

Review Article

#Contributed equally

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Factors correlated with demoralization among cancer patients: A systematic review and meta-analysis

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Abstract

Objectives. Demoralization is a common psychological problem in cancer patients. The purpose of this study is to systematically evaluate the correlated factors of demoralization among cancer patients. We also summarized the available evidence, effect estimates, and the strength of statistical associations between demoralization and its associated factors.

Methods. We systematically searched PubMed, Web of Science, CINAHL, Embase, the Cochrane Library, PsycINFO, and 2 electronic databases to identify studies published up to October 2023 with data on the correlates of demoralization. Two researchers independently reviewed references, extracted data, and assessed data quality. Meta-analysis was performed using R4.1.1 software.

Results. Thirty-eight studies were included in this meta-analysis. For the most studied sociodemographic correlates, demoralization was negatively correlated with income ($z = -0.29$, 95% CI: $-0.51, -0.02$), education ($z = -0.11$, 95% CI: $-0.16, -0.05$), and age ($z = -0.45$, 95% CI: $-0.75, -0.01$). For the most studied clinical correlates, demoralization was positively correlated with symptom burden ($z = 0.37$, 95% CI: $0.22, 0.50$) and negatively correlated with quality of life ($z = -0.40$, 95% CI: $-0.54, -0.24$). For the most studied psychosocial correlates, demoralization was negatively correlated with social support ($z = -0.39$, 95% CI: $-0.51, -0.26$) and positively correlated with anxiety ($z = 0.65$, 95% CI: $0.56, 0.73$), depression ($z = 0.61$, 95% CI: $0.54, 0.67$), and suicidal ideation ($z = 0.48$, 95% CI: $0.34, 0.60$).

Significance of results. Demoralization showed either positive or negative associations with sociodemographic, clinical, and psychological variables. More research is needed to explore the underlying mechanisms to develop effective interventions. This review provides information on the factors associated with demoralization in cancer patients, which can be used to inform strategies for clinical care providers.

Introduction

Malignant tumor is a significant public health problem threatening the physical and mental health of humans. According to the World Health Organization, in 2020, 19.3 million new cancer cases and almost 10 million cancer deaths were reported worldwide. By 2040, 28.4 million new cases of malignant tumors are expected, an increase of 47% over 2020 (Xia et al. 2022). Facing malignant diseases is one of the greatest challenges and pressures that patients face, and it can be a starting point of a life crisis that leads to a series of psychological problems (Wu et al. 2021). Demoralization is one of the psychosocial problems of cancer, from diagnosis to treatment and gradual recovery (Bobevski et al. 2022; Bovero et al. 2019; Mishra 2023).

Demoralization is a psychological issue caused by a series of internal or external pressures (Wang et al. 2023). It can be manifested as a sustained inability to cope with a stressful predicament, followed by a sense of helplessness, hopelessness, meaninglessness, subjective incompetence, and damaged self-respect, ranging from mild depression and depression to deep despair (Bockholt et al. 2021; Clarke and Kissane 2002). Demoralization has become a common psychological problem among cancer patients (Airoldi et al. 2019). Studies have shown that the incidence of demoralization among cancer patients can be as high as 86.75%, and the average score of demoralization among cancer patients is higher than that in non-tumor ones (Gan et al. 2022; Nanni et al. 2018). In addition, other systematic reviews have demonstrated that the prevalence of demoralization range from 20.6% to 94% in various diseases, including schizophrenic,

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progressive diseases (Costanza *et al.* 2022; Robinson *et al.* 2015; Tecuta *et al.* 2015). Furthermore, demoralization is also strongly associated with several adverse outcomes, such as lower quality of life (QoL) and suicidal thinking and behavior (Chang *et al.* 2022b; Costanza *et al.* 2022; Crespo *et al.* 2020; Robinson *et al.* 2017). Therefore, earlier identification of the demoralization of cancer patients by medical staff can more effectively improve the prognosis of patients and reduce the occurrence of adverse outcomes, such as depression and suicide.

A growing number of qualitative and quantitative studies have explored the factors associated with demoralization in cancer patients, but no consensus has been reached regarding the identification of relevant factors. For example, Belar *et al.* (2019) and Shao *et al.* (2024) have reported disagreements about the relationship between religion and demoralization. The former researchers show that demoralization negatively correlates with religion, whereas the latter concludes the opposite. Moreover, no meta-analysis of studies related to demoralization in cancer patients can help systematically synthesize these data to provide strong evidence of the identifying factors associated with demoralization among cancer patients.

This meta-analysis aimed to explore the correlates of demoralization among cancer patients and provide recommendations for further research and policymaking.

Methods

This meta-analysis was conducted based on the Preferred Reporting Items of Systematic Reviews and Meta-Analyses statement. It was registered with PROSPERO on September 25, 2023, number CRD42023463663.

Search strategy

A systematic search was conducted from database inception to October 2023 across 8 databases: PubMed, Web of Science, CINAHL, Embase, the Cochrane Library, PsycINFO, CNKI, and Wan Fang. Reference lists of included articles and previous relevant systematic reviews were screened for secondary literature. The search terms were “cancer OR tumor OR neoplasms OR carcinoma” AND “demoralization OR demoralization syndrome.” In addition, we checked references in this review and previous relevant systematic reviews to identify additional studies. We excluded gray literature from the search because their diverse formats presented a challenge for the systematic search. Search strategies for all databases are described in Table S1.

Eligibility criteria

Studies were eligible if participants (age ≥ 18 years) were diagnosed with cancer and reported their state of demoralization and factors associated with demoralization (e.g., demographic variables). Eligible study types were longitudinal studies, case-control studies, and cross-sectional studies. Studies that combined non-cancer patients or did not report demoralization were excluded. In addition, editorials and reviews were also excluded.

Data extraction and quality assessment

Two investigators independently performed the literature review and data extraction. The review process included title reviews, abstract reviews, and full-text reviews. If there was any disagreement between the 2 investigators after discussion, a third

researcher was invited to decide whether to include the study. The items extracted and coded included the first author, publication time, country, study design, sample size, age, type of cancer, demoralization assessment tool, prevalence/score of demoralization, and associated factors.

Regarding the quality of the included articles, 2 investigators independently evaluated by using the cross-sectional Study Quality Assessment Scale recommended by the Agency for Healthcare Research and Quality (AHRQ) (Rostom *et al.* 2004) and the Newcastle–Ottawa Scale (NOS) (Stang 2010). The AHRQ scale was adopted to assess the quality of the cross-sectional study, including 11 items. The score of each question ranges from 0 to 1, and the scale's total score ranges from 0 to 11. Studies were classified into low (0–3), medium (4–7), and high (8–11) quality according to their scores. We used the NOS to evaluate the quality of the longitudinal study. The NOS includes 8 items, and the assessment is conducted in 3 dimensions; the total score ranges from 0 to 9. Studies were classified into low (0–3), medium (4–6), and high (7–9) evidence. The low-quality studies were finally excluded.

Data synthesis and statistical analysis

R4.1.1 software was used to perform a meta-analysis on the relevant factors of the included studies; $p < 0.05$ was considered statistically significant. We adopted the Pearson correlation coefficients (r) as an effect analysis statistic. For studies that do not provide an r value, other convertible statistics, such as Spearman's correlation coefficient (r_s), odds ratio (OR), or standardized regression coefficient (β), can be converted into an r value (Peterson and Brown 2005; Sarraf *et al.* 2022).

We used I^2 test to quantify the heterogeneity and used subgroup analysis to find the possible sources of heterogeneity. When significant heterogeneity ($I^2 > 50\%$ and $p < 0.05$) was detected, a random-effect model was used; otherwise, using a fixed-effect model. Sensitivity analysis was adopted to assess the impact of each study on the pooled results. We used Egger's test to measure the potential publication bias.

Results

Study selection

We identified 1303 eligible articles through a database search, with 734 remaining after removing 569 duplicates. Among them, 646 were excluded by their title and abstract evaluation. The full text of 88 articles were searched. After further reading the full text, 38 publications were finally included (Fig. 1).

Study characteristic

A total of 38 articles ($n = 9639$) were included in the meta-analysis. The 38 included articles were published between 2014 and 2023. Most studies were conducted in China ($n = 23$) (Chang, Huang, *et al.*, 2022a; Chang, Hung, *et al.*, 2022b; Cheng *et al.* 2019; Chien *et al.* 2022; Kang *et al.* 2023; Ko *et al.* 2018; Lai *et al.* 2022; Li *et al.* 2020; Li *et al.* 2023; Li *et al.* 2016; Lin *et al.* 2022; Liu *et al.* 2020; Peng *et al.* 2021; Shao *et al.* 2024; Tang *et al.* 2020; Tang *et al.* 2022; Wu *et al.* 2021; Xu *et al.*, 2019). The studies included a sample size of 78–874 participants aged 18–97 years. The most commonly used tool in the studies was the Demoralization Scale (DS). The most frequently reported correlate was depression. Overall, the study quality scores were between 6 and 10 points, indicating that the

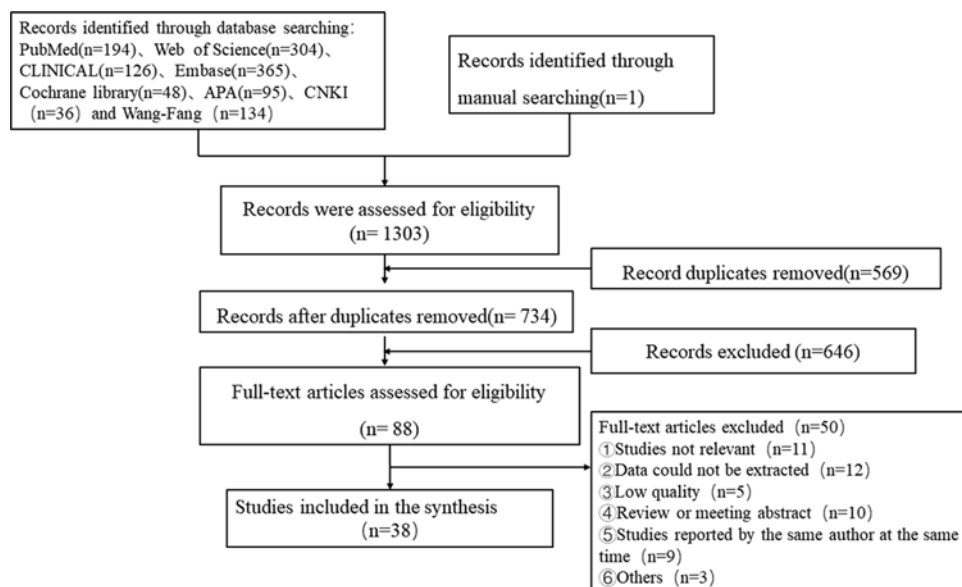


Figure 1. Flow chart of study selection procedure.

quality of studies was at a medium to high levels (Tables S2 and S3). The characteristics of all included studies are summarized in Table 1.

Meta-analysis results

Table 2 summarizes the meta-analysis results of all the reported correlates. Figures 2 and 3 respectively display the forest plots and Egger test plot of frequently reported correlates. The forest plots of variables reported in only 2 articles or with no statistical significance (Figures S1–S3), and the Egger test figures (Figure S4) are shown in the supplementary material.

Sociodemographic correlates

Three sociodemographic factors (income, education, and age) were found to be associated with demoralization. Results of the meta-analysis suggested that demoralization has a statistically negative correlation with income ($z = -0.29$, 95% CI: $-0.51, -0.02$; Fig. 2A), education ($z = -0.11$, 95% CI: $-0.16, -0.05$; Fig. 2B), and age ($z = -0.45, -0.75, -0.01$; Fig. 2C). These findings showed that the characteristics of the studies reported by income ($I^2 = 97%$, $p < 0.01$) and age ($I^2 = 99%$, $p < 0.01$) are highly heterogeneous, which may be attributed to the different tumor types and evaluation tools. Egger's asymmetry test for income ($t = -0.67$, $df = 4$, $p = 0.54$; Fig. 3A), education ($t = 1.51$, $df = 4$, $p = 0.207$; Fig. 3B), and age ($t = -0.21$, $df = 2$, $p = 0.85$; Fig. 3C) suggested no evidence of funnel-plot asymmetry, indicating that there is no publication bias.

Clinical correlates

QoL was the most frequently reported correlate associated with demoralization, followed by symptom burden. Results of the meta-analysis suggested that demoralization has a statistically mild, negative correlation with QoL ($z = -0.40$, 95% CI: $-0.54, -0.24$; Fig. 2D). These findings demonstrated that the characteristics of the included 9 studies are strongly heterogeneous ($I^2 = 94%$, $p < 0.01$). Symptom burden ($z = 0.37$, 95% CI: $0.22, 0.50$; Fig. 2E) had a small,

positive correlation with demoralization. These findings demonstrated that the characteristics of the included studies are strongly heterogeneous ($I^2 = 91%$, $p < 0.01$).

In addition, Egger's asymmetry test for QoL ($t = -1.48$, $df = 7$, $p = 0.18$; Fig. 3D) and symptom burden ($t = 0.64$, $df = 5$, $p = 0.548$; Fig. 3E) indicated no publication bias.

Psychological correlates

Sixteen studies were included in the meta-analysis examining the correlation between demoralization and depression (Fig. 2F). Results of the meta-analysis showed that demoralization has a statistically significant, strong, positive correlation with depression ($z = 0.61$, 95% CI: $0.54, 0.67$; Fig. 2F). These findings demonstrated that the characteristics of the included 16 studies are strongly heterogeneous ($I^2 = 92%$, $p < 0.01$). Egger's asymmetry test suggested no evidence of funnel-plot asymmetry, indicating that there is no publication bias ($t = -0.90$, $df = 14$, $p = 0.381$; Fig. 3F).

Anxiety ($z = 0.65$, 95% CI: $0.56, 0.73$; Fig. 2G) and suicidal ideation ($z = 0.48$, 95% CI: $0.34, 0.60$; Fig. 2H) were also found to have strong positive associations with demoralization. These findings demonstrated that the characteristics of the included studies are strongly heterogeneous ($I^2 = 71%$, $p = 0.02$; $I^2 = 89%$, $p < 0.01$, respectively). Egger's asymmetry test for anxiety ($t = -2.23$, $df = 2$, $p = 0.156$; Fig. 3G) and suicidal ideation ($t = 0.43$, $df = 4$, $p = 0.687$; Fig. 3H) suggested no evidence of funnel-plot asymmetry, indicated no publication bias.

Results of the meta-analysis showed that demoralization has a statistically significant small, negative correlation with social support ($z = -0.39$, 95% CI: $-0.51, -0.26$; Fig. 2I). These findings demonstrated that the characteristics of the included studies are strongly heterogeneous ($I^2 = 88%$, $p < 0.01$). Egger's asymmetry test suggested evidence of funnel-plot asymmetry, indicating that a publication bias is likely ($t = 0.31$, $df = 1$, $p = 0.37$; Fig. 3I).

Descriptive results

Given that the following variables were reported in only 1 literature, only descriptive analysis is reported here: demoralization

Table 1 Basic information of included studies

First author, year	Study area	Study design	Sample size	Age	Type of cancer	Tool	Prevalence (%) / Mean score (SD)	Correlates	Quality assessment score
An et al. 2018	Canada	Cross-sectional	307	59 ± 11.2	Mixed	DS	28 ± 14.1	4, 5, 44, 45, 46	6
Arvanitou et al. 2021	Greece	Cross-sectional	150	61.51 ± 12.97	Mixed	DS-II	3.1 ± 4.17		
	1, 2	7							
Belar et al., 2019	Multi-center	Cross-sectional	150	22–97	Mixed	DS-II	33%	1, 2, 5, 7, 8, 42	9
Bovero et al. 2023	Italy	Cross-sectional	170	68.76 ± 13.1	Mixed	DS	66.50%	2, 3, 5, 8, 24	9
Bovero et al. 2021	Italy	Cross-sectional	350	68.98 ± 12.65	Mixed	DS	36.25 ± 14.11	51	10
Chang et al. 2022a(1)	China	Cross-sectional	121	50.84 ± 8.59	Breast	DS	25.12 ± 14.89	3, 9, 20	6
Chang et al. 2022a(2)	China	Cross-sectional	155	52.9 ± 9.7	Oral	DS	27.2 ± 16.8	3, 9, 10	8
Cheng et al. 2019	China	Cross-sectional	203	46.26 ± 9.70	Breast	DS	32.81 ± 12.82	2, 3, 11, 13, 14, 15	10
Chien et al. 2022	China	Cross-sectional	122	68.82 ± 6.74	Prostate	DS	18.23 ± 14.40	5, 19, 21	8
Eggen et al. 2020	Canada	Cross-sectional	78	37–82	Lung	DS	33%	2, 4, 5, 16, 27, 28	10
Elmasian et al., 2023	Greece	Cross-sectional	150	/	Mixed	DS-II	/	1, 2	6
Garzón et al., 2018	Germany	Cross-sectional	187	57.8 ± 11.7	Mixed	DS	32.0 ± 15.2	2, 5, 22	10
Cai et al., 2022	China	Cross-sectional	162	57.64 ± 7.68	Pancreatic	DS	35.45 ± 11.93	14, 15, 18, 23	6
Ghiggia et al. 2021	Italy	Cross-sectional	210	67.8 ± 11.6	Mixed	DS	36.2 ± 14.3	3, 8, 47	6
Kang et al. 2023	China	Cross-sectional	289	46–87	Lung	DS	49.27 ± 15.19	3, 6, 12, 13, 18, 25, 26,	6
Kim et al., 2022	Australia	Cross-sectional	310	61.8 ± 11.5	Breast	DS-6	2.0 ± 2.5	29	10
Ko et al. 2018	China	Cross-sectional	113	66.7 ± 4.8	Mixed	DS	28.1 ± 16.3	2, 10, 14, 30, 48,	10
Liu et al., 2022	China	Cross-sectional	205	55.82 ± 9.66	Gastric	DS-II	18.87 ± 3.23	31	6
Lai et al. 2022	China	Cross-sectional	588	50–65	Mixed	DS-II	/	10	10
Li et al. 2020	China	Cross-sectional	375	/	Breast	DS	26.95 ± 12.83	6, 13, 18, 21, 32, 49	10
Li et al. 2016	China	Cross-sectional	411	/	Mixed	DS	30.08 ± 13.68	12, 13, 14, 15, 34, 35	7
Li et al. 2023	China	Cross-sectional	267	57.43 ± 11.51	Mixed	DS	23.84 ± 10.37	16	6
Lin et al. 2022	China	Cross-sectional	874	51.66 ± 13.05	Mixed	DS-II	7.30 ± 6.00	2, 3	7
Liu et al. 2020	China	Cross-sectional	244	/	Mixed	DS	/	2, 10, 11	6
Nanni et al. 2018	Multi-center	Cross-sectional	195	53.55 ± 10.51	Mixed	DS, DCPR/D	24.74 ± 13.38	1, 2, 3, 10, 12,	10

(Continued)

Table 1 (Continued.)

First author, year	Study area	Study design	Sample size	Age	Type of cancer	Tool	Prevalence (%)/ Mean score (SD)	Correlates	Quality assessment score
Peng et al. 2021	China	Cross-sectional	208	51.96 ± 8.27	Breast	DS	25.96 ± 13.75	20, 33, 36	10
Philipp et al. 2020	Germany	Longitudinal	307	59.6 ± 11.1	Mixed	DS	/	5, 43	6
Vehling and Mehnert 2014	Germany	Cross-sectional	112	56.0 ± 14.1	Mixed	DS	19.1 ± 11.7	2, 5, 22	9
Scandurra et al., 2022	Italy	Cross-sectional	197	67.19 ± 6.83	Prostate	DS-II	6.55 ± 6.67	2, 16, 19	8
Shao et al. 2024	China	Cross-sectional	187	/	Mixed	DS-II	/	7, 13, 17, 37, 38	8
Shapiro et al., 2020	Canada	Cross-sectional	305	/	Mixed	DS	/	2	7
Tang et al. 2020	China	Cross-sectional	296	19-83	Mixed	DS	30.4 ± 13.0	2, 3, 6, 11, 14, 39,	7
Tang et al. 2022	China	Longitudinal	101	52.8 ± 11.1	Mixed	DS	Head and neck cancer: 49.18-53.17, chest and breast cancer: 46.14-51.89, abdominal and pelvic cancer: 46.60-53.10	50	7
Wu et al. 2021	China	Cross-sectional	296	57.43 ± 9.254	Mixed	DS-II	11.67 ± 6.651	2	7
Xu et al., 2019	China	Cross-sectional	303	18-77	Mixed	DS	30.10 ± 14.44	10	10
Li et al. 2022	China	Cross-sectional	364	/	Breast	DS	32.04 ± 12.10	18, 40	7
Ou et al. 2021	China	Cross-sectional	250	63.33 ± 11.03	Mixed	DS-II	51.20%	5, 13, 14, 41	10
Zhu et al., 2022	China	Cross-sectional	327	/	Breast	DS	46.48%	5, 12, 15, 17, 18, 23	7

Note: DS = Demoralization Scale; DS-II = Demoralization Scale II; DS-6 = Demoralization Scale-short form; DCPRI/D = Diagnostic Criteria for Psychosomatic Research-Demoralization interview. Correlates: 1. anxiety; 2. depression; 3. quality of life; 4. death anxiety; 5. symptom burden and bother; 6. coping style; 7. religious; 8. functional status; 9. spiritual interests; 10. suicidal ideation; 11. hopelessness; 12. age; 13. income; 14. education level; 15. cancer stage (higher); 16. self-esteem; 17. residence (urban); 18. social support; 19. psychological resilience; 20. sleep quality; 21. self-efficacy; 22. relationship to health-care provider; 23. self-perceived burden; 24. spiritual well-being; 25. medical payment; 26. time of chemotherapy; 27. perceived cognitive impair; 28. illness intrusiveness; 29. at-work productivity loss; 30. psychological distress; 31. self-compassion; 32. having at least 1 child; 33. stress; 34. marital status; 35. treatment type; 36. psychological well-being; 37. source of income; 38. financial toxicity; 39. positive life orientation; 40. empirical avoidance; 41. gender; 42. the researchers' perceptions about the demoralization; 43. perceived relatedness; 44. anxious attachment; 45. avoidant attachment; 46. life completion; 47. personality traits; 48. cancer type; 49. surgery type; 50. time of radiotherapy; 51. Hope.

Table 2. Factors correlated with demoralization among cancer patients

Correlates	No. of studies	No. of individuals	<i>z</i> (95% CI)	<i>I</i> ²	<i>p</i> -value	Egger's test (<i>t</i>)
Demographic correlates						
Income	6	1715	-0.29(-0.51, -0.02)	97	<0.01	-0.67 n.s.
Education	6	1435	-0.11(-0.16, -0.05)	0	0.46	1.51 n.s.
Age	4	1222	-0.45(-0.75, -0.01)	99	<0.01	-0.21 n.s.
Religious	2	337	0.08(-0.46, 0.57)	96	<0.01	n. a.
Residence	2	514	0.13(-0.75, 0.84)	99	<0.01	n. a.
Clinical correlates						
QoL	9	2513	-0.40(-0.54, -0.24)	94	<0.01	-1.48 n.s.
Symptom burden	7	1575	0.37(0.22, 0.50)	91	<0.01	0.64 n.s.
Clinical stage	4	1103	0.21(-0.04, 0.44)	95	<0.01	-0.38 n.s.
Functional status	3	530	-0.24(-0.32, -0.16)	0	0.53	-2.78 n.s.
Sleep quality	2	329	-0.27(-0.66, 0.24)	95	<0.01	n. a.
Relationship to health care	2	299	0.59(-0.66, -0.51)	0	1	n. a.
Self-perceived burden	2	489	0.43(0.35, 0.50)	0	0.67	n. a.
Psychosocial correlates						
Depression	16	3720	0.61(0.54, 0.67)	92	<0.01	-0.9 n.s.
Anxiety	4	645	0.65(0.56, 0.73)	71	0.02	-0.82 n.s.
Suicidal ideation	6	1598	0.48(0.34, 0.60)	89	<0.01	0.43 n.s.
Social support	5	1517	-0.39(-0.51, -0.26)	88	<0.01	0.31 n.s.
Death anxiety	2	385	0.68(0.62, 0.73)	49	0.16	n. a.
Surrender coping	3	960	0.57(0.37, 0.72)	94	<0.01	2.98 n.s.
Facing coping	2	664	-0.17(-0.24, -0.10)	29	0.23	n. a.
Avoidance coping	3	960	0.28(0.02, 0.51)	95	<0.01	1.21 n.s.
Spiritual interests	2	276	0.93(0.29, 0.99)	99	<0.01	n. a.
Hopeless	3	743	0.48(0.04, 0.77)	98	<0.01	-1.83 n. s.
Self - esteem	3	542	-0.62(-0.70, -0.53)	59	0.09	-1.52 n.s.
Psychosocial resilience	2	319	-0.48(-0.56, -0.39)	22	0.32	n. a.
Self-efficacy	2	497	-0.59(-0.65, -0.53)	0	0.67	n. a.

Note: *n* = number of studies; n. s. = statistically nonsignificant; n. a. = not applicable due to the number of studies included.

was correlated with sociodemographic variables (medical payment ($r = 0.749$) (Kang et al. 2023), having at least 1 child ($r = 0.043$) (Liu et al. 2020), marital status ($r = 0.11$) (Y. C. Li et al. 2016), source of income ($r = 0.588$) (Shao et al. 2024), gender ($r = 0.041$) (Ou et al. 2021)), clinical variables (time of chemotherapy ($r = 0.61$) (Kang et al. 2023), treatment type ($r = 0.12$) (Y. C. Li et al. 2016), surgery type [breast-conserving surgery ($r = -0.028$), breast plastic surgery ($r = 0.029$)] (J. Li et al. 2020), time of radiotherapy ($r = -0.802$) (P. L. Tang et al. 2022), cancer type [digestive and liver ($r = 0.044$), head and neck ($r = 0.011$), breast ($r = -0.011$), gynecological ($r = 0.061$)] (Ko et al. 2018)), positive psychological variables (psychological well-being ($r = -0.67$) (Peng et al. 2021), self-compassion ($r = -0.299$) (Liu et al. 2020), spiritual well-being ($r = -0.718$) (Andrea Bovero et al. 2023), hope ($r = -0.695$) (A. Bovero et al. 2021), positive life orientation ($r = -0.471$) (L. L. Tang et al. 2020), life completion ($r = -0.45$) (An et al. 2018), perceived relatedness ($r = 0.763$) (Philipp et al. 2020), anxious attachment ($r = 0.54$) (An et al. 2018), avoidant attachment

($r = 0.37$) (An et al. 2018), empirical avoidance ($r = 0.661$) (T. Li et al. 2022)), negative psychological variables (psychological distress ($r = 0.422$) (Ko et al. 2018), stress ($r = 0.42$) (Peng et al. 2021), illness intrusiveness ($r = 0.50$) (Eggen et al. 2020), perceived cognitive impaired ($r = 0.38$) (Eggen et al. 2020)), social variables (at-work productivity loss ($r = 0.074$) (Kim et al. 2022), financial toxicity ($r = -0.616$) (Shao et al. 2024), personality traits [extraversion ($r = -0.395$), agreeableness ($r = -0.235$), conscientiousness ($r = -0.164$), neuroticism ($r = 0.475$), openness to experience ($r = -0.233$)] (Ghiggia et al. 2021), and researchers' perceptions about demoralization ($r = 0.64$) (Belar et al. 2019).

Discussion

Demoralization is a common mental problem affecting the prognosis of cancer patients. This systematic review highlights sociodemographic, clinical, and psychological factors associated with

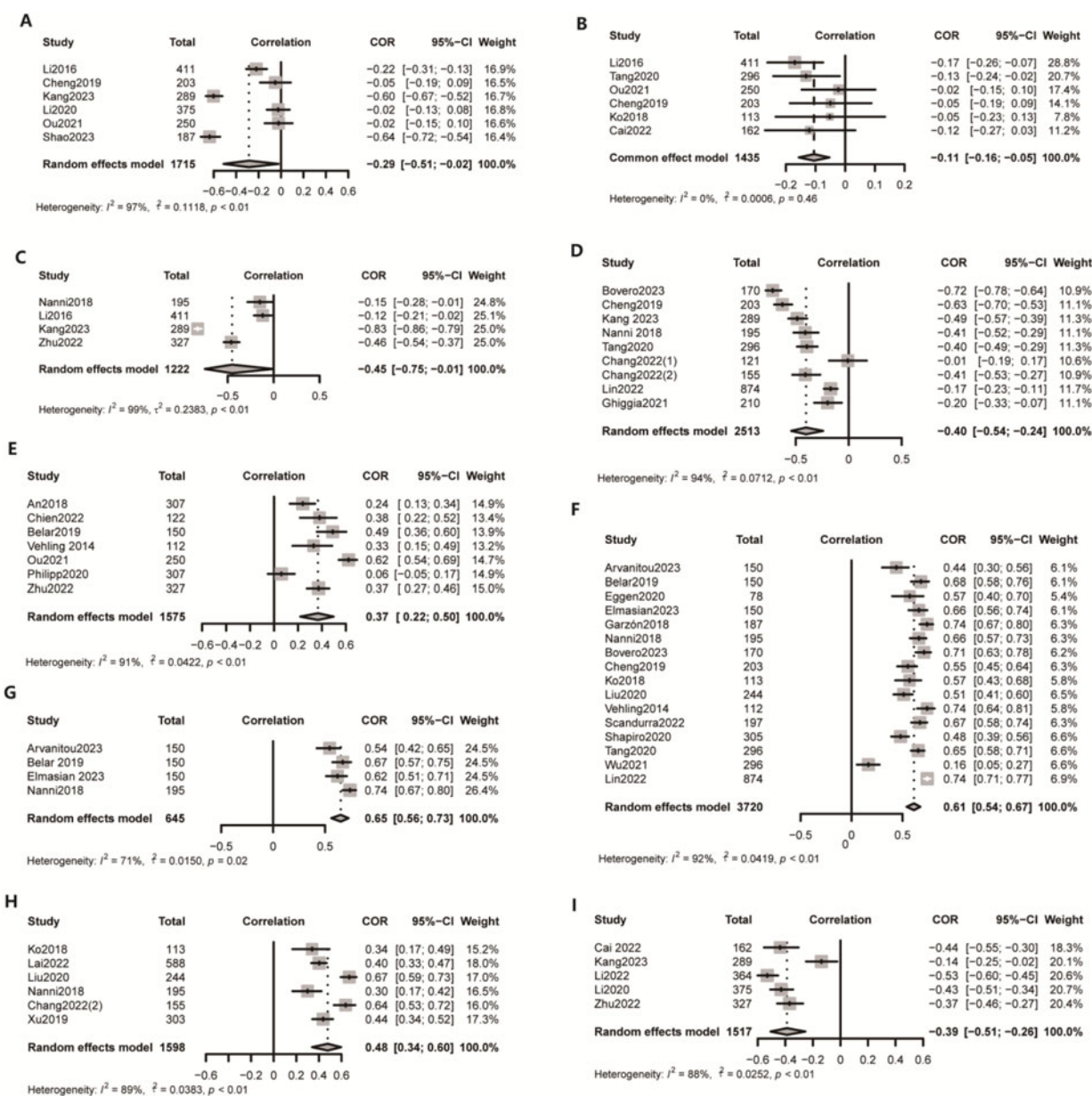


Figure 2. Forest plot of correlates of demoralization.

Note: A: income; B: education; C: age; D: QoL; E: symptom burden; F: depression; G: anxiety; H: suicidal ideation; I: social support.

demoralization among oncology patients. Although demoralization varies across types of cancer, the current findings suggest that the nature of sociodemographic, clinical, and psychological factors associated with demoralization is similar across types of cancer. Thus, demoralization associated with cancer may be universal.

This study assessed the methodological quality of the included evidence using the AHRQ and the NOS. The summarized evidence ranged from medium to high quality. Specifically, almost all studies identified the source of treatment, criteria for inclusion and exclusion of patients, time to identification, and included continuous subjects. In addition, all studies described assessments undertaken and how confounding was assessed, which could contribute to the reality of the results. However, 9 studies did not summarize patient

response rates, which could introduce bias into the results. Based on the findings above, the systematic review of the studies obtained a medium to high methodological quality.

Specifically, for demographic correlates, results show that demoralization has a mildly negative association with income and education levels. This finding is similar to a study in Taiwan (Li et al. 2017), revealing that education and monthly income are protective correlates of demoralization among cancer patients. The reason may be that the patient's economic status or income directly determines their treatment methods and ability to afford medical expenses (Yu-Chi et al. 2017). Low-income cancer patients have limited access to medical resources, causing them to suffer from demoralization. Bailey et al. also found that education is an effective resource for dealing with serious diseases, especially in improving

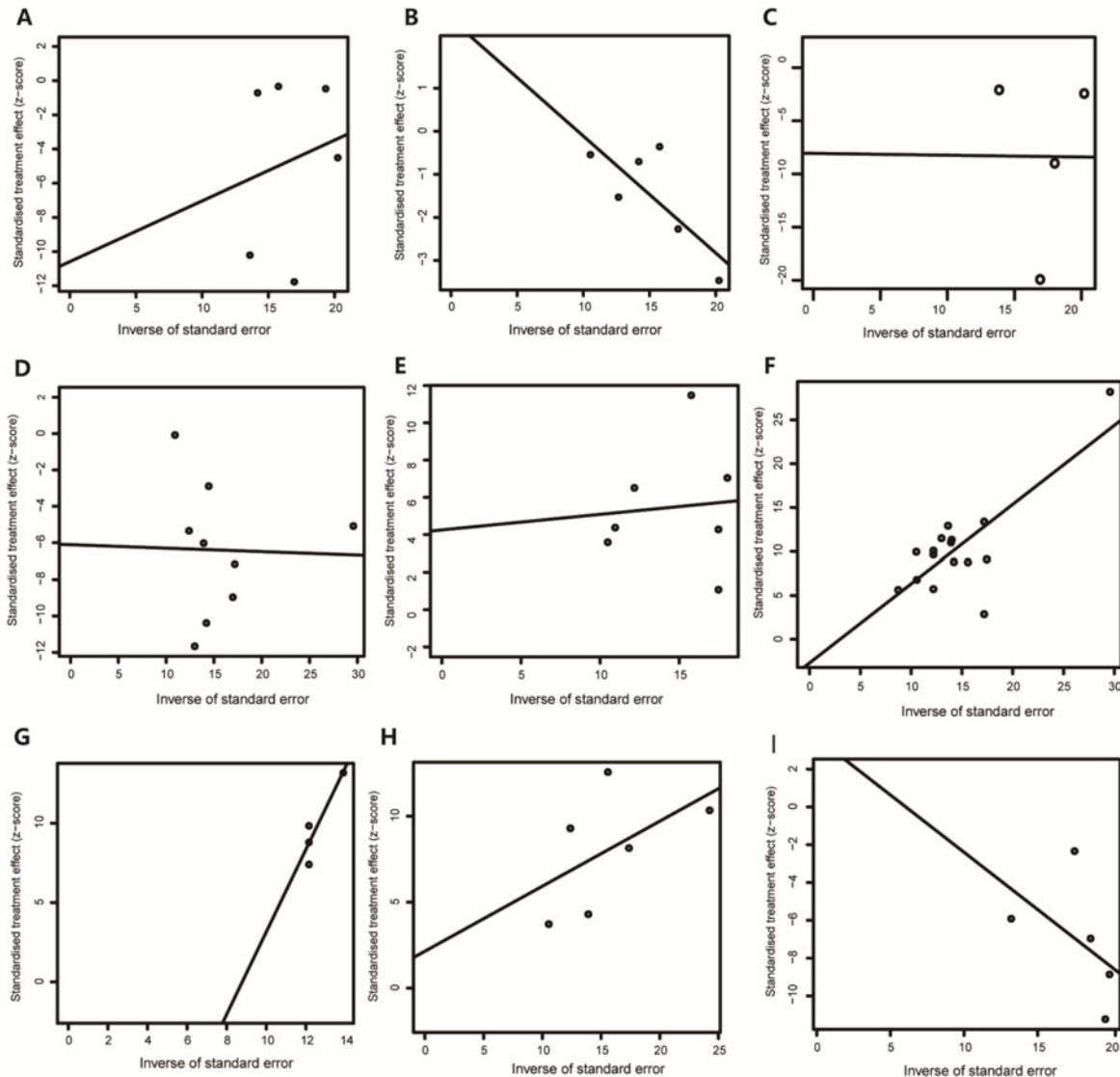


Figure 3. Egger test plot of correlates of demoralization.

Note: A: income; B: education; C: age; D: QoL; E: symptom burden; F: depression; G: anxiety; H: suicidal ideation; I: social support.

disease-related health literacy, which plays a crucial role (Bailey *et al.*, 2020). Thus, patients with low education levels have poor access to disease-related knowledge, resulting in a lower ability to cope with the disease, and cancer patients are more likely to suffer from demoralization. Age is also negatively correlated with demoralization; younger patients are more likely to experience higher levels of demoralization, consistent with previous studies (Bailey *et al.* 2020; Cimilli 2020). This may be related to younger patients taking on more social and family roles, leading to role conflicts caused by the disease. However, the result is contradictory in other studies that find no significant correlation between age and demoralization (Grassi *et al.* 2017; Vehling and Mehnert 2014). A recent study has further found that elderly patients have higher scores for demoralization (Vehling *et al.* 2012). Therefore, the correlation between age and demoralization remains controversial, and more high-quality studies are needed to evaluate the relationship between the 2 in the future.

The most frequently reported factors for clinical correlates are QoL and symptom burden. QoL generally refers to the state assessment of individual physiological, psychological, and social functions, which is a multidimensional concept. A moderate negative correlation between demoralization and QoL is detected among cancer patients, which has also been confirmed in other diseases (Zhu *et al.* 2021). This may be related to the intensity of demoralization associated with physical symptoms (e.g. fatigue, limited physical activity, pain) (Gan *et al.* 2022). As well as being related to negative emotions, the results highlight the need for psychological intervention, which can be needed for health-care professionals to adequately evaluate cancer patients with demoralization and provide targeted interventions to improve their QoL. A recent study also found that Parkinson's patients with demoralization report lower levels of QoL (Zhu *et al.* 2021). In addition, symptom burden, including pain, lymphedema, and so on, is proven to be positively correlated with demoralization. These findings are consistent with

those reported by Bailey et al. (2020). Treating cancer is a long process where patients are prone to experience pain, fatigue, hair loss, and other symptoms, thereby seriously affecting their mental health (Kwekkeboom 2016).

Our study also reveals a remarkably positive correlation between anxiety, depression, suicidal ideation, and demoralization. This result agrees with a previous one (Mehmood 2015; Nikoy Kouhpas et al. 2020; Ou et al. 2021), indicating that cancer patients are more likely to have anxiety, depression, demoralization, and other negative emotions owing to the disease diagnosis and a series of reasons such as surgery, radiotherapy, and chemotherapy (Xu et al. 2019). Depression is extensively recognized as a psychological problem in cancer patients, and its correlation with demoralization is widely supported (Shao et al. 2024). A systematic review by Tang et al. has shown that demoralization and depression are significantly positively correlated, with a risk ratio as high as 9.65 (Tang et al. 2015). Our study has also demonstrated a negative correlation between demoralization and social support. As an available or usable social resource, social support can buffer the social psychological stress response of individuals under stress and help cancer patients rid themselves of negative emotional experiences to promote physical and mental health (Falak et al. 2020). These results suggest that medical staff should actively guide patients in seeking social support to relieve their negative symptoms caused by stress.

Clinical implications

Understanding the factors associated with demoralization among cancer patients can guide the formulation of improved strategies for managing demoralization and addressing its sources. First, clinicians should pay more attention to younger, less educated, and lower-income cancer patients, as they are more likely to experience higher levels of demoralization. Second, medical staff should take measures to relieve patients' symptom burden and improve their QoL. Furthermore, clinicians could provide psychological interventions to reduce anxiety, depression, and suicidal ideation, potentially alleviating negative psychological and improving their QoL. Some psychological measures to improve self-esteem and mental resilience can also reduce demoralization in cancer patients. In addition, emphasizing social support can also help cancer patients manage demoralization and improve QoL.

Additionally, clinicians need to understand and distinguish between demoralization, anxiety, and depression. Demoralization and depression show common clinical features such as low mood or low self-esteem, and studies have found that when demoralization is severe, it may coexist with anxiety and depression (Grassi et al. 2017). Another study also demonstrated that demoralization may increase the risk of depression and anxiety (Bobevski et al. 2018). However, there are some clinical differences between demoralization and depression. Recent studies used network and exploratory graph analysis and latent class analysis to examine the relationship between demoralization and depression (Bobevski et al. 2022). The findings indicated that demoralization and depression exhibited specific common symptoms, including a low mood and suicidal thoughts. In contrast, symptoms specific to depression, such as inattention and insomnia, were clustered in a separate and stable community. Therefore, clinicians can use the new technology of network analysis to identify the main dimensions between demoralization and depression in cancer patients and evaluate their correlation more comprehensively. This can provide precise targets for psychotherapy and ultimately enhance the overall well-being of cancer patients.

Strengths and limitations

To our knowledge, this study is the first quantitative analysis of the sociodemographic, clinical, and psychological factors associated with demoralization among cancer patients, including different types of tumor. This meta-analysis may provide evidence for preventing and managing demoralization among cancer patients.

However, it still has the following limitations. First, different demoralization assessment tools are integrated into this meta-analysis, and various studies have different assessment tools for psychological distress, resulting in high heterogeneity. Second, the literature search is limited to studies published in English and Chinese, with the possibility of additional research published in the language of the country under investigation.

Conclusion

This study identifies sociodemographic, clinical, and psychological correlates of demoralization among cancer survivors. The results highlight a significant and growing demoralization among cancer patients, and such negative emotion may be overlooked. Demoralization should elicit the attention of health-care professionals and be evaluated to improve the health of cancer patients.

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Data availability statement. All data are available in the manuscript.

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