies, develop a sense of resilience, and receive support from close people or their community. Social support either from close people or cancer support associations, reduces levels of distress and contributes to patients' resilience, which has a positive impact on QoL in cancer patients [51]. Family harmony improves the cognitive and emotional QoL by reducing levels of rumination, mental fatigue, anxiety, and depression: patients with good social support may experience lower loneliness, less social isolation, and helplessness [52–54]. Social interactions also provide practical assistance and cultivate a fighting spirit, helping develop appropriate coping strategies [55]. In this regard, problem-solving and proactive approaches have a significant role in managing emotional challenges experienced by cancer patients and improving their mental state. Indeed, a positive mindset may be developed by patients feeling a greater support from family and/or friends. This would help them to focus on positive aspects rather than concentrate on some negative outcomes of the disease journey. Moreover, such mindset may generate positive mood and optimism, which have a great impact on cancer patients' well-being. Our findings confirm a positive association between positive thinking and optimism and higher QoL [23, 26, 55], increasing patients' hope and contributing to their confidence in remaining cancer-free [33, 36].

Our findings also reported the spiritual dimension plays a major role in patients undergoing treatments, stressing the importance of faith and spiritual well-being in this phase [30, 35, 38]. These factors may help enhance patients' overall health and provide a sense of meaning during their cancer journey. Indeed, a recent study on the impact of spirituality and religiosity on QoL of cancer patients found a positive association between these factors and physical, emotional, and social functioning [56]. This also goes in line with Brady et al.'s findings reporting that a higher level of spirituality contributes to patients' ability to enjoy life and tolerate levels of some symptoms such as fatigue and pain [57].

Our findings can shape public health policies and be integrated into the development of QoL questionnaires or m-Health technologies. Based on our results, it can be concluded that the first steps to be taken to stabilize and improve QoL of cancer patients in treatment are to manage depression, help patients develop appropriate coping strategies, and provide social support. This knowledge represents key areas to pay attention to while developing QoL questionnaires, interventions, and policies aimed at improving QoL. Moreover, due to current advances in technology, great attention is given to technological solutions aimed at improving cancer care. Our results can be beneficial for designing and developing interactive services for personalized medicine or m-Health technologies, the benefits of which are highlighted in the scientific literature [58, 59]. A mobile or web-based user-friendly application for cancer patients that provides them social and psychological support (eg. cancer community/discussion forum, articles on management of psychological challenges, etc.) could address cancer patients' unmet informational and psychological needs, and significantly increase their QoL and life satisfaction. Scientific literature highlights the importance of understanding the role of cancer diagnosis and its association with life satisfaction, and developing strategies aimed at improving QoL outcomes [60]. Considering public health dimension, understanding widespread psychosocial needs in cancer patients can help driving resources allocation towards the managements of these crucial factors. This could in turn, raise public awareness potentially shaping the social environment and enhancing the knowledge of the oncological world.

Limitations and future directions

Despite the great evidence achieved by this UR, some limitations have to be mentioned. Firstly, our inclusion criteria implied the selection of SRs published only in English, which contributes to the possibility of missing some relevant studies written in other languages. This limitation might have contributed to missing some cultural variables influencing cancer experience. Secondly, this UR included studies on patients of any cancer type and treatment stage, but the diversity of cancer- and treatment-specific symptoms may be not fully addressed, leading to some heterogeneity of the results. For example, nausea and vomiting caused by chemotherapy may impact the development of some ***psychosocial factors*** negatively influencing the QoL of patients undergoing *this specific treatment*, while *persistent coughing* (often with blood) and shortness of breath specific for lung cancer patients may create specific psychological issues for this cancer population group.

Despite these possible limitations, this UR provides a first attempt to comprehensively summarize the existing scientific findings on psychosocial factors affecting QoL in cancer patients undergoing treatment. Moreover, it provides a detailed overview of the psychosocial variables responsible for worsening and increasing QoL during treatment. However, it has to be considered that the great advancements in treatments options and their impact on the physical well-being may also contribute to the variation of psychological issues faced in this cancer phase. Thus, this UR highlights the importance of further research on this topic in order always to have an up-to-date overview of QoL and the factors impacting it. Furthermore, we encourage considering multilingual SRs to gather a more complete overview of cultural insights that can influence QoL and promote high-value oncological care.

Conclusion

Treatment is one of the most vulnerable time in the cancer journey. Aggressive treatments and unpredictable results may leave a negative trace on cancer patients' physical and psychological states, worsening their QoL and overall well-being. This UR, at the extent of our knowledge, is the first attempt to provide a comprehensive overview of psychosocial factors impacting QoL of cancer patients and underline the negative or positive impact of these factors on it.

These findings are essential to better address the challenges patients are facing, and develop personalized interventions aimed at managing factors negatively affecting QoL, thus improving the overall QoL of cancer patients undergoing treatment.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12955-025-02357-z.

Supplementary Material 1.

Acknowledgements

We thank Andrea V. Adani for his knowledge and expertise in generating search strings, which considerably contributed in obtaining relevant literature. We also want to thank Massimo Costantini for his support and guidance during the entire process. Finally, we would like to thank our co-researchers, Laura Pinnavaia (for her constructive feedback and linguistic revision as a native speaker) and Carina Dantas (for her assistance and suggestions), who enabled us to accomplish this investigation. Viktorya Voskanyan is a Ph.D. student in Medical Humanities within the European School of Molecular Medicine (SEMM) at the University of Milan, Italy.

Disclosure

The present review was conducted on behalf of the EUonQoL consortium.

Authors' contributions

All authors contributed to the study conception and design. Material preparations, data collection, and analyses were performed by C.M., D.S., and V.V. The first draft of the manuscript was written by C. M., V.V., D.S., and F.B., and all authors commented on and edited the manuscript. The final manuscript was read and approved by all authors.

Funding

This publication has received funding from the European Union's Research and Innovation Program HORIZON-MISS-2021-CANCER-02 under Grant Agreement No 101096362 Project EUonQoL.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

[1]Applied Research Division for Cognitive and Psychological Science, IEO, European Institute of Oncology IRCCS, Milan, Italy. [2]Department of Oncology and Hemato-Oncology, University of Milan, Milan, Italy. [3]SporeData OÜ, Tallinn, Estonia. [4]Nivel, Netherlands Institute for Health Services Research, Postbus 1568, Utrecht 3500 BN, The Netherlands. [5]Dipartimento Di Scienze Cliniche E Di Comunità, Università Degli Studi Di Milano, Milan, Italy. [6]European Cancer Organisation, Brussels, Belgium. [7]Health Services Research Group, Hospital del Mar Research Institute, Barcelona, Spain. [8]Department of Public Health, Bispebjerg Hospital and University of Copenhagen, Copenhagen, Denmark. [9]Department of Oncology, Oslo University Hospital, Oslo, Norway. [10]OECI-EEIG Organisation of European Cancer Institutes – European Economic Interest Grouping, Brussels, Belgium. [11]UNICANCER, Paris, France. [12]EORTC, Brussels, Belgium. [13]Leeds Institute of Medical Research at St James's, University of Leeds, Leeds, UK. [14]Scientific Directorate, Fondazione Istituto Di Ricovero E Cura a Carattere Scientifico, Fondazione IRCCS Istituto Nazionale Dei Tumori, Milan, Italy. [15]James's University Hospital, Leeds, UK. [16]Palliative Care, Pain Therapy and Rehabilitation Unit, Fondazione IRCCS Istituto Nazionale Dei Tumori Di Milano, Milan, Italy. [17]CIBER de Epidemiología y Salud Pública CIBERESP, Instituto de Salud Carlos III, Madrid, Spain.

Received: 13 December 2024 Accepted: 10 March 2025

References

1. Bray F, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2024;74(3):229–63. https://doi.org/10.3322/caac.21834.
2. Sung H, et al. Global Cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2021;71(3):209–49. https://doi.org/10.3322/caac.21660.
3. Miller KD, et al. Cancer treatment and survivorship statistics, 2022. CA Cancer J Clin. 2022;72(5):409–36. https://doi.org/10.3322/caac.21731.
4. de Ligt KM, et al. The impact of health symptoms on health-related quality of life in early-stage breast cancer survivors. Breast Cancer Res Treat. 2019;178(3):703–11. https://doi.org/10.1007/s10549-019-05433-3.
5. Allart P, Soubeyran P, Cousson-Gélie F. Are psychosocial factors associated with quality of life in patients with haematological cancer? A critical review of the literature. Psychooncology. 2013;22(2):241–9. https://doi.org/10.1002/pon.3026.
6. Voskanyan V, et al. Psychosocial factors associated with quality of life in cancer survivors: umbrella review. J Cancer Res Clin Oncol. 2024;150(5):249. https://doi.org/10.1007/s00432-024-05749-8.
7. Karimi M, Brazier J. Health, health-related quality of life, and quality of life: what is the difference? Pharmacoeconomics. 2016;34(7):645–9. https://doi.org/10.1007/s40273-016-0389-9.
8. Post M. Definitions of quality of life: what has happened and how to move on. Top Spinal Cord Inj Rehabil. 2014;20(3):167–80. https://doi.org/10.1310/sci2003-167.
9. WHOQOL. The World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. Soc Sci Med. 1995;41(10):1403–9. https://doi.org/10.1016/0277-9536(95)00112-K.

10. Hansen DG, Larsen PV, Holm LV, Rottmann N, Bergholdt SH, Søndergaard J. Association between unmet needs and quality of life of cancer patients: A population-based study. Acta Oncol (Madr). 2013;52(2):391–9. https://doi.org/10.3109/0284186X.2012.742204.
11. Pyo J, et al. Unmet needs related to the quality of life of advanced cancer patients in Korea: a qualitative study. BMC Palliat Care. 2021;20(1):58. https://doi.org/10.1186/s12904-021-00749-8.
12. Ruiz-Rodríguez I, Hombrados-Mendieta I, Melguizo-Garín A, Martos-Méndez MJ. The importance of social support, optimism and resilience on the quality of life of cancer patients. Front Psychol. 2022;13:833176. https://doi.org/10.3389/fpsyg.2022.833176.
13. Gudina AT, et al. Health related quality of life in adult cancer survivors: Importance of social and emotional support. Cancer Epidemiol. 2021;74:101996. https://doi.org/10.1016/j.canep.2021.101996.
14. Salonen P, Tarkka M, Kellokumpu-Lehtinen P, Koivisto A, Aalto P, Kaunonen M. Effect of social support on changes in quality of life in early breast cancer patients: a longitudinal study. Scand J Caring Sci. 2013;27(2):396–405. https://doi.org/10.1111/j.1471-6712.2012.01050.x.
15. Leung J, Pachana NA, McLaughlin D. Social support and health-related quality of life in women with breast cancer: a longitudinal study. Psychooncology. 2014;23(9):1014–20. https://doi.org/10.1002/pon.3523.
16. Fusar-Poli P, Radua J. Ten simple rules for conducting umbrella reviews. Evidence Based Mental Health. 2018;21(3):95–100. https://doi.org/10.1136/ebmental-2018-300014.
17. Aromataris E, Munn Z (Editors). JBI Manual for Evidence Synthesis, JBI, 2020. JBI, 2020. https://doi.org/10.46658/JBIMES-20-01.
18. Page MJ, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. Int J Surg. 2021;88:105906. https://doi.org/10.1016/j.ijsu.2021.105906.
19. Marzorati C, Sala D, Voskanyan V et al. Umbrella review: Psychosocial factors impacting on quality of life in ongoing treatment cancer patients. PROSPERO 2023, CRD42023413899, 2023. Available: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023413899.
20. Shea BJ, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017;358:j4008. https://doi.org/10.1136/bmj.j4008.
21. James C, Brunckhorst O, Eymech O, Stewart R, Dasgupta P, Ahmed K. Fear of cancer recurrence and PSA anxiety in patients with prostate cancer: a systematic review. Support Care Cancer. 2022;30(7):5577–89. https://doi.org/10.1007/s00520-022-06876-z.
22. Landry V, Siciliani E, Henry M, Payne RJ. Health-related quality of life following total thyroidectomy and lobectomy for differentiated thyroid carcinoma: a systematic review. Curr Oncol. 2022;29(7):4386–422. https://doi.org/10.3390/curroncol29070350.
23. Wintraecken VM, et al. A descriptive systematic review of the relationship between personality traits and quality of life of women with non-metastatic breast cancer. BMC Cancer. 2022;22(1):426. https://doi.org/10.1186/s12885-022-09408-4.
24. Rimmer B, et al. Health-related quality of life in adults with low-grade gliomas: a systematic review. Qual Life Res. 2023;32(3):625–51. https://doi.org/10.1007/s11136-022-03207-x.
25. Zou H, et al. "Economic Burden and Quality of Life of Hepatocellular Carcinoma in Greater China: A Systematic Review. Front Public Health. 2022;10:801981. https://doi.org/10.3389/fpubh.2022.801981.
26. Baba MA, Adali N. Neurocognitive state and quality of life of patients with glioblastoma in Mediterranean countries: a systematic review. Ann Palliat Med. 2021;10(11):11980–93. https://doi.org/10.21037/apm-21-1900.
27. Rupp SK, Stengel A. Influencing factors and effects of treatment on quality of life in patients with gastric cancer—a systematic review. Front Psychiatry. 2021;12:656929. https://doi.org/10.3389/fpsyt.2021.656929.
28. Sihvola S, Kuosmanen L, Kvist T. Resilience and related factors in colorectal cancer patients: a systematic review. Eur J Oncol Nurs. F. 2022;56:102079. https://doi.org/10.1016/j.ejon.2021.102079.
29. Aizpurua-Perez I, Perez-Tejada J. Resilience in women with breast cancer: A systematic review. Eur J Oncol Nurs. 2020;49:101854. https://doi.org/10.1016/j.ejon.2020.101854.
30. El Haidari R, Abbas LA, Nerich V, Anota A. Factors associated with health-related quality of life in women with breast cancer in the Middle East: a systematic review. Cancers (Basel). 2020;12(3):696. https://doi.org/10.3390/cancers12030696.
31. Kang D, Shim S, Cho J, Lim HK. Systematic Review of Studies Assessing the Health-Related Quality of Life of Hepatocellular Carcinoma Patients from 2009 to 2018. Korean J Radiol. 2020;21(6):633. https://doi.org/10.3348/kjr.2019.0808.
32. Odeo S, Degu A. Factors affecting health-related quality of life among prostate cancer patients: A systematic review. J Oncol Pharm Pract. 2020;26(8):1997–2010. https://doi.org/10.1177/1078155220959414.
33. Nierop-van Baalen C, Grypdonck M, van Hecke A, Verhaeghe S. Associated factors of hope in cancer patients during treatment: A systematic literature review. J Adv Nurs. 2020;76(7):1520–37. https://doi.org/10.1111/jan.14344.
34. Sousa H, Castro S, Abreu J, Pereira MG. A systematic review of factors affecting quality of life after postmastectomy breast reconstruction in women with breast cancer. Psychooncology. 2019;28(11):2107–18. https://doi.org/10.1002/pon.5206.
35. Ho PJ, Gernaat SAM, Hartman M, Verkooijen HM. Health-related quality of life in Asian patients with breast cancer: a systematic review. BMJ Open. 2018;8(4):e020512. https://doi.org/10.1136/bmjopen-2017-020512.
36. Brandão T, Schulz MS, Matos PM. Psychological adjustment after breast cancer: a systematic review of longitudinal studies. Psychooncology. 2017;26(7):917–26. https://doi.org/10.1002/pon.4230.
37. Razdan SN, Patel V, Jewell S, McCarthy CM. Quality of life among patients after bilateral prophylactic mastectomy: a systematic review of patient-reported outcomes. Qual Life Res. 2016;25(6):1409–21. https://doi.org/10.1007/s11136-015-1181-6.
38. Bai M, Lazenby M. A systematic review of associations between spiritual well-being and quality of life at the scale and factor levels in studies among patients with cancer. J Palliat Med. 2015;18(3):286–98. https://doi.org/10.1089/jpm.2014.0189.
39. Alwhaibi M, AlRuthia Y, Sales I. The impact of depression and anxiety on adult cancer patients' health-related quality of life. J Clin Med. 2023;12(6):2196. https://doi.org/10.3390/jcm12062196.
40. Mazzotti E, et al. Treatment-related side effects and quality of life in cancer patients. Support Care Cancer. 2012;20(10):2553–7. https://doi.org/10.1007/s00520-011-1354-y.
41. Smith HR. Depression in cancer patients: Pathogenesis, implications and treatment (Review). Oncol Lett. 2015;9(4):1509–14. https://doi.org/10.3892/ol.2015.2944.
42. Niedzwiedz CL, Knifton L, Robb KA, Katikireddi SV, Smith DJ. Depression and anxiety among people living with and beyond cancer: a growing clinical and research priority. BMC Cancer. 2019;19(1):943. https://doi.org/10.1186/s12885-019-6181-4.
43. Javan Biparva A, et al. Global depression in breast cancer patients: Systematic review and meta-analysis". PLoS One. 2023;18(7):e0287372. https://doi.org/10.1371/journal.pone.0287372.
44. Duarte V, et al. Anxiety and depression in patients with prostate cancer, at cancer diagnosis and after a one-year follow-up. Int J Environ Res Public Health. 2022;19(15):9122. https://doi.org/10.3390/ijerph19159122.
45. Kugbey N. Comorbid anxiety and depression among women receiving care for breast cancer: analysis of prevalence and associated factors. Afr Health Sci. 2022;22(3):166–72. https://doi.org/10.4314/ahs.v22i3.19.
46. Anderson J, Slade AN, McDonagh PR, Burton W, Fields EC. The long-lasting relationship of distress on radiation oncology-specific clinical outcomes. Adv Radiat Oncol. 2019;4(2):354–61. https://doi.org/10.1016/j.adro.2018.11.001.
47. Krishnasamy M, Hassan H, Jewell C, Moravski I, Lewin T. Perspectives on emotional care: a qualitative study with cancer patients, carers, and health professionals. Healthcare. 2023;11(4):452. https://doi.org/10.3390/healthcare11040452.
48. Edib Z, Kumarasamy V, Abdullah N, Rizal AM, Al-Dubai SAR. Most prevalent unmet supportive care needs and quality of life of breast cancer patients in a tertiary hospital in Malaysia. Health Qual Life Outcomes. 2016;14(1):26. https://doi.org/10.1186/s12955-016-0428-4.
49. Rha SY, Lee HJ, Lee J. Unmet needs in the physical and daily living domain mediates the influence of symptom experience on the quality of life of gastric cancer patients. Support Care Cancer. 2020;28(3):1419–31. https://doi.org/10.1007/s00520-019-04954-3.
50. Cochrane A, Woods S, Dunne S, Gallagher P. Unmet supportive care needs associated with quality of life for people with lung cancer: A systematic review of the evidence 2007–2020. Eur J Cancer Care (Engl). 2022;31(1):e13525. https://doi.org/10.1111/ecc.13525.

51. Seiler A, Jenewein J. Resilience in cancer patients. Front Psychiatry. 2019;10:208. https://doi.org/10.3389/fpsyt.2019.00208.
52. Sørensen HL, Schjølberg T. Kr, Småstuen MC, Utne I. Social support in early-stage breast cancer patients with fatigue. BMC Womens Health. 2020;20(1):243. https://doi.org/10.1186/s12905-020-01106-2.
53. Oh P-J, Lee Y-J. Predictors of fighting spirit or helplessness/hopelessness in people with cancer. J Korean Acad Nurs. 2008;38(2):270. https://doi.org/10.4040/jkan.2008.38.2.270.
54. Liu B, et al. Correlations of social isolation and anxiety and depression symptoms among patients with breast cancer of Heilongjiang province in China: The mediating role of social support. Nurs Open. 2021;8(4):1981–9. https://doi.org/10.1002/nop2.876.
55. Calderon C, et al. Social support, coping strategies and sociodemographic factors in women with breast cancer. Clin Transl Oncol. 2021;23(9):1955–60. https://doi.org/10.1007/s12094-021-02592-y.
56. Majda A, Szul N, Kołodziej K, Wojcieszek A, Pucko Z, Bakun K. Influence of spirituality and religiosity of cancer patients on their quality of life. Int J Environ Res Public Health. 2022;19(9):4952. https://doi.org/10.3390/ijerph19094952.
57. Brady MJ, Peterman AH, Fitchett G, Mo M, Cella D. A case for including spirituality in quality of life measurement in oncology. Psychooncology. 1999;8(5):417–28. https://doi.org/10.1002/(sici)1099-1611(199909/10)8:5<417::aid-pon398>3.0.co;2-4.
58. Gorini A, Mazzocco K, Triberti S, Sebri V, Savioni L, Pravettoni G. "A P5 approach to m-health: design suggestions for advanced mobile health technology. Front Psychol. 2018;9:2066. https://doi.org/10.3389/fpsyg.2018.02066.
59. Kondylakis H, et al. Development of interactive empowerment services in support of personalised medicine. Ecancermedicalscience. 2014;8:400. https://doi.org/10.3332/ecancer.2014.400.
60. Kang W, Whelan E, Malvaso A. Understanding the Role of Cancer Diagnosis in the Associations between Personality and Life Satisfaction. Healthcare. 2023;11:2359. https://doi.org/10.3390/healthcare11162359.

Publisher's Note