

REVIEW

Meaning and purpose in life, happiness, and life satisfaction in cancer: Systematic review with meta-analysis

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Abstract

Objective: To summarize current evidence on the potential cross-sectional and longitudinal association between meaning or purpose in life and subjective happiness or life satisfaction among cancer patients.

Methods: A systematic review with meta-analysis and meta-regression was conducted. CINAHL (via EBSCOhost), Embase, PubMed, and PsycINFO (via ProQuest) were searched from inception to 31 December 2022. In addition, manual searches were performed. The risk of bias in cross-sectional and longitudinal studies was assessed using the Joanna Briggs Institute Checklist for Analytical Cross-Sectional Studies and the Quality in Prognosis Studies tool, respectively. Certainty in the evidence was judged using the Grading of Recommendations, Assessment, Development, and Evaluations approach. Meta-regressions and sensitivity analyses were performed to explore potential sources of heterogeneity.

Results: We included 13 cross-sectional studies, comprising 12 different samples, and a longitudinal study. A total of 4968 individuals with cancer were interviewed across included studies. Certainty in the evidence was judged as very low for all outcomes, which was associated to serious concerns on risk of bias and imprecision of the results, and very serious concerns on indirectness of evidence. The assessed studies showed a marked heterogeneity in terms of participants' clinical (i.e., disease stage) and sociodemographic factors. A lack of reporting of these clinical and sociodemographic aspects were also evident among included studies.

Conclusions: The wide number of methodological flaws detected in this systematic review preclude to make any clinical recommendation. More rigorous high-quality observational studies should guide future research on this topic.

KEYWORDS

cancer, happiness, life satisfaction, meaning in life, meta-analysis, purpose in life, spirituality, systematic review

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1 | INTRODUCTION

One in five people will experience cancer in their lifetime¹ and this number is projected to grow in the following decades.² In 2020, the International Agency for Research on Cancer estimated 19.3 million new cases and roughly 10 million cancer deaths,³ along with an expected 47% increase in global cancer burden by 2040.³ Regardless of the disease stage, those diagnosed with cancer may need to cope with a heightened emotional distress, including fear of cancer recurrence,⁴ death anxiety,⁵ and demoralization.⁶ But having cancer can also drive people through a time of reflection, where they explore their inner state and spiritual needs, that is, finding a meaning and Purpose in life (PIL).⁷ A resource-oriented approach aiming to identify positive psychological constructs has attracted recent interest in psycho-oncological research.⁸ For example, having a meaning and PIL have been positively correlated with feelings of subjective happiness⁹ and life satisfaction^{10,11} (i.e., the cognitive evaluation of one's life based on self-selected standards¹²) among people with cancer. For some authors, meaning in life (ML) refers to coherence or sense,^{13,14} while PIL is about future relevant intentions or aims,^{13,14} as part of the general ML.¹⁵ The concepts of ML and PIL have been studied by modern existential philosophers and were introduced in Health Sciences through Logotherapy.¹⁶ Logotherapy has been a framework for developing the Meaning-Centered Group Psychotherapy, which has showed promising results in cancer outcomes.^{17,18} A large number of nomothetic tests has been validated to assess ML, some of them in cancer patients.¹⁹ However, important methodological confusions currently exist, and some instruments interchange the constructs of meaning and PIL, while others assess them differently, with PIL being more action-oriented or goal-focused. For example, some self-reported tools that have been used in cancer populations evaluate ML incorporating a sense of purpose, such as the ML Questionnaire,²⁰ the Perceived Personal Meaning Scale²¹ or the Functional Assessment of Chronic Illness Therapy--Spiritual Wellbeing Scale.^{22,23} However, other instruments are specifically focused on PIL such as the PIL Test,²⁴ the Quality of Life of Cancer Survivors Questionnaire,²⁵ or the Life Engagement Test.²⁶ Currently, there is not a systematic review with meta-analysis in cancer research that summarizes the potential relation between meaning and PIL with subjective happiness and life satisfaction. Therefore, this study aimed to conduct a systematic review with meta-analysis to evaluate the potential cross-sectional or longitudinal association between meaning or PIL and subjective happiness or life satisfaction among individuals with cancer.

2 | METHODS

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement and the PRISMA for abstracts were followed.^{27,28} The review protocol was prospectively registered on Open Science Framework (<https://osf.io/3cu2x>).

2.1 | Deviations from the review protocol

Deviations from the review protocol are listed in Supplementary File S1.

2.2 | Data sources and search strategies

CINAHL (via EBSCOhost), Embase, PubMed, and PsycINFO (via ProQuest) were searched by a reviewer from inception to 31 December 2022. Search filters were used for language and document type. The same reviewer conducted different manual searches. All electronic and manual searches are reported in Supplementary File S2. Only studies published in peer-review journals and written in English or Spanish languages were considered. Thesis dissertations and conference abstracts were excluded.

2.3 | Eligibility criteria

The PECO (Population, Exposure, Comparator, Outcomes, Study design) framework was followed to guide the eligibility criteria.²⁹

Inclusion criteria:

- Population: individuals with cancer without any age restriction. Body/location or disease stage restrictions were not imposed.
- Exposure: ML or PIL measured with self-reported tools.
- Comparators: Not applicable.
- Outcomes: Subjective happiness or life satisfaction measured with self-reported tools.
- Study design: cross-sectional studies, case-control studies, and longitudinal observational studies. Clinical trials that provided associations at the baseline assessment (prior to starting the intervention) between the exposure and outcomes of interest were also considered.

Exclusion criteria:

- Cancer participants were not separately analyzed from other populations.
- Cluster analysis.
- Meaning or PIL were not separately analyzed from other factors. For example, studies that jointly evaluated ML and peace.
- Measures of cancer-specific meaning, being only included measures of ML.
- Analyses that did not report any statistical measure (beta coefficient, bivariate correlation, or odds ratio) relevant to the aim of this study.

2.4 | Study selection

A reviewer conducted all study selection process. Retrieved references were inserted in Zotero Desktop version 6.0.13, and

subsequently, duplicates were manually removed. Afterward, the list of references without duplicates was evaluated by title and abstract. The next step was to screen the full text of those abstracts that seemed eligible and those studies where the abstract was unavailable. Finally, a consensus was reached between three reviewers when the reviewer who oversaw the study selection had some doubts about the inclusion or exclusion of a specific study. This consensus was needed for 17 full texts.

2.5 | Assessing the risk of bias

Two reviewers independently assessed the risk of bias in cross-sectional and longitudinal studies. The Joanna Briggs Institute Checklist for Analytical Cross-Sectional Studies³⁰ was used for cross-sectional studies. This tool consists of eight items that can be evaluated as “yes”, “no”, “unclear”, or “not applicable”. The Quality in Prognosis Studies (QUIPS) tool³¹ was used for longitudinal studies. This instrument includes 6 domains that can be judged as “low”, “moderate”, or “high” risk of bias.

2.6 | Certainty in the evidence

Two reviewers independently judged certainty in the evidence using the GRADE approach,³² which grades this certainty into four levels: high, moderate, low, and very low evidence. The GRADE approach was designed to judge certainty in the evidence of systematic reviews of interventions, but this approach can be also used for systematic reviews of observational studies.³² In randomized controlled trials, the certainty starts with high evidence, whereas observational studies starts with low evidence.³² A total of five factors are evaluated to downgrade one or two levels certainty in the evidence: risk of bias, inconsistency of results, indirectness of evidence, imprecision, and publication bias. In observational studies, three factors could upgrade the confidence in the observed findings. Large magnitude of the effect can increase one or two levels this certainty, whereas one level can be upgraded if dose-response gradient or all potential residual plausible confounding are considered.³² Certainty in the evidence was only judged for those studies that were included in each meta-analysis.

2.7 | Data extraction

A reviewer extracted the following information for each study, when available. The first author plus et al.; the year of publication; country; comorbidities; the number of participants; mean age; gender; cancer diagnosis; disease stage; time since cancer diagnosis; the evaluation of pain; exposure to chemotherapy, radiation therapy, or both; religious affiliation; educational stage; income levels; exposure; outcomes; and main findings. The same reviewer sent an email to each corresponding author when information of interest was not reported or needed

clarification ($n = 11$). A reminder was sent a week after the first message. Finally, only four corresponding authors answered.^{26,33–35}

2.8 | Statistical methods

Meta-analyses were performed to quantify the potential cross-sectional association between meaning or PIL and subjective happiness or life satisfaction. A meta-analysis was only conducted when there were at least two studies evaluating the same bivariate association. When necessary, data were transformed into correlation coefficients (r) before performing the analyses. Data were pooled using a random effect model and correlation coefficients were transformed using Fisher's Z and subsequently, back transformed to correlation coefficients. The effect of a correlation coefficient can be interpreted as “low correlation” ($r = 0.10$), “moderate correlation” ($r = 0.30$), and “high correlation” ($r = 0.50$).³⁶ Heterogeneity between studies was explored by I^2 , considering a high heterogeneity when $I^2 > 50\%$. Also, the heterogeneity was examined through the tau-square test displayed in the forest plots and Q-test for the between and within heterogeneity in the subgroups analyses. Meta-analyses were developed using R Studio software (v. 4.1.1) with the packages of meta (v.5.1-1),³⁷ metafor (v.3.0-2),³⁸ and dmetar (v.0.0.9000).³⁹ Microsoft Excel spreadsheet (v. 2207) was used to create the analyzed data set.

2.9 | Meta-regression and sensitivity analyses

Potential sources of heterogeneity were explored using meta-regression and sensitivity analyses. Meta-regressions were only conducted if at least three studies contained the same moderator. Sensitivity analyses were performed to detect the presence of outliers or significant influential cases of the size of the pooled effect. This analysis included automatic outlier detection using dmetar, Baujat plot, influence plot, and leave-one-out analysis sorted by effect size. When an outlier was identified, it was discarded from the analysis. A prediction interval, which denotes the interval in which a new study would fall whether selected at random from the same population of the analyzed studies, was added as a red line to the forest plots when allowed by sample sizes. In addition, subgroups meta-analyses were sorted by different factors (i.e., the presence of only one or several locations of cancer) to examine possible sources of heterogeneity. Subgroups meta-analyses were carried out as sensitivity analyses if at least data of interest was available in two studies.

2.10 | Publication bias

Publication bias was explored using funnel plots and calculating the Egger's test when there were at least three studies included in the same meta-analysis.

3 | RESULTS

The electronic databases retrieved 358 records and four extra studies were manually found. Considering retrieved citations from electronic databases and manual searches, a total of 219 titles and abstracts were evaluated after removing duplicates. Subsequently, 82 full texts were specifically analyzed. Finally, we included 14 studies,^{9-11,13,26,33-35,40-45} comprising 13 different samples (Supplementary File S3). Two studies^{43,44} shared the same sample and were evaluated as one study to avoid overlapping. The list of excluded studies in the last screening process ($n = 67$) is reported in Supplementary File S4. Most of evidence came from cross-sectional studies ($k = 13$, $n = 4854$). A single longitudinal study was included ($n = 114$). Overall, 4968 participants completed self-reported questionnaires (approximately 2987 females, 62%), being breast cancer the more explored cancer location (approximately $n = 1,648$, 34%). The characteristics of included studies are shown in Table 1.

3.1 | Risk of bias

According to the Joanna Briggs Institute Checklist for Analytical Cross-Sectional Studies, more than half of the cross-sectional studies lacked a clearly defined inclusion criteria and did not identify confounding factors or strategies to deal with them (Supplementary File S5; Interrater reliability, 88.5%). For the included longitudinal study, the risk of bias (QUIPS tool) was low for most of the items (Supplementary File S6; Interrater reliability, 83.3%).

3.2 | Meta-analyses and certainty in the evidence

A total of five meta-analyses were conducted, all based on bivariate associations. Two studies^{34,40} were not included in any meta-analysis because they assessed PIL with subscales that differed enormously from the rest of studies. No meta-analysis could be conducted for the potential association between ML and subjective happiness. The tools used to evaluate risk of bias in cross-sectional studies did not show any categorization that allowed us to include this tool in meta-regression and sensitivity analyses. Certainty in the evidence using the GRADE approach was judged as very low in all meta-analyses (Table 2, inter-rater reliability, 80%). Certainty in evidence was not judged in longitudinal analysis since there was only one study⁴² and no meta-analysis was provided.

3.3 | Meaning in life and life satisfaction (GRADE: Very low evidence)

The meta-analysis included two studies^{13,35} showing a positive correlation between ML and life satisfaction, r (95% CI) = 0.37 (0.27–0.46) $p = <0.01$ $\text{Tau}^2 = 0$ (Supplementary File S7). This analysis

included studies in which ML was assessed using either an abbreviated version of PPMS¹³ or the Guerra et al. Meaning in Life Questionnaire.³⁵ No publication bias was detected (Supplementary File S8). No meta-regression or sensitivity analysis could be developed since two studies were only meta-analyzed.

3.4 | Meaning in life (presence) and life satisfaction (GRADE: Very low evidence)

The meta-analysis included four studies^{11,33,41,45} showing a positive correlation between the subdomain presence of meaning and life satisfaction when this subdomain was assessed using a subscale of the ML Questionnaire, r (95% CI) = 0.55 (0.47–0.62) $p = < 0.01$, $I^2 = 45\%$, $\text{Tau}^2 = 0.0049$ (Supplementary File S9). No publication bias was detected (Egger's test = 0.77, Supplementary File S10). Meta-regression analysis found that age, the number of male participants, and the variability of cancer location could be sources of heterogeneity (Table 3, Supplementary Files S11–S13). Subgroup analyses supported the information of the meta-regression as the same covariates were found to modulate heterogeneity (Table 4, Supplementary Files S14–S20). When the main outlier was removed from the analysis,³³ I^2 changed from 45% to 0% although the value of the correlation barely increased r (95% CI) = 0.58 (0.50–0.67).

3.5 | Meaning in life (search) and life satisfaction (GRADE: Very low evidence)

The meta-analysis included three studies^{33,41,45} showing a lack of significant correlation between the subdomain search for meaning and life satisfaction when this subdomain was assessed using a subscale of the ML Questionnaire, r (95% CI) = 0.18 (–0.18 to 0.50) $p = 0.34$, $I^2 = 96\%$, $\text{Tau}^2 = 0.0990$ (Supplementary File S21). No publication bias was detected (Egger's test = 0.60, Supplementary File S22). Meta-regression analysis found that breast cancer could be a source of heterogeneity (Table 3, Supplementary File S23). Subgroup analyses showed that variability on cancer location may explain some sources of heterogeneity (Table 4, Supplementary files S24–S25). This could be associated with the findings of the meta-regression analysis.

3.6 | Purpose in life and subjective happiness (GRADE: Very low evidence)

The meta-analysis included two studies^{9,43} showing a positive correlation between PIL and subjective happiness, r (95% CI) = 0.37 (0.06–0.62) $p = 0.03$, $I^2 = 79\%$, $\text{Tau}^2 = 0.0472$ (Supplementary File S26). The meta-analysis included studies in which PIL was evaluated using either a single item regarding purpose⁹ or the "Purpose in Life Test."⁴³ No publication bias was detected (Supplementary File S27).

TABLE 1 Characteristics of the included studies.

Author(s), year, and country	Participants	Comorbidities	Cancer by body location/system Disease stage	Time since cancer diagnosis	Has pain been evaluated?	Are the participants being treated with chemotherapy and/or radiation?	Religious affiliations Educational stage Income levels	Exposure	Outcome	Main findings
Fleer et al. (2006) ⁴⁰ ; The Netherlands	N = 354 Age mean = 43.7 (SD unavailable) M (n = 354)	53 participants had chronic diseases	Testicular (n = 354) Unavailable	Unavailable	No	Chemotherapy plus Orchiectomy (n = 53) Chemotherapy plus Orchiectomy plus resection of residual tumor mass (n = 109) Radiation plus Orchiectomy (n = 68)	Unavailable Educational stage: Mean (SD): 4.2 (1.7) Unavailable	Purpose in life (subscale from LRI)	Happiness (HI)	Correlations: Framework subscale $r = 0.47$ $p \leq 0.001$ Fulfillment subscale $r = 0.68$ $p \leq 0.001$ Regression: Framework subscale $\beta = 0.43$ $p \leq 0.001$ Fulfillment subscale $\beta = 0.65$ $p \leq 0.001$
George et al. (2013) ¹³ ; USA	N = 167 Age mean = 46.34 (SD 6.29) F (n = 108), M (n = 59)	Unavailable	The most common locations were: Breast (n = 78) Cervix/uterus (n = 7) Colon/rectal (n = 10) Lymph nodes (n = 8) Prostate (n = 20) Unavailable	3.5 years (SD 1.7)	No	Chemotherapy (5%) Chemotherapy plus radiation plus surgery (23%) Radiation plus surgery (12%)	Catholic (43%) Protestant Christian (30%) Jewish (4%) Others (4%) None (19%) Educational stage: College educated or higher (71%) Financially secure (83% had household incomes of at least \$50,000)	Meaning in life (abbreviated PPM5) Purpose in life (subscale RSPWB)	Life satisfaction (SWLS)	Correlations: $r = 0.38$ $p < 0.01$ (meaning in life) $r = 0.33$ $p < 0.01$ (purpose in life)
Guerra et al. (2017) ³⁵ ; Portugal	N = 150 Age mean = 54.75 (SD 11.24) F (n = 150)	Unavailable	Breast (n = 150) Unavailable	Unavailable	No	Unavailable	Unavailable Educational stage: Elementary school made up 42.6% of the sample, middle and high school made up 41.3% of the sample and higher education made up 16.1% of the sample Unavailable	Meaning in life (ML)	Life satisfaction (SWLS)	Correlations: $r = 0.350$ $p < 0.05$

TABLE 1 (Continued)

Author(s), year; and country	Participants	Comorbidities	Cancer by body location/system Disease stage	Time since cancer diagnosis	Has pain been evaluated?	Are the participants being treated with chemotherapy and/or radiation?	Religious affiliations Educational stage Income levels	Exposure	Outcome	Main findings
Heo et al. (2016) ¹⁰ ; USA	N = 2670 Age mean = 78.54 (SD 0.19) F (n = 1.482), M (n = 1.188)	Unavailable	Unavailable Unavailable	Unavailable	No	Unavailable	Unavailable Unavailable Unavailable	Purpose in life (subscale RSPWB)	Life satisfaction (SWLS)	Correlations: r = 0.356 p < 0.01
Kang et al. (2017) ⁹ ; South Korea	N = 283 Age mean = 48.5 (SD 7.8) F (n = 283)	Unavailable	Breast (n = 283) Stage 0 (n = 14) Stage I (n = 136) Stage II (n = 107) Stage III (n = 26)	Unavailable	Yes	Chemotherapy plus surgery (n = 34) Chemotherapy plus radiation plus surgery (n = 165) Radiation plus surgery (n = 64)	Unavailable Educational stage: Less than high school (52.7%) and more than college (47.4%) Income levels: <4000 \$ (51.9%) and ≥4000\$ (46.6%)	Purpose in life (a question from QoL-CS)	Happiness (a single item from SHS)	Regressions: OR (95% CI) = 2.50 (1.42–4.40) p < 0.01
Loeffler et al. (2018) ¹¹ ; Germany	N = 65 Age mean = 60.5 (SD 11.7) F (n = 65)	Unavailable	Breast (n = 65) Post-surgical lymph nodes stage Stage 0 (n = 28) Stage I (n = 6) Stage II (n = 2) Stage III (n = 4) Stage unspecified (n = 4) Missing (n = 21)	Unavailable	Yes	Chemotherapy (51%) Radiation (n = 72%) All participants received surgery	Unavailable Educational stage: None (5%), 9th-grade school-leaving certificate (19%), secondary school certificate (10th grade) (52%), university entrance certificate (24%) Unavailable	Meaning in life (MLQ)	Life satisfaction (SWLS)	Correlations: r = 0.44 p ≤ 0.01 (presence of meaning subscale)
Mostarac et al. (2022) ³³ ; Croatia	N = 149 Age mean = 49.18 (SD 13.86) F (n = 105), M (n = 44)	Unavailable	Brain (n = 2) Breast (n = 57) Colon and terminal intestine (n = 6) Leukemia and lymphoma (n = 33)	7.42 years (SD 6.64)	No	Unavailable	Unavailable Educational stage: Elementary education (3.4%), secondary education (41.7%), higher level education (15.3%), college/university or	Meaning in life (MLQ)	Life satisfaction (SWLS)	Correlations: r = 0.65 p < 0.01 (presence of meaning) r = 0.24 p < 0.01 (search for meaning) Regressions: (Continues)

TABLE 1 (Continued)

Author(s), year, and country	Participants	Comorbidities	Cancer by body location/system Disease stage	Time since cancer diagnosis	Has pain been evaluated?	Are the participants being treated with chemotherapy and/or radiation?	Religious affiliations Educational stage Income levels	Exposure	Outcome	Main findings
			Mouth, pharynx, and larynx (n = 26) Ovary, fallopian tube, and adnexa (n = 8) Prostate (n = 1) Thyroid (n = 6) Trachea, bronchus, and lungs (n = 8) Unavailable				graduate degree (30.1%) Unavailable			$\beta = 0.56$ p-value (ns) (presence of meaning) $\beta = 0.03$ p-value (ns) (search for meaning)
Scheier et al. (2006) ²⁶ ; USA	N total = 284 Age range early-stage sample 26–78 F (n = 198) Age range late-stage sample 27–69 F (n = 86)	Unavailable	Breast (n = 284) Unavailable	Unavailable	Yes	Unavailable	Unavailable Unavailable Unavailable	Purpose in life (LET)	Life satisfaction (SWLS)	Correlations: $r = 0.58$ $p < 0.01$ (early-stage breast cancer) $r = -0.51$ $p < 0.01$ (late-stage breast cancer)
Schlegel et al. (2013) ⁴¹ ; USA	N = 188 Age mean = 56.93 (SD 12.27) F (n = 188)	Unavailable	Breast (n = 188) Stage 0 (n = 39) Stage I (n = 73) Stage II (n = 39) Stage III (n = 23) Stage IV (n = 4) Missing (n = 3)	Unavailable	No	The participants were provided with baseline surveys during their first week of radiation	Unavailable Unavailable Income levels: Median income bracket was \$35,000–45,000 (income was measured categorically)	Meaning in life (MLQ)	Life satisfaction (SWLS)	Correlations: $r = 0.51$ $p < 0.01$ (presence of meaning) $r = -0.17$ $p < 0.05$ (search for meaning)

TABLE 1 (Continued)

Author(s), year, and country	Participants	Comorbidities	Cancer by body location/system Disease stage	Time since cancer diagnosis	Has pain been evaluated?	Are the participants being treated with chemotherapy and/or radiation?	Religious affiliations Educational stage Income levels	Exposure	Outcome	Main findings
Teques et al. (2016) ³⁴ , Portugal	N = 202 Age mean = 58.65 (SD 11.97) F (n = 162), M (n = 40)	Unavailable	Breast (n = 100) Intestine (n = 36) Stomach (n = 16) Unavailable	Between 7 months and 2 years	No	Chemotherapy (17.8%)	Unavailable Unavailable Unavailable	Purpose in life (PIL-R)	Life satisfaction (SWLS)	Correlations: $r = 0.60$ $p < 0.01$ (experiential subscale) $r = 0.72$ $p < 0.01$ (existential subscale) Regressions: $B = 0.59$ $p < 0.01$ (experiential subscale) $B = 0.75$ $p < 0.01$ (existential subscale)

Thompson et al. (2013) ⁴² , USA ^a	N = 114 Age mean = 57.2 (SD 10.8) F (n = 114)	Number of chronic diseases mean (SD): 1.46 (1.58)	Breast (n = 114) Stage IV (n = 114)	7.90 years (SD 5.58)	No	Chemotherapy (n = 58)	Unavailable Educational stage: Mean (SD): 15.7 (3.0) Unavailable	Purpose in life (subscale RSPWB) This version was adapted to metastatic cancer	Life satisfaction (SWLS)	Cross-sectional analysis Correlations: $r = 0.48$ $p < 0.01$ (purpose in life and life satisfaction) life satisfaction were measured at baseline) $r = 0.39$ $p < 0.01$ (purpose in life and life satisfaction were measured at 3-month) Longitudinal analysis Correlations: $r = 0.42$ $p < 0.01$ (purpose in life was measured at baseline whereas life satisfaction was assessed at 3-month)
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(Continues)

TABLE 1 (Continued)

Author(s), year, and country	Participants	Comorbidities	Cancer by body location/system Disease stage	Time since cancer diagnosis	Has pain been evaluated?	Are the participants being treated with chemotherapy and/or radiation?	Religious affiliations Educational stage Income levels	Exposure	Outcome	Main findings
Whuk et al. 2012 and (2022) ^{43, 44} ; Poland	N = 50 Age mean = 55.16 (SD 12.69) F (n = 46), M (n = 4)	Unavailable	Breast (n = 46) Lung (n = 4) Unavailable	2.12 years >12 months (n = 29) 1–5 years (n = 15) 6–12 years (n = 6)	No	Unavailable	Unavailable Educational stage: Primary education (16%), occupational education (8%), high school education (44%), university education (32%) Unavailable	Purpose in life (PIL)	Happiness (Czapiński's test of his opinion theory of happiness) Life satisfaction (CLT)	Correlations: r = 0.55 p ≤ 0.01 (happiness in recent days) r = 0.41 p ≤ 0.01 (past life satisfaction) r = 0.53 p ≤ 0.01 (current life satisfaction) r = 0.68 p ≤ 0.01 (anticipated life satisfaction) Regressions: β (95% CI) = 0.528 (0.277 to 0.707) p ≤ 0.01 (life satisfaction)
Zhou et al. (2019) ⁴⁵ ; China	N = 292 Age mean = 52.2 (SD 11.8) F (n = unreported), M (n = unreported)	Unavailable	Gastrointestinal (n = 292) Stage I (n = 45) Stage II (n = 48) Stage III (n = 113) Stage IV (n = 86)	Unavailable	No	Unavailable	Unavailable Educational stage: Primary school (12.3%, middle or high school education (57.9%), college degree (25.3%), a graduate's or higher degree (4.5%) Income levels: Monthly income, 33.2% reported under ¥2000; 46.6% between	Meaning in life (MLQ)	Life satisfaction (SWLS)	Correlations: r = 0.55 p < 0.001 (presence of meaning) r = 0.43 p < 0.001 (search for meaning) r = 0.67 p < 0.005 (total meaning in life)

TABLE 1 (Continued)

Author(s), year, and country	Participants	Comorbidities	Cancer by body location/system Disease stage	Time since cancer diagnosis	Has pain been evaluated?	Are the participants being treated with chemotherapy and/or radiation?	Religious affiliations	Educational stage	Income levels	Exposure	Outcome	Main findings
									¥2100 and ¥5000; 13.4% between ¥5001 and ¥10,000%; 5.8% over ¥10,000.			

Abbreviations: b, beta coefficient; CI, confidence interval; CLT, Cantril's Ladder tool; F, female; HI, the Happiness Index; LET, the Life Engagement Test; LRI, the Life Regard Index; M, male; ML, Meaning in Life Scale; MLQ, Meaning of Life Questionnaire; (n/s), results were not statistically significant; OR, odds ratio; PIL, the Purpose in Life Test; PIL-R, the Purpose in Life Test Revised; PPMS, the Perceived Personal Meaning Scale; QoL-CS, the Quality of Life of Cancer Survivors questionnaire; r, correlation coefficient; RSPWB, the Ryff's Scales of Psychological Well-being; SD, standard deviation; SHS, the Subjective Happiness Scale; SWLS, the Satisfaction with Life Scale; β , standardized beta coefficient.

^aLongitudinal study.

No meta-regression or sensitivity analysis could be developed since two studies were only meta-analyzed.

3.7 | Purpose in life and life satisfaction (GRADE: Very low evidence)

The meta-analysis included four studies^{10,13,26,42} showing a lack of significant correlation between PIL and life satisfaction, r (95% CI) = 0.24 (−0.17 to 0.58) $p = 0.25$, $I^2 = 98%$, $\text{Tau}^2 = 0.2172$ (Supplementary File S28). The meta-analysis included studies in which PIL was evaluated using either the subscale from the Ryff's Scales of Psychological Well-being^{10,13,42} or the Life Engagement Test.²⁶ No publication bias was detected (Egger's test = 0.69, Supplementary File S29). No potential sources of heterogeneity were observed in the meta-regression analysis (Table 3). Subgroup analyses showed that the lack of sufficient information from one study²⁶ may be responsible for the observed heterogeneity (Table 4, Supplementary Files S30–S33). Also, the instrument that was used to evaluate PIL (the Life Engagement Test) in the mentioned study could be a source of heterogeneity.²⁶

3.8 | Longitudinal analysis

A single longitudinal study satisfied our eligibility criteria,⁴² and no meta-analysis could be performed. Therefore, we did not grade certainty in the evidence. This study reported a univariate analysis where PIL at baseline was longitudinally and positively correlated with life satisfaction at 3 months. Baseline values of life satisfaction were not controlled.

4 | DISCUSSION

The purpose of this systematic review with meta-analysis was to summarize and critically appraise current evidence on the potential cross-sectional and longitudinal association between meaning or PIL and subjective happiness or life satisfaction among patients with cancer. We found that ML, when evaluated as a global measure or as presence of meaning, was cross-sectionally and positively correlated with life satisfaction. However, there was no significant association between the subscale search for meaning and life satisfaction. Certainty in the evidence was judged as very low in all meta-analyses. No meta-analyses could be performed for ML and subjective happiness. Purpose in life was cross-sectionally and positively correlated with subjective happiness, although this finding was based on two studies. On the contrary, no significant correlation was detected between PIL and life satisfaction. Certainty in the evidence was also judged as very low. Only one longitudinal analysis was included and thus no meta-analysis was conducted. Findings from this study showed a correlation over time between PIL and life satisfaction, although baseline values of life satisfaction were not controlled.

TABLE 2 Certainty in the evidence in cross-sectional studies: GRADE.

Summary of findings					Certainty in evidence based on the GRADE approach				
Outcome	Studies (k)	Participants (N)	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	Certainty in evidence	Importance
Meaning in life									
Life satisfaction (general meaning in life)	2	317	Serious ^a	No	Very serious ^{c,d}	Serious ^e	Undetected	Very low	Critical
Life satisfaction (presence of meaning)	4	694	No	No Heterogeneity was 0% after conducting a sensitivity analysis	Very serious ^{c,d}	No	Undetected	Very low	Critical
Life satisfaction (search for meaning)	3	629	No	Serious ^b	Very serious ^{c,d}	No	Undetected	Very low	Critical
Purpose in life									
Happiness	2	333	No	Serious ^b	Very serious ^{c,d}	Serious ^e	Undetected	Very low	Critical
Life satisfaction	4	3235	No	Serious ^b	Very serious ^{c,d}	No	Undetected	Very low	Critical

^aRisk of bias: More than 75% of the included studies showed important risk of bias.

^bInconsistency: One level was downgraded due to heterogeneity remained high after performing a sensitivity analysis.

^cIndirectness: Lack of reporting details regarding clinical cancer factors, religious variables, or sociodemographic characteristics.

^dIndirectness: Marked heterogeneity mainly in clinical cancer factors or sociodemographic variables.

^eImprecision: One level was downgraded due to the total sample size was less than 400 participants.

4.1 | Methodological and clinical considerations

The included studies showed important methodological concerns. Readers should be aware of these issues that clearly affect the interpretation of the current findings and make difficult to provide clinical recommendations. A strength of this systematic review was the use of the GRADE approach. However, all evidence came from observational studies, which should be considered as low evidence from start.³² Certainty in the evidence was judged as very low for all outcomes. This was due to serious risk of bias, mainly associated with a lack of reporting of potential confounding factors during analyses of included studies and small sample sizes, causing serious concerns in the precision of the results. We also identified very serious concerns related to indirectness of evidence. Most of the studies lacked a precise description of the clinical, religious, and sociodemographic characteristics of the participants and included high heterogeneous samples, which makes difficult to interpret the results. For example, clinical differences between cancer participants were evident, such as type of malignancy, disease stages, time since diagnosis, or treatment received. Furthermore, the study with the highest sample size ($n = 2670$)¹⁰ did not report the disease site/type of malignancy. More than half of included studies did not inform of the disease stage, and none of them presented analyses that were reasonably homogenous for disease stage (e.g., early vs. late). Similarly, information about time since cancer

diagnosis was not provided in more than half of included studies. In addition, religious affiliations seem to influence how individuals perceive their meaning and PIL,^{46,47} which may have important implications in cancer population. Despite this, this item was only reported in one study.¹³ Other important factors that may affect the interpretation of the results such as the presence of comorbidities, educational stage, or income levels were scarcely reported, or they were highly heterogeneous across studies. In line with this, there was also a marked heterogeneity of the instruments used to assess meaning and PIL. Some studies used specific tools such as the ML Questionnaire¹¹ or the PIL Test,^{43,44} whereas others used subscales from a broad well-being measure, the Ryff's Scales of Psychological Well-being,⁴² or a single question from the Quality of Life of Cancer Survivors questionnaire.⁹ Previous research has suggested a potential overlap between the exposures and the outcomes of this systematic review.⁴⁸⁻⁵⁰ For example, item content in the PIL test overlaps with well-being and meaning, whereas a few items on the Guerra et al. Meaning in Life seem conflated with well-being. Moreover, the Life Regard Index⁵¹ measures ML as composed of two subscales, framework and fulfillment, that may overlap with subjective happiness or life satisfaction, especially the fulfillment subscale. This could help us to understand the high correlation found between this subscale and subjective happiness ($r = 0.68$) in one study,⁴⁰ although this study was not included in the meta-analysis.

TABLE 3 Univariate meta-regression analysis of covariate that could moderate between the exposure and outcome in patients with cancer.

Covariate (k)	Coefficient β (95% CI) ^a	p-value
Purpose in life		
Life satisfaction		
Age (3)	0.00 (−0.00 to 0.01)	0.89
Pain		
No (3)	0.33 (−0.57 to 1.22)	0.48
Cancer by body location		
Breast (4)	−0.01 (−0.01 to 0.00)	0.61
Exposure instruments		
RSPWB (3)	0.33 (−0.57 to 1.22)	0.48
Number of females (5)	0.00 (−0.00 to 0.01)	0.82
Number of males (5)	0.00 (−0.00 to 0.01)	0.82
Sample size (5)	0.00 (−0.00 to 0.01)	0.82
Sex		
Both (4)	−0.22 (−0.44 to −0.002)	0.73
Variability on tumor location		
Onne (4)	0.22 (−0.31 to 0.75)	0.41
Meaning in life		
Life satisfaction (presence of meaning)		
Age (4)	−0.02 (−0.04 to −0.002)	0.03*
Pain		
No (3)	0.17 (−0.13 to 0.48)	0.27
Cancer by body location		
Breast (4)	−0.00 (−0.00 to 0.01)	0.78
Education stage		
Elementary school (3)	−0.00 (−0.02 to 0.01)	0.77
Secondary school (3)	0.00 (−0.01 to 0.00)	0.88
Colleague (3)	0.00 (−0.01 to 0.01)	0.96
Post-colleague (3)	0.01 (0.00–0.01)	0.04*
Number of females (3)	0.00 (−0.00 to 0.01)	0.98
Number of males (3)	0.01 (0.00–0.01)	0.02*
Sample size (4)	0.00 (−0.001 to 0.002)	0.78
Variability on tumor location		
One (3)	−0.19 (−0.38 to −0.01)	0.04*
Life satisfaction (search of meaning)		
Age (3)	−0.06 (−0.17 to 0.05)	0.27
Cancer by body location		
Breast (3)	−0.003 (−0.004 to −0.002)	<0.0001*
Sample size (3)	0.02 (−0.00 to 0.01)	0.49

Abbreviations: k, number of studies analyzed; No, The covariate was reported as not present in the primary studies; RSPWB, the Ryff's Scales of Psychological Well-being; Yes, the covariate was reported as present in the primary studies.

^aMixed model effect-based meta-regression; Only predictors included in at least three studies was assess; Categorical predictors need at least two categories to be analyzed; Redundant predictors were avoided.

* refer to statistical significance (p-value < 0.05).

TABLE 4 Subgroup analyses.

Exposure/outcome/subgroup (number of studies)	Cor (95% CI)	I^2	Q within subgroups (p-value)*	Q between groups (p-value)*
Purpose in life/Life satisfaction				
Pain:			211.22 ($p < 0.0001$)	0.50 ($p = 0.48$)
No (3)	0.36 (−0.19 to 0.74)	0%		
Yes (2)	0.05 (−0.57 to 0.63)	99.5%		
Exposure instruments			211.22 ($p < 0.0001$)	0.50 (0.48)
LET (2)	0.05 (−0.57 to 0.63)	0%		
RSPWB (3)	0.36 (−0.19 to 0.74)	99.5%		
Sex			259.27 ($p < 0.0001$)	0.12 ($p = 0.72$)
Both (4)	0.20 (−0.31 to 0.62)	98.8%		
Female (1)	0.39 (−0.56 to 0.90)	NA		
Variability on tumor location			260.14 ($p < 0.0001$)	0.04 ($p = 0.84$)
One (4)	0.22 (−0.29 to 0.64)	98.8%		
Several (1)	0.33 (−0.6 to 0.88)	NA		
Meaning in life/Life satisfaction - presence of meaning				
Pain:			3.91 ($p = 0.14$)	1.23 ($p = 0.14$)
Yes (1)	0.44 (0.19–0.64)	NA		
No (3)	0.57 (0.49–0.64)	48.95%		
Education stage			4.53 ($p = 0.10$)	0.29 ($p = 0.59$)
Elementary school				
Yes (3)	0.56 (0.46–0.66)	55.9%		
NA (1)	0.51 (0.32–0.67)	NA		
High school			4.53 ($p = 0.10$)	0.29 ($p = 0.59$)
Yes (3)	0.56 (0.46–0.66)	55.9%		
NA (1)	0.51 (0.32–0.67)	NA		
University studies			4.53 ($p = 0.10$)	0.29 ($p = 0.59$)
Yes (3)	0.56 (0.46–0.66)	55.9%		
NA (1)	0.51 (0.32–0.67)	NA		
Post-graduate studies			2.39 ($p = 0.12$)	1.92 ($p = 0.38$)
Yes (2)	0.59 (0.49–0.68)	58.1%		
No (1)	0.44 (0.17–0.65)	NA		
NA (1)	0.51 (0.33–0.64)	NA		
Sex			0.38 ($p = 0.54$)	5.09 ($p = 0.08$)
Both (1)	0.65 (0.54–0.73)	NA		
Female (1)	0.39 (−0.56 to 0.90)	0%		
NA (1)	0.55 (0.46–0.63)	NA		
Variability on tumor location			260.14 ($p < 0.0001$)	0.04 ($p = 0.84$)
One (4)	0.22 (−0.29 to 0.64)	98.8%		
Several (1)	0.33 (−0.6 to 0.88)	NA		

TABLE 4 (Continued)

Exposure/outcome/subgroup (number of studies)	Cor (95% CI)	I^2	Q within subgroups (p-value)*	Q between groups (p-value)*
Meaning in life/Life satisfaction-search of meaning				
Sex			NA	45.10 ($p < 0.001$)
Both (1)	0.24 (0.08–0.39)	NA		
Female (1)	–0.17 (–0.31 to –0.03)	NA		
NA (1)	0.43 (0.33–0.52)	NA		
Variability on tumor location			0.03 (0.85)	44.99 ($p < 0.001$)
One (2)	0.14 (–0.44 to 0.64)	97.8%		
Several (1)	0.24 (–0.56 to 0.81)	NA		

Abbreviations: LET, The Life Engagement Test; NA, the analysis was not possible because the number of studies within the subgroup is one; No, The covariate was reported as not present in the primary studies; RSPWB, the Ryff's Scales of Psychological Well-being; Yes, the covariate was reported as present in the primary studies.

* p -value < 0.05 indicates heterogeneity.

Another important methodological concern was related to the global term “meaning”, which is not always related to ML, including an umbrella of terms (i.e., meaning of the illness).¹⁹ We were very strict in our eligibility criteria and the concept of ML was exclusively included (i.e., meaning of cancer was excluded). However, readers need to know that many meaning-related terms are often interchangeably used in across cancer-related literature which should be shortly corrected to avoid overlapping and methodological confusions.

4.2 | Clinical implications

Meaning-centered therapies or coping skills strategies may be interesting approaches to help cancer patients to better focus on their meaning and PIL.⁵² However, the wide number of methodological concerns that have been previously discussed means that further research may be needed before some of these could be integrated into routine clinical care.

4.3 | Future agenda

Cancer research on this topic could benefit if future research increases and improves the overall certainty in the evidence by reducing very serious concerns on indirectness of evidence. This involves the heterogeneity observed among included studies in terms of patients' clinical characteristics (e.g., disease stage or time since cancer diagnosis), but also the lack of precise information about other factors that may contribute to explain this heterogeneity, such as religious affiliations, comorbidities, educational stage, and income levels. In addition, the inclusion of potential covariates in different analyses could facilitate a better understanding about potential associations between different domains. Finally, more

longitudinal observational studies are warranted to have a better picture about the possible longitudinal association between meaning or PIL and the outcomes explored in this systematic review. Future agenda should call for action for developing high-quality observational studies that reduce the abovementioned methodological flaws.

4.4 | Study limitations

This systematic review specifically focused on meaning and PIL. Eligibility criteria were strict, and readers should be aware that some potential interesting studies evaluating the term meaning were excluded when they focused in other forms rather than ML (i.e., meaning of cancer). Furthermore, we limited study selection to English and Spanish publications. This could cause some potential studies may have been missed. We made a big effort to explore what factors could contribute to explain the marked heterogeneity observed in meta-analyses. To solve it, we developed meta-regression and sensitivity analyses. However, some factors, that is, risk of bias, could not be included as moderators. Data about comorbidities, educational stage, and income levels were extracted a posteriori. Therefore, we did not contact with corresponding authors to request additional details about these. Although we performed multiple analyses, we recognize that the inclusion of multiple effects from the same study could not be managed, which could lead to dependency in the data. Moreover, the use of the term cancer survivors remains a debate.⁵³ We would have liked to explore if this concept is a relevant covariate on the topic of this systematic review but included studies that used this term did not explain in detail what they referred as cancer survivors. Therefore, we decided to use the general term cancer patients to avoid misunderstandings throughout the manuscript.

4.5 | Conclusions

Cancer research on meaning and PIL is growing. Despite the potential importance that spiritual factors could have in cancer patients, there was a surprisingly small number of observational studies regarding the association between meaning or PIL and subjective happiness or life satisfaction. Although we performed multiple meta-analyses, sensitivity analyses, and meta-regression, a wide number of methodological concerns appeared, which preclude to make clinical recommendations. A call for action for increasing and improving the quality of cancer research considering these factors is important if we want to determine if meaning and PIL are truly relevant domains for individuals diagnosed with cancer.

AUTHOR CONTRIBUTIONS

All authors contribute to develop of this work.

CONFLICT OF INTEREST STATEMENT

The authors declares that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ETHICS STATEMENT

This is a systematic review and thus, this statement is not applicable.

PATIENT CONSENT STATEMENT

This is a systematic review and thus, this statement is not applicable.

OPEN SCIENCE FRAMEWORK DOI REGISTRATION

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REFERENCES

1. Ferlay J, Colombet M, Soerjomataram I, et al. Cancer statistics for the year 2020: an overview. *Int J Cancer*. 2021;149(4):778-789. <https://doi.org/10.1002/ijc.33588>
2. Miller KD, Nogueira L, Devasia T, et al. Cancer treatment and survivorship statistics. *CA Cancer J Clin*. 2022;72(5):409-436. <https://doi.org/10.3322/caac.21731>
3. Sung H, Ferlay J, Siegel RL, 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):209-249. <https://doi.org/10.3322/caac.21660>
4. Luigjes-Huizer YL, Tauber NM, Humphris G, et al. What is the prevalence of fear of cancer recurrence in cancer survivors and patients? A systematic review and individual participant data meta-analysis. *Psycho Oncol*. 2022;31(6):879-892. <https://doi.org/10.1002/pon.5921>
5. Soleimani MA, Bahrami N, Allen K.-A, Alimoradi Z. Death anxiety in patients with cancer: a systematic review and meta-analysis. *Eur J Oncol Nurs Off J Eur Oncol Nurs Soc*. 2020;48:101803. <https://doi.org/10.1016/j.ejon.2020.101803>
6. Robinson S, Kissane DW, Brooker J, Burney S. A systematic review of the demoralization syndrome in individuals with progressive disease and cancer: a decade of research. *J Pain Symptom Manage*. 2015;49(3):595-610. <https://doi.org/10.1016/j.jpainsymman.2014.07.008>
7. Mesquita AC, Chaves É de CL, de Barros GAM. Spiritual needs of patients with cancer in palliative care: an integrative review. *Curr Opin Support Palliat Care*. 2017;11(4):334-340. <https://doi.org/10.1097/SPC.0000000000000308>
8. Finck C, Barradas S, Zenger M, Hinz A. Quality of life in breast cancer patients: associations with optimism and social support. *Int J Clin Health Psychol IJCHP*. 2018;18(1):27-34. <https://doi.org/10.1016/j.ijchp.2017.11.002>
9. Kang D, Kim I.-R, Choi E.-K, et al. Who are happy survivors? Physical, psychosocial, and spiritual factors associated with happiness of breast cancer survivors during the transition from cancer patient to survivor. *Psycho Oncol*. 2017;26(11):1922-1928. <https://doi.org/10.1002/pon.4408>
10. Heo J, Chun S, Lee S, Kim J. Life satisfaction and psychological well-being of older adults with cancer experience: the role of optimism and volunteering. *Int J Aging Hum Dev*. 2016;83(3):274-289. <https://doi.org/10.1177/0091415016652406>
11. Loeffler S, Poehlmann K, Hornemann B. Finding meaning in suffering?—meaning making and psychological adjustment over the course of a breast cancer disease. *Eur J Cancer Care*. 2018;27(3):1. <https://doi.org/10.1111/ecc.12841>
12. Suldo SM, Huebner ES, Friedrich AA, Gilman R. Life satisfaction. In: *Handbook of Positive Psychology in Schools Routledge*; 2009:45-54.
13. George LS, Park CL. Are meaning and purpose distinct? An examination of correlates and predictors. *J Posit Psychol*. 2013;8(5):365-375. <https://doi.org/10.1080/17439760.2013.805801>
14. Yalom ID. *Existential Psychotherapy*. 1st ed. Basic Books; 1980.
15. Martela F, Steger MF. The three meanings of meaning in life: distinguishing coherence, purpose, and significance. *J Posit Psychol*. 2016;11(5):531-545. <https://doi.org/10.1080/17439760.2015.1137623>
16. Viktor E. Frankl. *Man's Search for Meaning Pocket Books*; 1985. Revised and Updated Edition (1 January 1985).
17. Breitbart W, Rosenfeld B, Gibson C, et al. Meaning-centered group psychotherapy for patients with advanced cancer: a pilot randomized controlled trial. *Psycho Oncol*. 2010;19(1):21-28. <https://doi.org/10.1002/pon.1556>
18. Holtmaat K, Spek N, Lissenberg-Witte B, Breitbart W, Cuijpers P, Verdonck-de Leeuw I. Long-term efficacy of meaning-centered group psychotherapy for cancer survivors: 2-Year follow-up results of a randomized controlled trial. *Psycho Oncol*. 2020;29(4):711-718. <https://doi.org/10.1002/pon.5323>
19. Brandstätter M, Baumann U, Borasio GD, Fegg MJ. Systematic review of meaning in life assessment instruments. *Psycho Oncol*. 2012;21(10):1034-1052. <https://doi.org/10.1002/pon.2113>
20. Steger MF, Frazier P, Oishi S, Kaler M. The Meaning in Life Questionnaire: assessing the presence of and search for meaning in life. *J Couns Psychol*. 2006;53(1):80-93. <https://doi.org/10.1037/0022-0167.53.1.80>
21. Wong PTP. Implicit theories of meaningful life and the development of the personal meaning profile. In: Wong PTP, Fry PS, eds. *The Human Quest for Meaning: A Handbook of Psychological Research and Clinical Applications*. American Psychological Association.; 1998:111-140.
22. Canada AL, Murphy PE, Fitchett G, Peterman AH, Schover LR. A 3-factor model for the FACIT-Sp. *Psycho Oncol*. 2008;17(9):908-916. <https://doi.org/10.1002/pon.1307>
23. Peterman AH, Fitchett G, Brady MJ, Hernandez L, Cella D. Measuring spiritual well-being in people with cancer: the functional assessment of chronic illness therapy--Spiritual Well-being Scale (FACIT-Sp). *Ann Behav Med Publ Soc Behav Med*. 2002;24(1):49-58. https://doi.org/10.1207/S15324796ABM2401_06
24. Crumbaugh JC, Maholick LT. An Experimental study in existentialism: the psychometric approach to Frankl's concept of noogenic neurosis.

- J Clin Psychol.* 1964;20(2):200-207. [https://doi.org/10.1002/1097-4679\(196404\)20:2<200::aid-jclp2270200203>3.0.co;2-u](https://doi.org/10.1002/1097-4679(196404)20:2<200::aid-jclp2270200203>3.0.co;2-u)
25. Ferrell BR, Dow KH, Grant M. Measurement of the quality of life in cancer survivors. *Qual Life Res Int J Qual Life Asp Treat Care Rehabil.* 1995;4(6):523-531. <https://doi.org/10.1007/BF00634747>
 26. Scheier MF, Wrosch C, Baum A, et al. The life engagement test: assessing purpose in life. *J Behav Med.* 2006;29(3):291-298. <https://doi.org/10.1007/s10865-005-9044-1>
 27. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ.* 2021;372:n71. <https://doi.org/10.1136/bmj.n71>
 28. Beller EM, Glasziou PP, Altman DG, et al. PRISMA for Abstracts: reporting systematic reviews in journal and conference abstracts. *PLoS Med.* 2013;10(4):e1001419. <https://doi.org/10.1371/journal.pmed.1001419>
 29. Morgan RL, Whaley P, Thayer KA, Schünemann HJ. Identifying the PECO: a framework for formulating good questions to explore the association of environmental and other exposures with health outcomes. *Environ Int.* 2018;121(Pt 1):1027-1031. <https://doi.org/10.1016/j.envint.2018.07.015>
 30. Moola S, Munn Z, Tufanaru C, et al. Chapter 7: systematic reviews of etiology and risk. In: Aromataris E, Munn Z, eds. *Joanna Briggs Institute Reviewer's Manual*; 2017.
 31. Hayden JA, van der Windt DA, Cartwright JL, Côté P, Bombardier C. Assessing bias in studies of prognostic factors. *Ann Intern Med.* 2013;158(4):280-286. <https://doi.org/10.7326/0003-4819-158-4-201302190-00009>
 32. Schünemann H, Brożek J, Guyatt G, Oxman A, eds. In: *GRADE Handbook for Grading Quality of Evidence and Strength of Recommendations*. The GRADE Working Group; 2013. Updated October 2013.
 33. Mostarac I, Brajković L. Life after facing cancer: posttraumatic growth, meaning in life and life satisfaction. *J Clin Psychol Med Settings.* 2022;29(1):92-102. <https://doi.org/10.1007/s10880-021-09786-0>
 34. Teques AP, Carrera GB, Ribeiro JP, Teques P, Ramón GL. The importance of emotional intelligence and meaning in life in psycho-oncology. *Psycho Oncol.* 2016;25(3):324-331. <https://doi.org/10.1002/pon.3921>
 35. Guerra MP, Lencastre L, Silva E, Teixeira PM. Meaning in life in medical settings: a new measure correlating with psychological variables in disease. *Cogent Psychol.* 2017;4(1):12. <https://doi.org/10.1080/23311908.2017.1286747>
 36. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Routledge; 1988.
 37. Balduzzi S, Rucker G, Schwarzer G. How to perform a meta-analysis with R: a practical tutorial. *Evid Based Ment Health.* 2019;22(4):153-160. <https://doi.org/10.1136/ebmental-2019-300117>
 38. Viechtbauer W. Conducting meta-analyses in R with the metafor package. *J Stat Softw.* 2010;36(3):1-48. <https://doi.org/10.18637/jss.v036.i03>
 39. Harrer M, Cuijpers P, Furukawa T, Ebert DD, Metzger R. Companion R Package for the Guide "Doing Meta-Analysis in R". R Package Version 0.0.9000; 2019.
 40. Fleer J, Hoekstra HJ, Sleijfer D, Tuinman MA, Hoekstra-Weebers JEHM. The role of meaning in the prediction of psychosocial well-being of testicular cancer survivors. *Qual Life Res.* 2006;15(4):705-717. <https://doi.org/10.1007/s11136-005-3569-1>
 41. Schlegel RJ, Manning MA, Bettencourt BA. Expectancy violations and the search for meaning among breast cancer survivors. *J Posit Psychol.* 2013;8(5):387-394. <https://doi.org/10.1080/17439760.2013.807354>
 42. Thompson E, Stanton AL, Bower JE. Situational and dispositional goal adjustment in the context of metastatic cancer. *J Pers.* 2013;81(5):441-451. <https://doi.org/10.1111/jopy.12025>
 43. Wnuk M, Marcinkowski JT, Fobair P. The relationship of purpose in life and hope in shaping happiness among patients with cancer in Poland. *J Psychosoc Oncol.* 2012;30(4):461-483. <https://doi.org/10.1080/07347332.2012.684988>
 44. Wnuk M. Beneficial effects of spiritual experiences and existential aspects of life satisfaction of breast and lung cancer patients in Poland: a pilot study. *J Relig Health.* 2022;61(6):4320-4336. <https://doi.org/10.1007/s10943-022-01601-w>
 45. Zhou Y, Xu W. Short report: the mediator effect of meaning in life in the relationship between self-acceptance and psychological well-being among gastrointestinal cancer patients. *Psychol Health Med.* 2019;24(6):725-731. <https://doi.org/10.1080/13548506.2018.1554252>
 46. Toledo G, Ochoa CY, Farias AJ. Religion and spirituality: their role in the psychosocial adjustment to breast cancer and subsequent symptom management of adjuvant endocrine therapy. *Support Care Cancer.* 2021;29(6):3017-3024. <https://doi.org/10.1007/s00520-020-05722-4>
 47. Holt C, Wang M, Caplan L, Schulz E, Blake V, Southward VL. Role of religious involvement and spirituality in functioning among African Americans with cancer: testing a mediational model. *J Behav Med.* 2011;34(6):437-448. <https://doi.org/10.1007/s10865-010-9310-8>
 48. Seligman MEP. *Flourish: a visionary new understanding of happiness and well-being*. Simon & Schuster; 2011:349.
 49. Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *J Pers Soc Psychol.* 1989;57(6):1069-1081. <https://doi.org/10.1037/0022-3514.57.6.1069>
 50. Ryff CD. Psychological well-being revisited: advances in the science and practice of eudaimonia. *Psychother Psychosom.* 2014;83(1):10-28. <https://doi.org/10.1159/000353263>
 51. Debats DL. The Life Regard Index: Reliability and Validity; n.d.
 52. Park CL, Pustejovsky JE, Trevino K, et al. Effects of psychosocial interventions on meaning and purpose in adults with cancer: a systematic review and meta-analysis. *Cancer.* 2019;125(14):2383-2393. <https://doi.org/10.1002/cncr.32078>
 53. García-Vivar C. The use and misuse of the concept of cancer survivor. *Cancer Nurs.* 2022;45(6):419-420. <https://doi.org/10.1097/NCC.0000000000001167>

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