Resilience and related factors in caregivers of adult cancer patients: a systematic review

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Background: This systematic review aimed to investigate resilience and its related factors in caregivers of adult patients with cancer.
Materials and methods: A systematic search of online electronic databases including Scopus, PubMed, Web of Science, Iranmedex, and Scientific Information Database (SID) was performed using keywords extracted from Medical Subject Headings such as "Psychological Resilience", "Caregiver", and "Cancer" from the earliest to 6 June 2023. The quality of the studies included in this review was evaluated using the appraisal tool for cross-sectional studies (AXIS tool).
Results: A total of 2735 caregivers of cancer patients participated in 15 studies. The majority of the studies found that caregivers of cancer patients had high levels of resilience. Factors related to the resilience of cancer patients' caregivers included caregivers' social support, caregivers' quality of life, patients' resilience, caregivers' family function, patients' performance, caregivers' age, caregivers' health status, caregivers' self-esteem, caregivers post-traumatic growth, caregivers religious, caregivers hope, caregivers positive affect, patients age, patients social support, patients resilience support, patients quality of life, caregivers' anxiety, caregivers' depression, caregivers' burden, caregivers level of education, caregivers financial problem, caregivers memory, caregivers negative affect, caregivers post-traumatic stress disorder, maternal distress, and patients post-traumatic stress disorder.
Conclusion: Therefore, healthcare administrators and policymakers can enhance the resilience of caregivers and the quality of care they provide by instituting ongoing training initiatives focused on evaluating mental well-being and implementing coping strategies for managing stress and depression.

Keywords: cancer patients, cancer, caregiver, psychological resilience, systematic review

Introduction

Cancer stands as one of the prevailing chronic illnesses globally, resulting in premature mortality[1–4]. About one in every five

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HIGHLIGHTS

- This research showed that the resilience of caregivers of cancer patients was at a high level.
- Caregivers' social support and quality of life and patients' resilience were among the most common factors related to the resilience of cancer patients' caregivers.
- The development of continuous training programs through assessing mental health and strategies to deal with stress and depression can improve caregivers' resilience and quality of care.

individuals across the world is expected to experience cancer at some point in their lives[5]. In 2020, the global count of cancer-related fatalities neared 10 million[5], with projections indicating a rise to 16.3 million by the year 2040[6].

A cancer diagnosis is regarded as a crisis, impacting not just the patient but also their family members, who often suffer comparable or even greater distress than the primary victim[7,8]. Existing literature highlights that individuals facing advanced diseases like cancer typically express a preference for receiving care or passing away in the comfort of their homes[9,10]. Those individuals who share emotional and social bonds with the patient and provide non-professional yet substantial unpaid care are commonly referred to as family caregivers[11–13]. This caregiving role commences with the cancer diagnosis and can persist for several years until the patient either recovers or passes away[14]. Family caregivers shoulder these responsibilities in addition to their other obligations, including household chores, caring for other family members, and fulfilling social

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responsibilities[15]. Unfortunately, these responsibilities can result in adverse consequences, encompassing physical, psychological, social, and economic tolls[16]. While cancer constitutes a crisis in the lives of the patient's family members, and caregiving for these patients proves to be a multifaceted and evolving endeavour[17], research demonstrates that certain families have successfully navigated these challenges, gaining new social support resources[18,19], effectively managing stressful situations and their adverse effects[20]. Consequently, for them, caring for the patient has become a positive and enriching experience[21].

Certain family caregivers make concerted efforts to maintain their physical and mental well-being, a capacity often referred to as "resilience"[22–24]. The American Psychological Association defines resilience as "the process of effectively adapting in the face of adversity, trauma, tragedy, threats, or significant sources of stress, such as family and relationship issues, severe health challenges, or workplace and financial pressures." Essentially, it involves the ability to "bounce back" from challenging experiences[25]. Research indicates that resilience among family caregivers serves as a protective factor against the weight of caregiving responsibilities[26], diminishes the likelihood of experiencing depression, anxiety, and stress[27], and has a positive impact on their overall quality of life[28].

Taking into account the vital role that nurses play in assessing the well-being and functioning of families caring for cancer patients, understanding resilience can equip nurses to alleviate the distress experienced by family caregivers. It can also empower them to enhance the positive aspects of caregiving and offer tailored and holistic care[29]. Given the significance of this matter and the absence of a comprehensive review in this domain, this present review was undertaken to explore resilience and its associated factors within the realm of family caregivers for cancer patients.

Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analyzes (PRISMA) checklist was utilized for carrying out the systematic review (Supplementary Table S1, Supplemental Digital Content 1, http://links.lww.com/MS9/A381)[30]. However, there is no public protocol and it was not entered into the international prospective register of systematic reviews (PROSPERO) database. Since this study is a systematic review of already published research, patient-informed permission and ethics approval were not required.

Search strategy

A systematic search of online electronic databases including Scopus, PubMed, Web of Science, Iranmedex, and Scientific Information Database (SID) was performed using keywords extracted from Medical Subject Headings such as "Psychological Resilience", "Caregiver", and "Cancer" from the earliest to June 6, 2023. For example, the search strategy was in PubMed/ MEDLINE database including (("Resilience") OR ("Resiliency") OR ("Psychological resilience") AND ("Caregivers") OR ("Carers") OR ("Spouse caregivers") OR ("Family caregivers") AND ("Cancer") OR ("Neoplasm") OR ("Cancer patients")). Boolean operators (AND/OR) were used to combine keywords. Persian keywords equivalents were utilized to search the electronic Persian databases. Two researchers independently carried out each phase of the search. The review excluded the gray literature, which includes conference presentations, expert comments, dissertations, research and committee reports, and continuing research. Papers created in print and electronic formats without being reviewed by a for-profit publisher are referred to as "gray literature"[31].

Inclusion and exclusion criteria

This systematic review comprised original research written in English and Persian that focused on caregivers of cancer patients' resilience. Reviews, case reports, conference proceedings, letters to the editor, experiments, and research with qualitative designs were not included.

Study selection

The EndNote 20 program was used for data management. The following processes were taken to choose studies based on inclusion/exclusion criteria: (1) Identify duplicate articles, first electronically and then manually; (2) examine the study's title and abstract; and (3) review the publications' full texts. A third reviewer evaluated the paper in the presence of disagreement between the two researchers. To avoid losing important data, a reference list of proper research was evaluated.

Data extraction and quality assessment

Information including the name of the first author, year of publication, location, sample size, male/female ratio, age, level of education, occupation, relationship with patients, caregiving duration, type of cancer, stage of cancer, type of treatment, questionnaire, and key results were extracted from the articles which included in this systematic review. The quality of the studies included in this review was evaluated using the appraisal tool for cross-sectional studies (AXIS tool). This tool evaluates the quality of the included studies via 20 items with a two-point Likert, including yes (score of 1) and no (score of 0). This tool assesses report quality (7 items), study design quality (7 items), and the possible introduction of biases (6 items). Finally, AXIS rates the quality of studies at three levels: high (70 to 100%), fair (60–69.9%), and low (0–59.9%)[32]. Separate data extraction and study quality assessments were conducted by two researchers. Also, the AMSTAR 2 checklist was completed to evaluate the study quality (Supplementary File S2, Supplemental Digital Content 2, http://links.lww.com/MS9/A382)[33].

Results

Study selection

As shown in Figure 1, a search of electronic databases yielded a total of 2737 articles. 2042 studies were left after a preliminary analysis of all research and the removal of duplicate studies. Then, the titles and abstracts of the remaining papers were thoroughly examined by the inclusion and exclusion criteria. Fifty-six studies in all were chosen for full-text evaluation. Finally, for this systematic review, 15 studies[28,34–47] were chosen for inclusion.
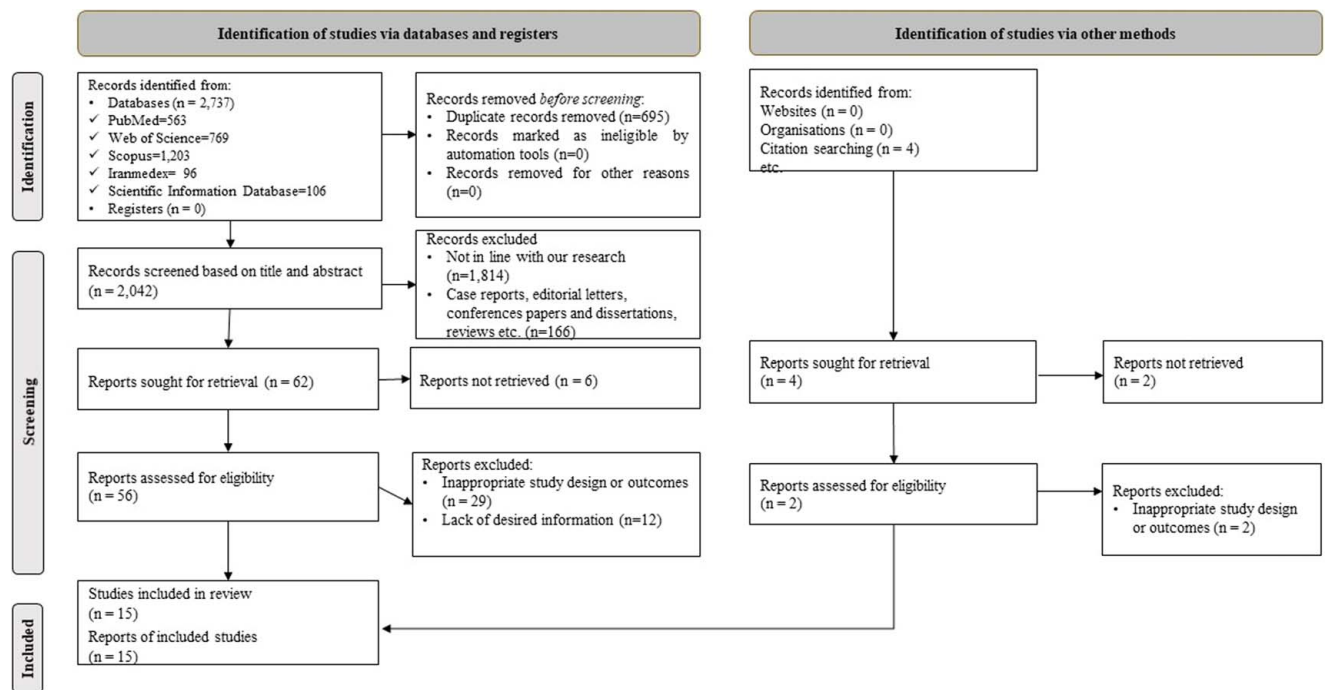
Figure 1. Flow diagram of the study selection process.

Study characteristics

As shown in Table 1, a total of 2735 caregivers of cancer patients participated in 15 studies[28,34–47]. The average age of the participants was 49.44 (SE = 2.42). Also, 68.8% of the participants were women and 68.1% of the caregivers were spouses or partners of cancer patients. The studies included in this systematic review were conducted in China $(n = 4)$[34,38,46,47], USA $(n = 3)$[37,39,41], Australia $(n = 1)$[43], South Korea $(n = 1)$[28], Colombia $(n = 1)$[40], Taiwan $(n = 1)$[35], Turkey $(n = 1)$[44], Netherland $(n = 1)$[45], Japan $(n = 1)$[45], and Poland $(n = 1)$[36].

Methodological quality of included study

As shown in Figure 2, all studies[28,34–47] included in this systematic review were of high quality.

Resilience in cancer patient's caregivers

As shown in Table 1, based on the scales used in different studies, the level of resilience of caregivers of cancer patients was high in 9 studies[28,34,37,38,41,43,45–47], moderate in 2 studies[39,40], and low in 4 studies[35,36,42,44].

Factors related to the resilience of cancer patients' caregivers

As shown in Table 2, the resilience of cancer patients' caregivers had a significant positive relationship with caregivers' social support $(n = 3)$[28,34,35], caregivers' quality of life $(n = 3)$[38,44,46], patients resilience $(n = 3)$[34,46,47], caregivers family function $(n = 2)$[28,46], patients performance $(n = 2)$[28,35], caregivers age $(n = 1)$[43], caregivers health status $(n = 1)$[28], caregivers self-esteem $(n = 1)$[28], caregivers post-traumatic growth $(n = 1)$[38],

caregivers religious $(n = 1)$[36], caregivers hope $(n = 1)$[36], caregivers positive affect $(n = 1)$[36], patients age $(n = 1)$[35], patients social support $(n = 1)$[34], patients resilience support $(n = 1)$[34], and patients quality of life $(n = 1)$[46].

Also, caregivers' anxiety $(n = 2)$[28,43], caregivers' depression $(n = 2)$[28,43], caregivers' burden $(n = 2)$[38,45], caregivers' age $(n = 1)$[35], caregivers level of education $(n = 1)$[35], caregivers financial problem $(n = 1)$[28], caregivers memory $(n = 1)$[41], caregivers negative affect $(n = 1)$[36], caregivers post-traumatic stress disorder $(n = 1)$[47], maternal distress $(n = 1)$[37], and patients post-traumatic stress disorder $(n = 1)$[47] had a significant negative relationship with the resilience of cancer patients' caregivers.

Discussion

This systematic review comprised fifteen studies, and the majority of the studies found that caregivers of cancer patients had high levels of resilience. While the study outcomes exhibited diversity, this variance may be attributed to distinct factors associated with the resilience of caregivers for cancer patients in various research studies. Factors related to the resilience of cancer patients' caregivers included caregivers' social support, caregivers' quality of life, patients' resilience, caregivers' family function, patients' performance, caregivers' age, caregivers' health status, caregivers' self-esteem, caregivers post-traumatic growth, caregivers religious, caregivers hope, caregivers positive affect, patients age, patients social support, patients resilience support, patients quality of life, caregivers' anxiety, caregivers' depression, caregivers' burden, caregivers level of education, caregivers financial problem, caregivers memory, caregivers negative affect,

Table 1

Basic characteristics of the included studies in this systematic review

First author/ year	Location	Sample size	M/F ratio (%)	Age (mean ± SD)	Level of education (%)	Occupation (%)	Relationship with patients (%)	Caregiving duration	Type of cancer (%)	Stage of cancer (%)	Type of treatment (%)	Questionnaire	Key results	AXIS Score
Lim et al., 2014[38]	USA	91	35.20/ 64.80	63.80 (SD = 11.1)	Under diploma: 4 (4.40) Diploma: 26 (28.90) Above diploma: 60 (66.70)	Unemployed: 24 (26.70) Employed: 66 (73.30) Retired: 0 (0)	Spouses or Partners: 91 (100)	NA	Breast cancer: 28 (30.80) Colorectal cancer: 18 (19.80) Prostate cancer: 45 (49.5)	I: 23 (25.60) II: 63 (70.00) III: 4 (4.40)	Surgery: 70 (79.60) Chemotherapy: 27 (30.00) Radiotherapy: 53 (58.20)	Brief Resilience Scale- 6	The mean score of resilience in caregivers was 4.00 (SD = 1.00) out of 6 which was moderate.	High
Simpson et al., 2015[42]	Australia	51	14.00/ 86.00	NA	Under diploma and Diploma 40 (78.00) Above diploma: 11 (22.00)	NA	Spouses or Partners: 38 (75.00) Parents, Siblings, Children, Friends, and Paid caregivers: 13 (25.00)	NA	Head and Neck: 51 (100)	I:11 (22.00) II:5 (10.00) III: 5 (10.00) IV: 21 (41.00) Unable to Assess: 9 (18.00)	Radiotherapy: 27 (54.00) Surgery and radiotherapy: 15 (30.00) Surgery: 8 (16.00)	RS-25	The mean score of resilience in caregivers was 152.00 (SD = 17.20) out of 175. which was high.	High
Saria et al., 2017[40]	USA	56	30.40/ 69.60	56.30 (SD = 14.90)	Under Diploma and Diploma: 39 (69.6) Above Diploma: 16 (28.6) Missing data: 1 (1.8)	NA	Spouses or Partners: 38 (67.90) Children: 9 (16.10) Parents: 3 (5.30) Siblings: 2 (3.60) Sun and daughter-in-law: 1 (1.80) Missing Data: 3 (5.30)	Above 6 months: 41 (73.20) 6 months or Less: 14 (25.00) Missing data: 1 (1.80)	Breast cancer: 4 (7.10) Lung Cancer: 12 (21.40) Melanoma: 6 (10.70) Other: 8 (14.40) Missing Data: 26(46.40)	NA	NA	RS-25	The mean score of resilience in caregivers was 146.36 (SD = 17.02) out of 175 which was high.	High
Hwang et al., 2018[28]	South Korea	273	23.80/ 76.20	48.3 (SD = 13.7)	Under diploma: 145 (53.1) Diploma and Above diploma: 128 (46.9)	NA	NA	Above 6 months: 179 (66.50) 6 months or Less: 94 (33.50)	NA	NA	NA	CD-RISC-25	The mean score of resilience in caregivers was 62.2 (SD = 16.13) out of 100 which was high.	High
Palacio et al., 2018[39]	Colombia	50	12/88	48.00 (SD = 13.00)	Under diploma: 15 (30) Diploma: 12 (24) Above diploma: 23 (46)	Unemployed: 11 (22) Employed: 6 (12) Retired: 3 (6) House Keeper: 29 (58) Other: 1 (2)	Spouses or Partners: 10 (20) Siblings: 121 (24) Children: 16 (32) Parents: 3 (6) Friends: 2 (4) Other: 7 (14)	NA	NA	NA	NA	BRCS-S	The mean score of resilience in caregivers was 16.56 (SD = 2.26) out of 20 which was moderate.	High
Li et al., 2019[37]	China	108	NA	45.00 (SD = 10.00)	Under diploma: 20 (18.6) Diploma: 66 (61.1) Above diploma: 22 (20.3)	Unemployed: 55 (50.9) Employed and Retired: 53 (49.1)	Spouses or Partners: 72 (66.7) Siblings: 4 (3.7) Children: 17 (15.7) Parents: 15 (13.9)	NA	Breast: 108 (100)	I: 56 (51.9) II: 31 (28.7) III: 21 (19.4)	Surgery and Chemotherapy: 82 (75.9) Surgery and Radiotherapy: 4 (3.7) Surgery, Chemotherapy, and Radiotherapy: 22 (20.4)	FRAC-32-C	The mean score of resilience in caregivers was 100.30 (SD = 9.90) out of 128 which was high.	High
Lau et al., 2020[36]	USA	28	0/100	28.00	NA	NA	Parents: 28 (100)	NA	ALL: 7 (25) AML: 3 (11) Germ Cell Tumour: 2 (7) Lymphoma-Hodgkin: 2 (7) Lymphoma-Non-Hodgkin: 3 (11) Sarcoma: 10 (36) Other: 1 (4)	NA	NA	CD-RISC-10	The mean score of resilience in caregivers was 29.00 (SD = 5.00) out of 40 which was high.	High

Study	Country	N	Age		Education	Employment	Relationship	Duration	Cancer type	Stage	Treatment	Instrument	Result	Quality
Chen et al., 2020[34]	Taiwan	148	10.8/ 89.2	44.76 (SD: 11.13)	Under Diploma: 78 (52.7) Diploma: 63 (19.6) Above Diploma: 7 (4.7)	Unemployed: 54 (36.5) Leave Job: 2 (1.4) Quit Job: 27 (18.2) Changed Work: 11 (7.4) Employed: 54 (36.5)	Spouse: 100 (67.6) Other: 48 (32.4)	NA	Breast: 148 (100)	III: 39 (26.4) IV: 109 (73.6)	Surgery and Chemotherapy: 1 (0.7) Surgery and Radiotherapy: 18 (2.2) Surgery, Chemotherapy, and Radiotherapy: 99 (66.9) Radiotherapy: 3 (2) Chemotherapy: 1 (0.7) Chemotherapy and Radiotherapy: 26 (17.6)	RS-25	The mean score of resilience in caregivers was 118.33 (SD = 11.05) out of 175 which was low.	High
Üzar-Özçetin & Dursun, 2020[43]	Turkey	210	47.6/ 52.4	39.62 (SD = 14.24)	Under Diploma: 0 (0) Diploma: 63 (30) Above Diploma: 147 (70)	NA	NA	12–37 months:36 (17.1) Above 37 months: 174 (82.9)	NA	NA	NA	CD-RISC-25	The mean score of resilience in caregivers was 49.53 (SD = 16.30) out of 100 which was low.	High
Chen et al., 2021[33]	China	272	68.75/ 31.25	55.60 (SD = 11.95)	Under diploma: 182 (66.91) Diploma: 44 (16.18) Above diploma: 46 (16.91)	Unemployed: 131 (48.16) Employed: 94 (34.56) Retired: 47 (17.28)	Spouses or partners: 272 (100)		Breast cancer: 111 (40.81) Colorectal cancer: 78 (28.68) Lung cancer: 83 (30.51)	I: 77 (28.31) II: 160 (58.82) III: 35 (12.87)	Surgery: 68 (25.00) Surgery and chemotherapy: 130 (47.79) Surgery and radiotherapy: 40 (14.71) Surgery, chemotherapy, and radiotherapy: 34 (12.50)	RS-14	The mean score of resilience in caregivers was 72.40 (SD = 10.69) out of 98 which was high.	High
Krok et al., 2021[35]	Poland	240	44.8/ 55.2	51.16 (SD = 12.08)	Under Diploma: 46 (21.4) Diploma: 105 (49.2) Above Diploma: 63 (29.4)	Active: 134 (62.6) Not Active: 80 (37.4)	Spouses or Partners: 240 (100)	NA	Gastrointestinal Cancer: 240 (100)	NA	NA	RAS-25	The mean score of resilience in caregivers was 5.08 (SD = 0.88) out of 100 which was low.	High
Van Roij et al., 2021[44]	Netherland	746	40/60	61.00 (SD = 13.00)	Under Diploma: 199 (27) Diploma: 328 (44) Above Diploma: 212 (28)	NA	Spouses or Partners: 583 (78) Children: 99 (13) Other Family Members or Friends: 58 (8)	NA	Lung Cancer: 203 (27) Colorectal Cancer: 121 (16) Breast Cancer: 94 (13) Prostate Cancer: 82 (11) Other: 174 (24) Missing Data: 71 (10)	IV: 746 (100)	NA	CD-RISC-2	The mean score of resilience in caregivers was 6.30 (SD = 1.60) out of 8 which was high.	High
Wang et al., 2021[45]	China	287	52.3/ 47.7	45.30	Under Diploma: 113 (39.4) Diploma: 86 (30) Above Diploma: 88 (30.7)	Unemployed: 102 (35.5) Employed: 146 (50.9) Retired: 39 (13.6)	Spouses or Partners: 136 (47.4) Children: 151 (52.6)	NA	Lung: 287 (100)	III: 95 (33.1) IV: 192 (66.9)	Chemotherapy: 144 (50.2) Chemotherapy and Targeted therapy: 53 (18.5) Supportive care: 40 (13.9) Targeted therapy: 13 (4.5) Chemotherapy and Radiotherapy: 10 (3.5) Chemotherapy and Immunotherapy: 9 (3.1) Other treatments: 15 (5.2) Missing: 3 (1.0)	CD-RISC-10	The mean score of resilience in caregivers was 35.65 (SD = 5.31) out of 40 which was high.	High
Yan et al., 2021[46]	China	104	NA	42.00 (SD = 10.90)	Under Diploma: 26 (25) Diploma: 33 (31.7) Above Diploma: 45 (43.3)	NA	Spouses or Partners: 60 (57.7) Siblings: 10 (9.6) Children: 27 (26) Parents: 7 (6.7)	NA	Breast: 104 (100)	NA	NA	FRAS-32-C	The mean score of resilience in caregivers was 106.80 (SD = 14.60) out of 128 which was high.	High

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Table 1

(Continued)

First author/year	Location	Sample size	M/F ratio (%)	Age (mean ±SD)	Level of education (%)	Occupation (%)	Relationship with patients (%)	Caregiving duration	Type of cancer (%)	Stage of cancer (%)	Type of treatment (%)	Questionnaire	Key results	AXIS Score
Shimizu et al., 2022[41]	Japan	71	22.5/77.5	63.40 (SD=13.2)	Under Diploma: 50 (7) Diploma: 43 (60.6) Above Diploma: 23 (32.4)	NA	Spouses or Partners4: 44 (62) Children: 21 (29.6) Siblings: 2 (2.8) Parents: 2 (2.8) Son-in-law and Daughter-in-law: 2 (2.8)	NA	Lung: 10 (14.1) Liver, Gall Bladder and Pancreas: 15 (21.1) Upper Digestive Tract: 12 (16.9) Lower Digestive Tract: 13 (18.3) Head and Neck: 4 (5.6) Uterus and Ovary: 2 (2.8) Breast: 7 (9.9) Kidney and Bladder: 2 (2.8) Haematological Malignancy: 1 (1.4) Other: 5 (7.1)	End Stage	Palliative Care: 71 (100)	CD-RISC-25	The mean score of resilience in caregivers was 58.70 (SD = 16.50) out of 100 which was low.	High

BRCS, Brief Resilient Coping Scale; BRS, Brief Resilience Scale; CDRISC, Connor Davidson Resilience Scale; FRAS, Family Resilience Assessment Scale; NA, not applicable; RAS, Resiliency Assessment Scale; RS, Resilience Scale.

caregivers post-traumatic stress disorder, maternal distress, and patients post-traumatic stress disorder.

A person's resilience is defined as their capacity to respond well to adversity, trauma, tragedy, threats, or pressures. In other words, the capacity to bounce back from challenging situations[48]. Several factors, such as low levels of distress, the existence of positive affect, high levels of health-related quality of life, and profitability, are used to describe resilience among caregivers of cancer patients[49].

According to the results of the study, the social support factor and the caregivers' burden factor of resilience had a significant relationship with the caregivers of cancer patients. Social support had a positive relationship with resilience in caregivers[28,34,35], while caregiver burden had a negative and significant relationship[38,45]. The results of the study by Shieh et al.[47] showed that there was a significant negative relationship between social support and caregiver burden in patients with colorectal cancer. The findings showed that an increase in social support perceived by the caregivers of cancer patients could increase their resilience and consequently reduce their burden.

Another influencing factor on caregivers' resilience was their level of quality of life. The results of the studies included in this systematic review showed that the quality of life of the caregivers of cancer patients had a significant positive relationship with their level of resilience[38,44,45]. Also, the results of the study of Li et al.[38] showed that the level of quality of life had a positive relationship with resilience and a negative and significant relationship with caregiver burden. Resilience can improve the quality of life by influencing caregivers in positive ways and enhancing an individual's ability for adaptation[46,51,52].

Another factor influencing the resilience of caregivers of cancer patients was the resilience of patients. The results of this study showed that the resilience of patients has a significant direct relationship with the resilience of caregivers[34,46,47]. Also, the results of this study showed that family function has a significant positive relationship with caregivers' resilience[28,46]. This relationship can indicate that proper supportive communication between family members can reduce the negative effects of the disease, facilitate effective adaptation, and subsequently improve the level of resilience in caregivers.

Anxiety and depression in caregivers of cancer patients are two factors that have a negative impact on their resilience[28,46]. These findings are consistent with the theory of resilience and the premise that resilience and negative affect don't go together[43,53]. The high responsibility of caring for these individuals causes the caregivers of these patients to feel a great deal of stress and anxiety. To lessen caregivers' anxiety and depression and subsequently boost their flexibility and resilience, healthcare professionals should look into their emotional state.

Limitations

The present research had several limitations worth highlighting, as with most systematic reviews. Meta-analysis was not possible in this systematic review due to methodological differences in the design of the included papers and tools. The likelihood of findings being heterogeneous increases with a lack of meta-analysis, which reduces the findings' precision. The systematic review was strong enough in its methodical approach to gathering, classifying, and assessing studies despite the absence of meta-analysis. Despite a thorough search of numerous databases, it's possible that not all

		Lim et al., 2014	Simpson et al., 2015	Saria et al., 2017	Hwang et al., 2018	Palacio et al., 2018	Li et al., 2019	Lau et al., 2020	Chen et al., 2020	Üzar-Özçetin & Dursun, 2020	Chen et al., 2021	Krok et al., 2021	Van Roij et al., 2021	Wang et al., 2021	Yan et al., 2021	Shimizu et al., 2022
Introduction	Clear aims	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
	Appropriate design	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Methods	Sample size justified	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
	Population defined	★	■	★	★	★	★	★	★	★	★	★	★	★	★	★
	Sample representative of population	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
	Selection process representative	■	★	■	★	★	★	★	■	★	★	★	★	★	★	■
	Measures to address non-responders	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Appropriate outcome variables	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
	Valid measures	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
	Defined statistical significance	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
	Methods described	■	■	★	■	■	★	★	★	★	★	★	★	★	★	★
Results	Results data described	★	★	★	★	★	■	★	★	★	★	★	★	★	★	★
	Concerns about non-response bias	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Non-responder information described	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Results internally consistent	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
	Results presented for analyses	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Discussion	Conclusions justified	★	■	★	★	★	★	★	★	★	★	★	★	★	★	★
	Limitations identified	■	■	■	★	★	■	★	★	★	★	★	★	★	★	★
Others	Funding sources or conflicts of interests	■	■	■	★	★	■	■	★	■	★	★	■	★	★	★
	Ethical approval/consent attained	■	■	■	★	★	■	–	★	■	★	★	★	★	★	★

Figure 2. Assessment of the quality of the included articles.

Table 2

Factors associated with resilience in caregivers of cancer patients

First author/year	Positive relationship	Negative relationship
Lim et al., 2014[38]	NA	NA
Simpson et al., 2015[42]	Caregiver's age (r = 0.291, P < 0.05).	Caregivers' anxiety (r = − 0.383, P < 0.01) Caregivers' depression (r = − 0.468, P < 0.01)
Saria et al., 2017[40]	NA	Caregivers' memory (ρ = − 0.30, P < 0.05)
Hwang et al., 2018[28]	Caregivers' health status (OR = 2.35, P = 0.001) Patient's performance (OR = 1.92, P = 0.020) Caregivers' family function (OR = 2.54, P < 0.001) Caregivers' social support (P < 0.001) Caregivers' self-esteem (OR = 1.82, P = 0.016)	Caregivers' depression (OR = 3.52, P < 0.001) Caregivers' anxiety (OR = 3.49, P < 0.001) Caregivers' financial problem (OR = 1.88, P = 0.010)
Palacio et al., 2018[39]	NA	NA
Li et al., 2019[37]	Caregivers' post-traumatic growth (r = 0.35, P < 0.01) Caregivers' quality of life (r = 0.37, P < 0.01)	Caregiver's burden (r = − 0.31, P < 0.01)
Lau et al., 2020[36]	NA	Maternal distress (β = − 0.48, P = 0.043)
Chen et al., 2020[34]	Caregivers' social support (β = 0.283, P = 0.001) Patient's performance (β = 0.369, P = 0.001) Patient's age (β = 0.293, P = 0.001)	Caregiver's age (β = − 0.225, P = 0.003) Caregiver's level of education (β = − 0.157, P = 0.037)
Üzar-Özçetin & Dursun, 2020[43]	Caregivers' quality of life (r = 0.74, P = 0.01)	NA
Chen et al., 2021[33]	Patients' resilience (r = 0.129, P < 0.05) Patients social support (r = 0.214, P < 0.01) Caregivers social support (r = 0.570, P < 0.01) Patients' resilience support (r = 0.306, P < 0.01)	NA
Krok et al., 2021[35]	Caregivers religious (r = 0.15, P < 0.05) Caregiver's hope (r = 0.37, P < 0.001) Caregivers positive affect (r = 0.66, P < 0.001)	Caregivers negative affect (r = − 0.55, P < 0.001)
Van Roij et al., 2021[44]	NA	Caregiver's burden (P < 0.05)
Wang et al., 2021[45]	Caregivers' family function (r = 0.26, P < 0.01) Patients' resilience (r = 0.20, P < 0.01) Caregivers' quality of life (r = 0.28, P < 0.01) Patient's quality of life (r = 0.28, P < 0.01)	NA
Yan et al., 2021[46]	Patients' resilience (r = 0.58, P < 0.001)	Caregivers' post-traumatic stress disorder (r = − 0.27, P = 0.006) Patients post-traumatic stress disorder (r = − 0.24, P = 0.016)
Shimizu et al., 2022[41]	NA	NA

OR, odds ratio; NA, not applicable.

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studies on this topic were located. Last but not least, because this review only looked at research written in English and Persian, there might be problems with a language barrier and additional findings in important languages that were not accessed and considered in the analysis.

Implications for health managers and policymakers

The resilience of cancer patients' caregivers is one of the most important factors in the quality of care for these patients and the quality of life of caregivers. Also, due to the pressure on caregivers, these people are prone to emotional problems, which subsequently reduces their resilience. Therefore, healthcare managers and policymakers can improve their resilience and quality of care by developing continuous training programs to assess mental health and strategies to deal with stress and depression.

Implication for future research

Considering the factors related to the resilience of cancer patients' caregivers, it is suggested that future studies investigate appropriate interventions to improve the resilience of caregivers.

Conclusion

Overall, the majority of the studies found that caregivers of cancer patients had high levels of resilience. Factors related to the resilience of cancer patients' caregivers included caregivers' social support, caregivers' quality of life, patients' resilience, caregivers' family function, patients' performance, caregivers' age, caregivers' health status, caregivers' self-esteem, caregivers post-traumatic growth, caregivers religious, caregivers hope, caregivers positive affect, patients age, patients social support, patients resilience support, patients quality of life, caregivers' anxiety, caregivers' depression, caregivers' burden, caregivers level of education, caregivers financial problem, caregivers memory, caregivers negative affect, caregivers post-traumatic stress disorder, maternal distress, and patients post-traumatic stress disorder.

Ethical approval

None.

Consent

This study is a systematic review and does not require ethical approval and consent.

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Author contribution

Study concept and design by all authors; Data acquisition by all authors; Data interpretation by all authors; drafting the manuscript by all authors; Revision of the manuscript by all authors; the final version of the manuscript is approved by all authors.

Conflicts of interest disclosure

The authors declare no conflict of interest.

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We could not register our manuscript in the Research Registry UIN: www.researchregistry.com due to internet access restrictions and international sanctions. we live in Iran. We hardly even meet the basic needs of our daily life. We do not receive any funding for our research and we cannot pay for our research. Please excuse us from registering this manuscript in the Research Registry UIN: www.researchregistry.com.

Guarantor

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Data availability

The datasets generated and analyzed during the current study are available from the corresponding author on reason-able request.

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