Review article

A comprehensive review and meta-analysis of clinical trials examining the impact of logotherapy on anxiety and depression in cancer patients

Maryam Shaygan[1], Fateme Beheshtaeen[2*], Reza Moshfeghinia[3], Davood Zarei[4], Sahar Khaki[4], Marzieh Kargar Jahromi[5], Ehsan Afzal[6]

ABSTRACT

Background

Individuals with cancer experience substantial distress, including anxiety and depression, due to disease burden and impending death.

Aim

Psycho-spiritual interventions such as logotherapy could enhance the mental health of these patients. This systematic review and meta-analysis study aimed to investigate the impacts of logotherapy on depression and anxiety in patients with cancer.

Materials and methods

PubMed, Proquest, Web of Science, Scopus, and Google Scholar were searched. Cochrane Collaboration's tool was utilized for the risk of bias assessment. A random-effect model was applied to estimate the pooled effect sizes. Statistical analyses were performed using STATA software version 17.

Results

Twenty-five clinical trial studies were included in the systematic review. Twenty-three studies investigated the impact of logotherapy on depression and twenty studies were included to assess the effects of logotherapy on anxiety in cancer patients. The meta-analysis results showed a significant effect of logotherapy compared with routine care for anxiety (SMD: -9.38 [-17.50, -1.26], I2: 99.93%) and depression (SMD: -4.67 [-5.90, -3.44], I2: 96.29%). Other findings revealed no significant differences among the subgroups on group formation, cancer stage, and cancer type. Egger's and Begg's test showed potential risk of bias in studies.

Conclusion

This study demonstrated that logotherapy led to a significant improvement in anxiety and depression of patients with cancer. It seems that finding meaning in life could help cancer patients to deal with cancer adversities.

Keywords

Anxiety; Cancer; Depression; Logotherapy; Neoplasm; Psychology

INTRODUCTION

Logotherapy is a therapeutic procedure designed to empower individuals to attain genuine self-awareness and broaden their perspectives on themselves and the world around them, and attribute meaning to their current and future lives [1]. In logotherapy, the objective is not to prescribe a predefined meaning of life to clients, but rather to aid them in uncovering the significance of their own existence. Embracing a sense of meaning in life allows individuals to interpret events and establish values concerning how they wish to navigate life and pursue their aspirations [2]. Frankl presented logotherapy as a form of psychotherapy that delves into the spiritual dimension to address grief in individuals experiencing mental disorders [3].

A unique psychological intervention, logotherapy stands out because it helps patients

1. Community Based Psychiatric Care Research Center, Shiraz University of Medical Sciences. Shiraz, Iran.
2. School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran.
3. Research Center for Psychiatry and Behavioral Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
4. Student Research Committee, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran
5. Department of Nursing, Gerash University of Medical Sciences, Gerash, Iran
6. Diagnostic Laboratory Sciences and Technology Research Center, Paramedical School, Shiraz University of Medical Sciences, Shiraz, Iran

Correspondence

Fateme Beheshtaeen, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: fbeheshtaeen@sums.ac.ir

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understand the meaning of their life in the presence of many other methods of treating depression and anxiety. Logotherapy provides emotional support to individuals struggling with anxiety and depression [4, 5].

Due to advancements, cancer is now recognized as a chronic condition that can be managed, treated, and potentially cured. According to International Agency for Research on Cancer (IARC), there are 19.3 million new cancer cases reported globally and about 10.0 million cancer-related death [6].

Several research studies investigated the psychological well-being of individuals coping with cancer [7, 8]. Poor quality of life and experiencing depression or anxiety are reported in cancer patients [9, 10].

Depression and anxiety are prevalent neuropsychiatric challenges experienced by cancer patients, with their impact varying based on disease and treatment stages [11]. The coexistence of these conditions diminishes overall quality of life, extends hospital stays [12], and increases mortality risk [11]. Managing cancer becomes more challenging with these psychological issues, leading to elevated healthcare costs [13]. Fostering resilience and improving outcomes for cancer patients facing these difficulties depends on the integration of targeted psychological support with medical treatments; logotherapy is one such therapeutic approach [14]. The quality of life and psychological distress of cancer patients can be significantly influenced by a sense of meaning and purpose in life [15].

A small number of systematic review studies have examined the impact of logotherapy on the mental health of cancer patients. Koulaee et al. (2018) demonstrated the advantages of logotherapy on cancer patients' depressive symptoms [5]. Limited number of included studies and a lack of quantitative analysis were among some of its limitations. Another study by Kang et al. (2018) demonstrated that logotherapy was effective in reducing anxiety in patients with cancer [16]. In this study, only three articles were included in the meta-analysis, which doesn't provide strong evidence.

Conducting a systematic review and meta-analysis on the impact of logotherapy on depression and anxiety in cancer patients is crucial for some reasons. It addresses a notable gap in the literature, exploring logotherapy's efficacy in this context. Our inclusive approach encompasses randomized and non-randomized clinical trial studies, enhancing the reliability and applicability of the findings for a broader demographic of cancer patients; therefore, this study aims to investigate the effects of logotherapy on depression and anxiety in patients with cancer.

MATERIAL AND METHODS

This research adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines 2020 [17]. The research protocol was recorded in the International Prospective Register of Systematic Reviews (PROSPERO) with number CRD42023453228.

Search strategy

A comprehensive systematic review of the literature encompassed databases such as PubMed, Scopus, Proquest, Web of Science, and Google Scholar. Until June 30, 2024, the search was conducted without time limit. Persian databases including SID, Irandoc, and Iran Medex were also searched. Gray literature was manually examined to increase the thoroughness of the search by getting the references from the included papers.

The search strategy consists of keywords such as: (Logotherapy OR Meaning-Centered Psychotherapy OR Meaning Therapy OR Meaning-Making Intervention) AND (Depression(s) OR Depressive Symptom(s) OR Emotional Depression(s) OR Depressive Disorder(s)) OR (Anxiety OR Anxieties OR Anxiousness OR Anxiety Symptom(s) OR Anxiety Disorder(s)) AND (Neoplasia OR Neoplasm OR Malignant Neoplasm OR Malignancy OR Cancer OR Oncology) AND (Clinical Trial OR Controlled Trial OR Controlled Study).

Inclusion and exclusion criteria

· Types of studies:

Clinical trials (randomized and non-randomized) were incorporated in the study. Other interventional (e.g., pre-experimental) and observational studies with cross-sectional and longitudinal designs were excluded. Additionally, case studies, letters to the editor, conference abstracts, incomplete data studies were eliminated from the analysis.

Following the PICO criteria, the inclusion/exclusion criteria were as follows:

· Population:

Criteria for inclusion: Patients who are adults with any type and stage of cancer

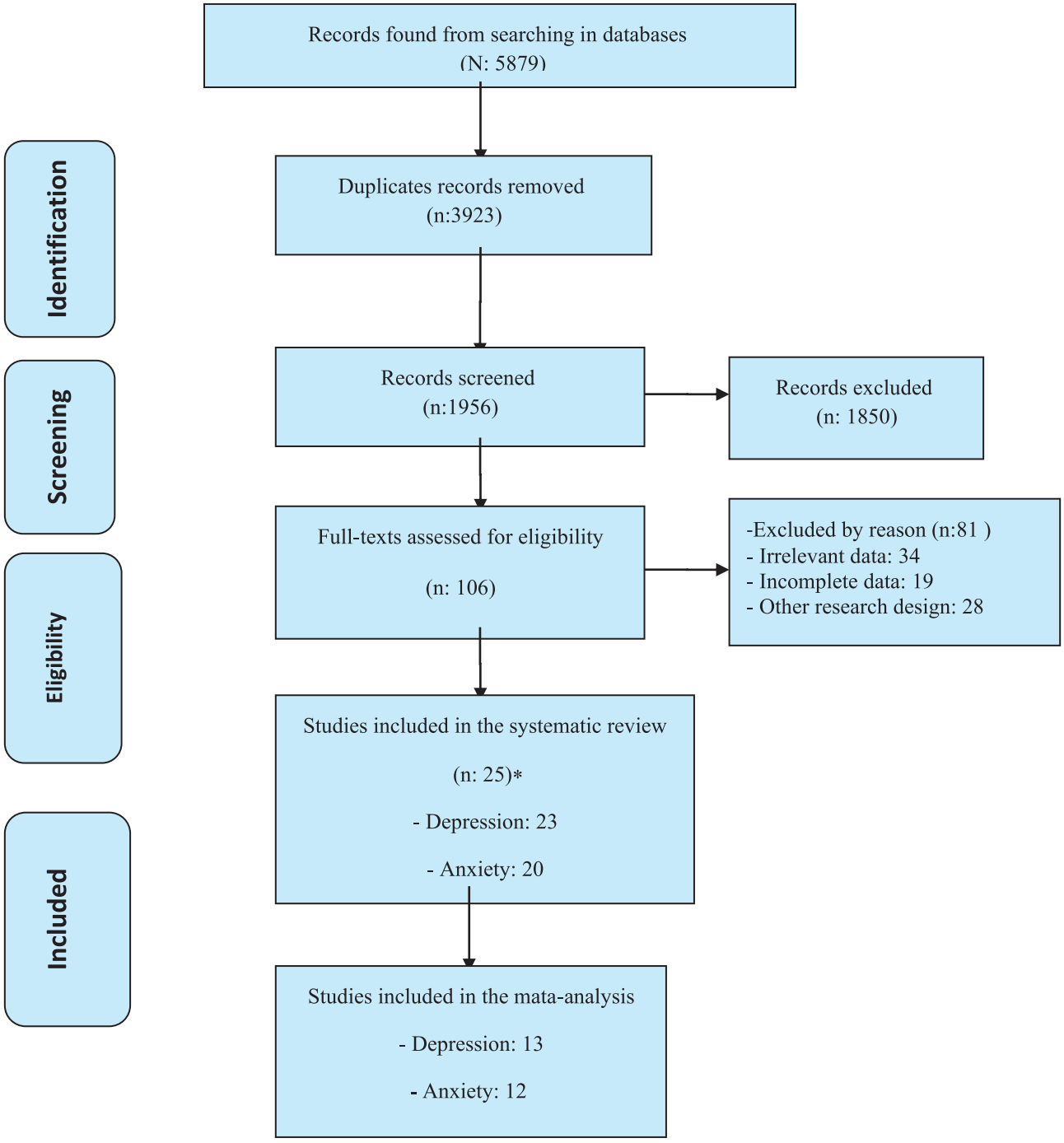

Figure 1: PRISMA diagram

*In most of the included studies, depression and anxiety were examined concurrently

Criteria for exclusion: Individuals with cognitive deficits, chronic or severe mental health issues.

· Interventions:

Logotherapy [meaning-centered psychotherapy, meaning-making interventions, and Managing Cancer and Living Meaningfully (CALM)]. These interventions are implemented individually or in groups.

· Comparators:

The control groups were either provided with routine care or put on a waiting list for training, in addition to receiving various types of support interventions. In order to improve the accuracy of the quantitative findings, only research studies where the control group received routine care were incorporated in the meta-analysis.

· Outcomes:

Depression and anxiety.

Study selection

Two authors identified the relevant articles by reviewing the titles and abstracts of the studies independently. Repeated studies were identified and removed. The relevant studies' full texts were reviewed according to the criteria mentioned above. Consultation with a third author resolved all disagreements. Ultimately a total of 25 eligible articles included in the systematic review (Figure 1).

Risk of bias assessment

Two independent reviewers employed the Cochrane Collaboration's risk of bias tool to evaluate study quality. Each study was categorized as having a "low risk of bias," "high risk of bias," or "some concerns risk of bias." The assessment encompassed several domains: randomization processes (selection bias), allocation concealment (selection bias), blinding of participants and study personnel (performance bias), blinding of outcome assessors (detection bias), incomplete outcome data (attrition bias), selective outcome reporting (reporting bias), and other potential sources of bias [18]. The results of the bias assessments were visualized and analyzed using Review Manager and STATA software, with detailed quality assessment outcomes presented in Table S1 of the supplementary material

Data extraction

The data collected included: name of author, year of publication, country, study design, cancer type and stage, sample size, age, intervention group protocol, control group protocol, measurement tools for outcomes, and time of outcome assessment. (Table 1)

Table 1. The characteristics of the included studies

ID	Time of outcome assessment	Measurement tools for outcomes	The control group protocol	The intervention group protocol	Age Mean (SD) or Range	Sample size	Type (stage of cancer)	Study design	Country	Author's name (year)
1	T_0: Baseline T_1: Post treatment	Depression (BDI)	Routine care	Type: Logotherapy Duration: 8 sessions lasting 75 minutes over a period of one month	Case: 33.89 (10.28) Control: 34.11 (11.67)	Case: 15 Control: 15	Breast cancer (Any stage)	Non- RCT	Iran	Babanejad (2023)[19]
2	T_0: Before treatment T_1: Post treatment T_2: 3 months after last treatment	Anxiety (BAI)	Routine care	Type: Meaning-based existential psychotherapy Duration: 10 (90 minutes) sessions	NR	Case:12 Control:12	Breast cancer (Stage II or III)	RCT	Iran	Ahmadinasab (2022)[20]
3	T_0: Baseline T_1:2 months after treatment	Anxiety (BAI) Depression (BDI)	Type: Nutrition counselling Duration: Four 120-min sessions during 2 months	Type: Group logotherapy plus nutrition counselling Duration: Four 120-min nutrition counselling sessions and weekly logotherapy for 2 months	control: 50.4 (9.1) Control: 48.2 (10.9)	Case: 46 Control: 44	Breast cancer (Stage 0-III)	RCT	Iran	Raji Lahiji (2022)[21]

ID	Time of outcome assessment	Measurement tools for outcomes	The control group protocol	The intervention group protocol	Age Mean (SD) or Range	Sample size	Type (stage of cancer)	Study design	Country	Author's name (year)
4	T_0: Baseline T_1: One week after last treatment	Anxiety (HADS-A) Depression (HADS-D)	Routine care	Type: MCP-EC Duration: Four sessions (45 minutes)	Case: 54.9 (9.71) Control: 56 (8.89)	Case: 20 (10 in individual format and 10 in group format) Control:10	Any type (Stage IV)	RCT	Spain	Quilez-Bielsa (2021) [22]
5	T_0: Before treatment T_1: Post treatment	Anxiety (BAI) Depression (BDI)	Routine care	Type: Group logotherapy (online) Duration: 1-hr classes for eight weeks	NR	Case: 15 Control: 15	Prostate cancer (Advanced stage)	Non-RCT	Iran	Arefpour (2022) [3]
6	T_0: Baseline T_1: 3 months after randomization T_2: 6 months after randomization	Depression (BDI-II and PHQ-9) Anxiety (GAD-7)	Type: SPI Duration: Up to six sessions lasting 50 minutes each, with the possibility of adding two booster sessions within a period of 6 months.	Type: CALM Duration: Up to six sessions lasting 50 minutes each, with the possibility of adding two booster sessions within a period of 6 months.	Case: 59.5 (12.1) Control: 56.5 (11.3)	Case: 99 Control: 107	Any type (Stage III or IV)	RCT	Germany	Mehnert (2020) [23]
7	T_0: Baseline T_1: Post treatment	Depression (HADS-D) Anxiety (HADS-A)	Type: Psychotherapeutic counselling Duration: Three (45 to 60 minutes) sessions in 4- weeks	Type: IMCP-PC Duration: Three (45 to 60 minutes) sessions in 4-weeks	Case: 67.75 (12.66) Control: 67 (11.71)	Case: 16 Control: 16	Any type (Advanced stage)	RCT	Spain	Fraguell-Hernando (2020) [24]
8	T_0: Baseline T_1: One -week post treatment	Depression, anxiety and stress (DASS)	Routine care	Type: Logotherapy Duration: 4 sessions	Case: ≤45 y: 24 >45: 11 Control ≤45 y: 25 >45: 10	Case: 35 Control: 35	Breast cancer (Stages II and III)	Non- RCT	Indonesia	Putri (2019) [25]
9	T_0: Baseline T_1: 12 weeks after the pre-test.	Depression (PHQ)	Individual education sessions lasting 1 to 2 hours focusing on breast and gynecological cancer care.	Type: Logotherapy Duration: 4 to 6 times over the course of 12 weeks (phone interview)	Case: 53.03 (9.1) Control: 53.0 (7.5)	Case: 31 Control: 30	Breast and gynecological cancer (Any stage)	Non- RCT	Taiwan	Sun (2019) [26]
10	T_0: Baseline T_1: Mid-treatment (4 weeks) T_2: 8 weeks post treatment T_3:16 weeks post treatment	Anxiety (HADS-A) Depression (HADS-D)	G_1: SP Duration: 8 sessions in 14 weeks G_2: EUC	Type: IMCP Duration: 8 sessions in 14 weeks	Case: 58.1 (10.2) Control: G1: 58.8 (12.0) G2: 57.1 (10.9)	Case:109 Control: G1:108 G2:104	Tumor cancer (Stage III or IV)	RCT	USA	Breitbart (2018) [27]

ID	Time of outcome assessment	Measurement tools for outcomes	The control group protocol	The intervention group protocol	Age Mean (SD) or Range	Sample size	Type (stage of cancer)	Study design	Country	Author's name (year)
11	T_0: Baseline T_1: 2 months follow up	Depression (HADS-D) Anxiety (HADS-A)	Routine care	Type: MCP Duration: Four 1-hr sessions	Case: 63.13 (10.28) Control: 67.08 (10.93)	Case: 16 Control:13	Pancreatobiliary cancer (Any stage)	Non-RCT	Korea	Ryu (2018) [28]
12	T_0: Baseline T_1: 3 months post treatment T_2: 6 months post treatment	Depression (PHQ-9) Anxiety (GAD	Routine care	Type: CALM Duration: Three to six sessions (45 to 60 minutes) over 3 to 6 months	Case: 59.05 (10.55) Control: 59.10 (11.48)	Case: 151 Control: 154	GI, gynecologic, sarcoma, melanoma, or endocrine cancers (Stage III or IV)	RCT	Canada	Rodin (2018) [29]
13	T_0: Baseline T_1: Post treatment	Depression (BDI) Anxiety (BAI)	Routine care	Type: Group logotherapy Duration: 10 weekly sessions (60-70 min).	45-20	Case:15 Control:15	Any type (Any stage)	RCT	Iran	Heshmati (2018) [30]
14	T_0: Baseline T_1: 1-week post treatment T_2: 3 months post treatment T_3: 6 months post treatment	Anxiety (HADS-A) Depression (HADS-D)	G_1: SGP Duration: 8 sessions lasting 2 hours each week G_2: No intervention	Type: MCGP-CS Duration: 8 sessions lasting 2 hours each week	Case: 58.6 (10.7) Control: G1: 55.5 (9.6) G2: 57.3 (10.4)	Case:57 Control: G1:56 G2:57	Any type	RCT	the Netherlands	Van der Spek (2017) [31]
15	T_0: Baseline T_1: Post treatment	Depression (BDI)	Routine care	Type: Logotherapy Duration: six 45-minute sessions each week	NR	Case:15 Control:15	Cervical cancer (Stages III -IV)	RCT	Indonesia	Soetrisno (2016) [14]
16	T_0: Baseline T_1: Post treatment T_2: 2 months after treatment	Depression (BDI) Anxiety (HADS-A)	Type: SGP Duration: Eight weekly sessions	Type: MCGP Duration: Eight weekly sessions	Case: 57.0 (11.5) Control: 59.6 (10.3)	Case: 132 Control: 121	Any type (Stage III or IV)	RCT	USA	Breitbart (2015) [32]
17	T_0: Baseline T_1: Post treatment	Anxiety (BAI)	Routine care	Type: Group logotherapy Duration: Eight sessions (90 minutes) during one month	NR	Case: 15 Control: 15	Breast Cancer (Any stage)	Non -RCT	Iran	Mohabbat-Bahar (2014) [4]
18	T_0: Baseline T_1: Post treatment T_2: 6 months follow up	Anxiety (GHQ) Depression (GHQ)	Routine care	Type: Group logotherapy Duration: 8-weekly sessions (120 minutes)	NR	Case:17 control:18	Colorectal cancer (Stages I-III)	RCT	Iran	Hosseinzadeh-Khezri (2014) [33]

ID	Time of outcome assessment	Measurement tools for outcomes	The control group protocol	The intervention group protocol	Age Mean (SD) or Range	Sample size	Type (stage of cancer)	Study design	Country	Author's name (year)
19	T_0: Baseline T_1: Post treatment	Depression (BDI) Anxiety (ANQ)	Routine care	Type: Group logotherapy Duration: 10 sessions	NR	Case:15 Control: 15	Any type and stage	Non-RCT	Iran	Hamid (2012) [34]
20	T_0: Baseline T_1: Post treatment T_2: 45 days follow up	Depression (BDI)	Routine care	Type: Group logotherapy Duration: 10 sessions (120 minutes) twice a week	20-40	Case:15 Control:15	Any type and stage	RCT	Iran	Rezaei (2012) [35]
21	T_0: Baseline T1: Post treatment T_2: 2 months follow up	Depression (HADS-D) Anxiety (HADS-A)	Type: TM Duration: Seven (1-hour) sessions	Type: IMCP Duration: Seven (1-hour) sessions in 7weeks	T: 54.4 (11.6)	Case: 64 Control: 56	Any type (Stage III or IV)	RCT	USA	Breitbart (2012) [36]
22	T_0: Baseline T_1: Post treatment	Depression (BDI)	Routine care	Type: Group logotherapy Duration: 10 sessions (2 hrs) in 10 weeks	Case: 45.6 (9) Control: 46.3 (6.5)	Case: 11 Control: 11	Breast cancer (Any stage)	Non -RCT	Iran	Haghighi (2012) [37]
23	T_0: Baseline T_1: 1-month post treatment T_2: 3 months post treatment	Anxiety (HADS-A) Depression (HADS-D)	Routine care	Type: MMi and usual care Duration: 1–4 sessions (30–90 minutes)	T:55 (9.7)	Case:12 Control:12	Ovarian cancer (Stage III or IV)	RCT	Canada	Henry (2010) [38]
24	T_0: Baseline T_1: Post treatment	Depression (BDI) Anxiety (CAQ)	G_1: Guided imaginary Duration: 10 sessions (45 minutes) in 5 weeks G_2: Routine care	Type: Logotherapy Duration: 10 sessions (45 minutes) in 5 weeks	NR	Case: 14 Control: 14	Women with any type and stage of cancer	Non-RCT	Iran	Abolghasemi (2010) [39]
25	T_0: Baseline T_1: Post treatment T_2: 2 months follow up	-Anxiety (HADS-A) Depression (HADS-D)	Type: SGP Duration: eight weekly 90-min sessions	Type: MCGP Duration: 8-sessions in 8 weeks	T: 60.1 (11.8)	Case:49 Control: 41	Any type (Stage III or IV)	RCT	USA	Breitbart (2010) [40]

abbreviations: ANQ: Anxiety Questionnaire**; BAI**: Beck Anxiety Inventory; **BDI**: Beck Depression Inventory; **CALM**: Management of Cancer and Living Meaningfully; **CAQ**: Cattell Anxiety Questionnaire; **EUS:** enhanced usual care**; GHQ**: general health questionnaire; **GI:** Gastrointestinal**; GAD**: Generalized Anxiety Disorder; **HADS-D**: Hospital Anxiety and Depression scale-Depression; **HADS-A**: Hospital Anxiety and Depression Scale-Anxiety; **IMCP-PC**: Individual Meaning-Centred Psychotherapy-Palliative Care; **IMCP**: Individual Meaning-Centred Psychotherapy; **MaP:** Meaning and Purpose; **MCGP-CS**: Meaning-Centered Group Psychotherapy-cancer **Survivor; MCP**: Meaning-Centered Psychotherapy; **MCP-EC**: Meaning-Centred Psychotherapy and Essential Care; **MMi**: Meaning-Making Intervention; **MCGP**: Meaning-Centred Group Psychotherapy; **Non-RCT**: Non-Randomized Clinical Trial; **NR**: Not reported; **PHQ**: Patient Health Questionnaire; **RCT**: Randomized Clinical Trial; **SPI**: supportive psycho-oncological counselling intervention; **SGP**: supportive group psychotherapy**; SP**: supportive psychotherapy**; T**: Time, **TM**: Therapeutic Massage

Statistical analysis

The mean and standard deviation (SD) of depression and anxiety scores in the logotherapy and routine care groups were used to calculate the standardized mean difference (SMD) to determine the overall effect size. SD was calculated using the standard error (SE) and 95% confidence interval (CI) as per the guidelines provided by Hozo et al., (2005) [41]. The unstandardized mean difference and its confidence intervals from the studies were combined using a random-effects model and the restricted maximum likelihood (REML) method. The chi-squared test and I^2 statistic were used to assess the variation among the studies. Egger's test and Begg's test were used to evaluate the likelihood of publication bias by analyzing the correlation between effect size and standard error, or sample size, in order to identify any asymmetry. A graphical representation called a funnel plot was utilized to show publication bias by plotting the effect size against the standard error for every study. A funnel-shaped distribution that is symmetrical suggests a low likelihood of publication bias, whereas an asymmetrical distribution indicates a high likelihood. Subgroup analysis assessed the combined impact of the study design, type, and stage of cancer, with sensitivity analysis conducted to evaluate the strength of the combined effect size. Analysis was conducted using STATA software (version 17, STATA Corporation, College Station, Texas, USA), with statistical significance determined by p values below 0.05.

RESULTS

Qualitative analysis

This systematic review and meta-analysis included 25 articles from the years 2010 to 2023. The studies were carried out in multiple countries such as Iran (11), the United States (4), Canada (2), Spain (2), Indonesia (2), the Netherlands (1), Korea (1), Taiwan (1), and Germany (1).

Out of the studies that were analyzed, nine utilized a non-randomized clinical trial design, while sixteen studies employed a randomized clinical trial format. Twenty studies were included in the systematic review and twelve studies were included in the meta-analysis to assess the impact of logotherapy on anxiety among cancer patients. Twenty-three studies were examined to study how logotherapy affects depression, with 13 articles meeting the criteria for inclusion in the meta-analysis.

The qualitative analysis of the studies showed that gynecological cancers (breast, cervix, and ovarian) were the predominant cancer. The stages of cancer were as follows: any stage (10 studies), advanced stage (11 studies), and early stage (4 studies). In this systematic review, logotherapy encompassed interventions such as meaning-centered psychotherapy, meaning-making intervention, and CALM, which were performed in individual and group formats. In almost all the studies, the interventions were delivered face-to-face, except for one study that used the online sessions for training cancer patients [3].

Quantitative analysis

Depression

The analysis involved thirteen articles with a total of 743 individuals, including 375 cases and 368 controls. These studies investigated the effects of logotherapy compared to routine care on depression in patients with cancer. The findings showed that logotherapy was much more effective than routine care in decreasing depression (SMD: -4.67 [-5.90, -3.44], I2: 96.29%) (Figure 2). A sensitivity analysis was performed by systematically excluding one study at a time to assess the impact of individual studies on the primary outcome. Supplementary material, Figure S1, illustrated that removing Abolghasemi et al.'s study significantly impacted the overall estimation of effect size (SMD = -4.34; 95% CI -5.48 to -3.20, $p < 0.001$). Nevertheless, it is important to highlight that this study had a relatively low weight in the meta-analysis, accounting for just 6.47% of to the total, thereby constraining its effects on both the SMD and the 95% CI. Furthermore, an evaluation of publication bias using Egger's test, Begg's test, and a funnel plot indicated an asymmetric data distribution, indicating potential publication bias. The results supported the results of Egger's and Begg's tests, both showing a significant publication bias risk ($p < 0.001$ and $p < 0.001$, respectively) (Figure S2). As a result, the trim-and-fill technique was used, revealing that there was no alteration in the observed effect size.

Subgroup meta-analysis

Analyses were performed on subgroups considering differences in continent, study design, group formation, cancer stage, and cancer type. The results indicated no significant differences among the subgroups for any of the variables. The details are provided in Table 2 and the Supplementary Material, Figure S3-6.

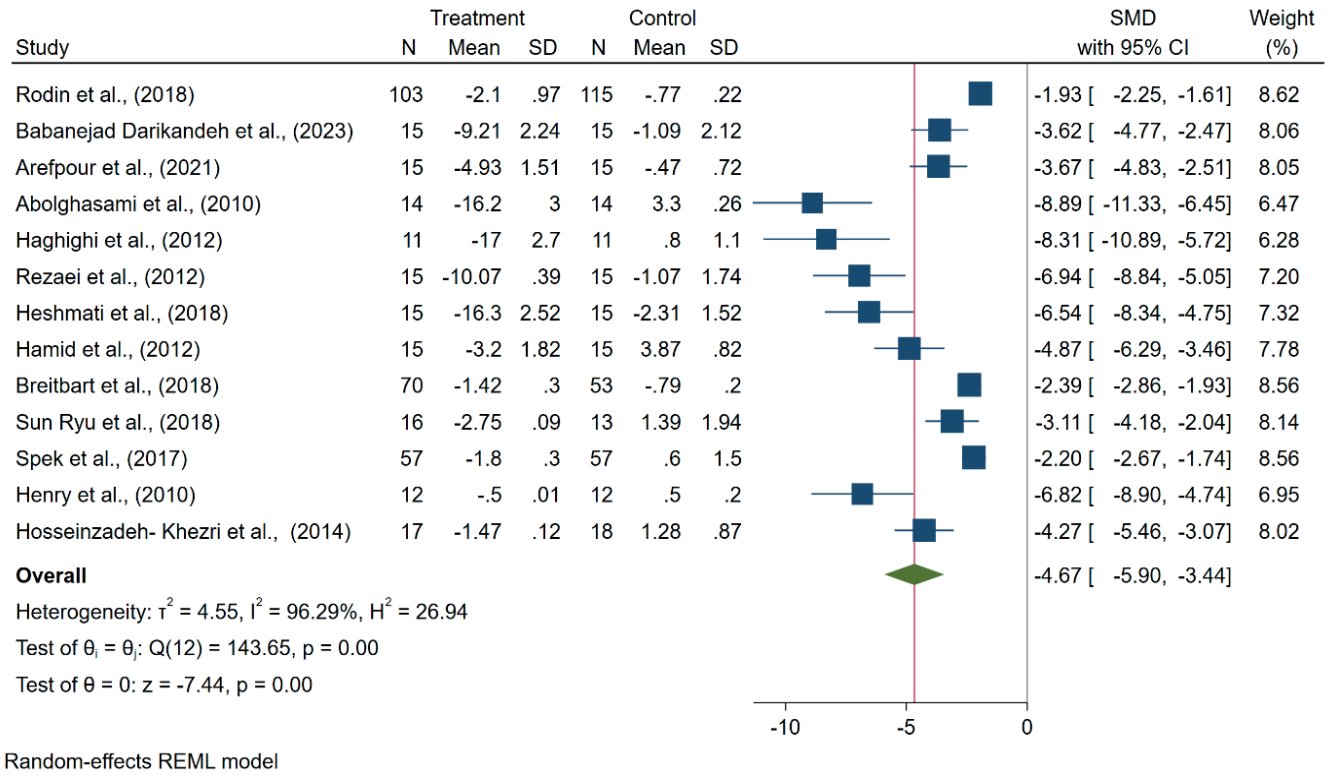

Figure 2. Overall results of the meta-analysis evaluating the impact of logotherapy compared to routine care on depression among cancer patients.

Table 2. Subgroup analysis evaluating the effect of logotherapy compared to routine care on depression in cancer patients considering the different variables

Subgroups	Number of studies	Standardized mean difference (95% CI)	P value	I^2
Continent				
Asia	10	-5.36 (-6.68, -4.03)	<0.001	86.24
North America	3	-3.55 (-6.44, -0.67)	<0.001	98.74
Test of group differences: Qb (1) = 1.24, p = 0.26, I2: 95.19%				
Group formation				
Group	10	-4.88 (-6.38, -3.39)	<0.001	95.72
Individual	3	-3.94 (-6.48, -1.40)	<0.001	94.22
Test of group differences: Qb (1) = 0.40, p = 0.53, I2: 96.15%				
Stage of cancer				
All stages	8	-5.34 (-7.05, 3.55)	<0.001	92.90
Advanced	4	-3.59 (-5.66, -1.51)	<0.001	97.66
Test of group differences: Qb (1) = 1.63, p = 0.20, I2: 96.77%				

Subgroups	Number of studies	Standardized mean difference (95% CI)	P value	I^2
Type of cancer				
All types	7	-4.65 (-6.63, -2.66)	<0.001	90.33
Breast	2	-5.82 (-10.40, -1.24)	<0.001	90.51
Test of group differences: Qb (1) = 0.21, p = 0.65, I2: 97.80%				
Abbreviations: CI, confidence interval; RCT, randomized control trial;				

Anxiety

The analysis consisted of twelve studies with a combined 715 participants, including 354 cases and 361 controls. These studies examined the effects logotherapy compared to routine care on anxiety in patients with cancer. The results showed that logotherapy significantly decreased anxiety in comparison to routine care (SMD: -9.38 [-17.50, -1.26], I2: 99.93%) (Figure 3). A sensitivity analysis was conducted by excluding one study at a time to investigate the impact of each study on the primary outcome. Figure S7 in the supplementary material shows that the removal of Mohabbat-Bahar et al.'s study had a significant impact on the overall effect size estimation (SMD = -5.47; 95% CI -9.16 to -1.79, P = 0.004). Nevertheless, it is essential to point out that this research carried low weight in the meta-analysis, accounting for just 6.58% of the total, which constrained its influence on both the SMD and the 95% CI. Moreover, an examination for publication bias using Egger's test, Begg's test, and a funnel plot revealed an asymmetric distribution of the data, suggesting a likelihood of publication bias. Both Egger's and Begg's tests showed a significant risk of publication bias ($p < 0.001$ for both), in line with the observation shown in Figure S8. Following that, the trim-and-fill method was utilized, showing no difference in the calculated effect size

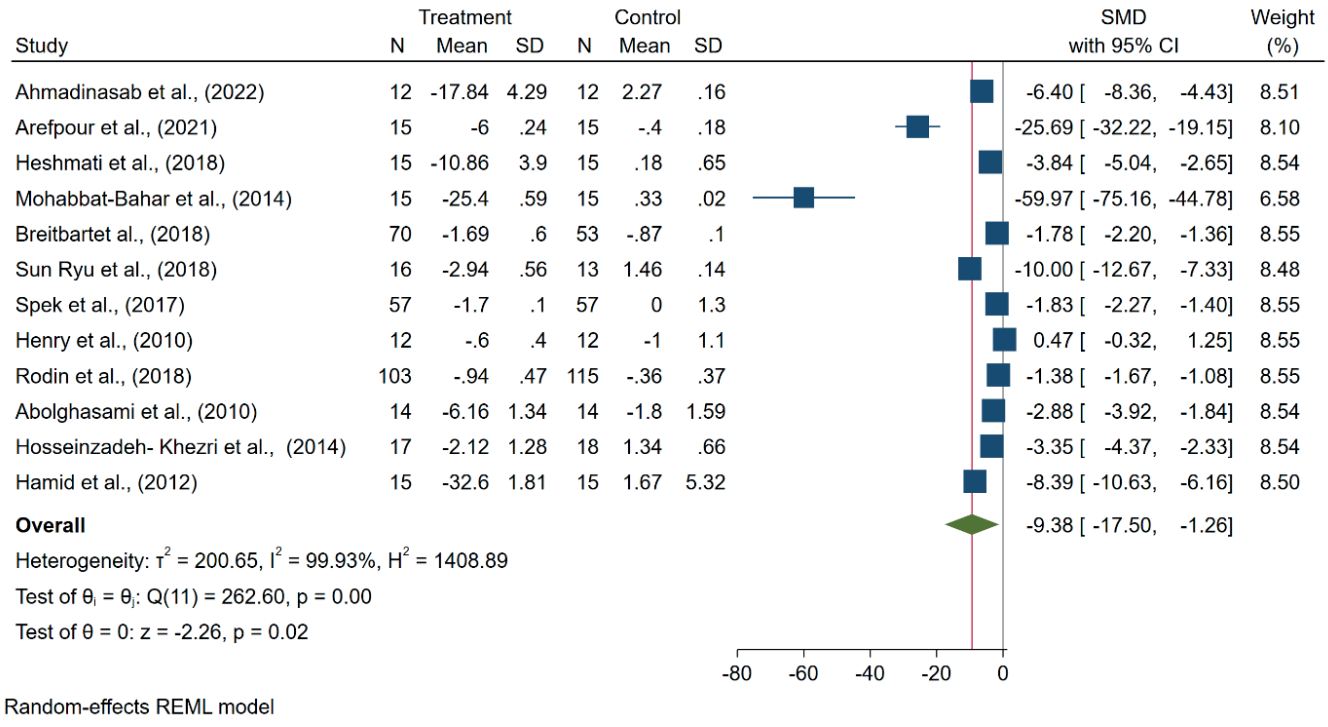

Figure 3. Overall results comparing the impact of logotherapy with routine care on anxiety levels in cancer patients.

Subgroup meta-analysis

Subgroup analyses were carried out considering differences in continent, study design, group formation, cancer stage, and cancer type. The results indicated that no significant differences were observed among the subgroups for any of these variables. Further details can be found in Table 3 and the Supplementary Material, Figures S9-12.

Table 3. Subgroup analysis assessing the impact of logotherapy in comparison to routine care on anxiety in cancer patients considering the different variables

Subgroups	Number of studies	Standardized mean difference (95% CI)	P value	I2
Continent				
Asia	8	-14.07 (-26.23, -1.91)	<0.001	99.75
North America	2	-0.68 (-2.88, 1.52)	<0.001	95.93
Europe	2	-1.57 (-2.02, 1.13)	<0.001	
Test of group differences: Qb (2) = 4.68, p = 0.10, I2: 99.93%				
Stage of cancer				
All stages	6	-13.52 (-30.01, 2.98)	<0.001	99.90
Early	2	-4.75 (-7.73, -1.78)	0.01	86.24
Advanced	4	-6.75 (-18.47, 4.98)	<0.001	99.94
Test of group differences: Qb (2) = 1.13, p = 0.57, I2: 99.93%				
Type of cancer				
All types	6	-3.18 (-5.07, -1.29)	<0.001	98.51
Breast	2	-32.63 (-85.13, 19.86)	<0.001	97.87
Test of group differences: Qb (1) = 1.21, p = 0.27, I2: 99.96%				
Group consideration				
Group	9	-11.65 (-22.81, -0.48)	<0.001	99.94
Individual	3	-3.65 (-9.77, 2.47)	<0.001	99.34
Test of group differences: Qb (1) = 1.22, P = 0.63, I2: 99.93%				

Abbreviations: CI, confidence interval; RCT, randomized control trial

DISCUSSION

Numerous cancer patients encounter varying levels of anxiety and depression, triggered by factors such as altered physical appearance, diminished physical capabilities, familial difficulties, apprehension about what lies ahead, and the prospect of mortality [4]. Consequently, the assessment and management of psychological symptoms, including depression and anxiety, are acknowledged as essential components of oncology care [42].

This systematic review and meta-analysis offer crucial insight into the effect of logotherapy on anxiety and depression in cancer patients. To express the results more precisely, studies in which the control group used routine care were included in the meta-analysis, and studies in which other supportive methods, such as psychological counselling, massage therapy, guided imaginary, and patient education, were used in the control group were incorporated in the systematic review for qualitative analysis.

The meta-analysis showed that logotherapy had significant effects on the mental health of cancer patients, as anxiety and depression were reduced significantly in such patients. It seems that logotherapy considers the transience of existence, provides a new interpretation of the human environment and gives meaning to life, calls patients to strive, and helps them increase their interest and passion for normal activities. Additionally, logotherapy could help cancer patients reduce their fear and anxiety by restoring lost hope and maintaining communication with others [39]. By changing the perspectives of illness, suffering, and death, and increasing resilience, logotherapy allows patients to reduce their anxiety and become more hopeful about their lives and existence [19, 30].

The results of this study demonstrated that logotherapy is effective for reducing anxiety and depression in cancer patients both individually and in groups, but the results of subgroup analysis did not reveal a significant difference between the two treatments. The rational for this finding could be due to the fact that although people have the ability to share feelings and empathy in group interventions, in the studies in which logotherapy was performed individually, people's priorities and personal needs have been considered.

Other findings of the subgroup analysis showed that logotherapy did not have a significant effect among patients with different types and stages of cancer, and this means that this intervention could be effective for all cancer patients and in all stages of the disease.

In the qualitative review of the studies comparing

logotherapy and other psychological supportive interventions, it was found that both these interventions were associated with a significant decrease in anxiety and depression, but that logotherapy interventions were associated with a greater impact [21, 24, 27, 39].

The greater effectiveness of logotherapy interventions in most studies suggests that logotherapy can change patients' views and attitudes by influencing their identities and awakenings, allowing them to have deeper impacts on patients' mental health [1].

However, in a small number of studies, logotherapy interventions did not significantly differ from psychological supportive interventions in reducing anxiety in patients [23, 31]. In the study by Mehrnet et al. for example, there were no significant differences in depression or anxiety between patients in the meaning-based therapy group and those in the supportive treatment group. It seems that many of the key elements of supportive psychological interventions overlap with meaning-based psychotherapies [23]. It is noteworthy that in the above studies, there was a relatively large time gap between the time of the last evaluation and the meaning-based psychotherapy interventions.

A number of studies have been conducted on the effects of logotherapy on symptoms of anxiety and depression in patients including the diabetics [43], elderly patients [44], and patients with renal disease [45]. Findings of all of these studies are consistent with the results of the present study.

Although most of the studies were conducted in Iran with people having strong spiritual beliefs, by examining the locations of the other studies (Asia, North America, and Europe), it can be concluded that logotherapy as a psycho-spiritual intervention has been used in societies with different cultures. Several studies show the positive effects of spirituality on well-being [46] and self-care behaviours of patients [47]. Wang et al. who examined the effect of meaning-centered psychotherapy on Chinese cancer patients, showed that even people without strong spiritual beliefs can obtain meaning from sources such as individual values, meaningful relationships, and connections with nature [48].

Strengths and Limitations

A more comprehensive search of databases and the incorporation of updated studies in the forms of clinical trials, as well as the inclusion of patients with different types and stages of cancer, provided more reliable results than did other literature. Additionally, we decided to only include studies in the meta-analysis that utilized routine care for control groups, as this provided a more precise representation of the results. Studies with alternative control groups were not considered in the meta-analysis. Searching for articles in English and Persian languages created the chance of missing some evidence.

CONCLUSION

Our study illuminates the therapeutic benefits of logotherapy, greatly advancing knowledge of its effectiveness in alleviating anxiety and depression among cancer patients facing multifaceted challenges. Discovering life's purpose and affirming the significance of their existence can empower individuals with cancer to cope with the difficulties of their condition.

Ethical clearance: Not applicable in this methodological study

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Author contribution: F.B. and M.Sh. conceived the study, interpreted the data, and approved the final version of the paper. D.Z. and M.K extracted the data and drafted the manuscript. R.M. analyzed the quantitative results, and S.Kh and E.A critically interpreted the data.

REFERENCES

1. Alreda JJA, Mohameed DAA-H, Al-Hili A, Jawad MA, Khamees SS. The Effectiveness of Group Logotherapy on Life Expectancy and Death Anxiety of Patients with Breast Cancer: The effectiveness of group logotherapy in patients with breast cancer. *International Journal of Body, Mind and Culture*. 2023;**9**(sp):129-37.
2. Ulrichová M. Logo therapy and existential analysis in counselling psychology as prevention and treatment of burnout syndrome. *Procedia-Social and Behavioral Sciences*. 2012;**69**:502-8.
3. Arefpour AM, Mahdavi H. Effects of group logotherapy on mood and function of locally advanced prostate cancer patients. *Counselling and Psychotherapy Research.* 2022;**22**(4):868-75.
4. Mohabbat-Bahar S, Golzari M, Moradi-Joo M, Akbari ME. Efficacy of group logotherapy on decreasing anxiety in women with breast cancer. *Iranian journal of cancer prevention*. 2014;**7**(3):165-70.
5. Koulaee AJ, Khenarinezhad F, Abutalebi M, Bagheri-Nesami M. The effect of logotherapy on depression in cancer patients: A systematic review study. *World Cancer Research Journal*. 2018;**5**(3):e1134.
6. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians. 2021;**71**(3):209-49.
7. Nasution LA, Afiyanti Y, Kurniawati W. Effectiveness of Spiritual Intervention toward Coping and Spiritual Well-being on Patients with Gynecological Cancer. *Asia-Pacific journal of oncology nursing*. 2020;**7**(3):273-9.
8. Chen J, You H, Liu Y, Kong Q, Lei A. Association between spiritual well-being, quality of life, anxiety and depression in patients with gynaecological cancer in China. 2021;**100**(1):e24264.
9. Lewandowska A, Rudzki G, Lewandowski T, Próchnicki M, Rudzki S, Laskowska B, et al. Quality of Life of Cancer Patients Treated with Chemotherapy. *International Journal of Environmental Research and Public Health*. 2020;**17**(19):6938.
10. Prapa P, Papathanasiou IV, Bakalis V, Malli F, Papagiannis D, Fradelos EC. Quality of Life and Psychological Distress of Lung Cancer Patients Undergoing Chemotherapy. *World journal of oncology.* 2021;**12**(2-3):61-6.
11. Ayalew M, Deribe B, Duko B, Geleta D, Bogale N, Gemechu L, et al. Prevalence of depression and anxiety symptoms and their determinant factors among patients with cancer in southern Ethiopia: a cross-sectional study. *BMJ open*. 2022;**12**(1):e051317.
12. Mukwato KP, Mweemba P, Makukula M, Makoleka M. Stress and coping mechanisms among breast cancer patients and family caregivers: A review of literature. *Medical journal of Zambia*. 2010;**37**(1):40-5.
13. Mausbach BT, Decastro G, Schwab RB, Tiamson-Kassab M, Irwin SA. Healthcare use and costs in adult cancer patients with anxiety and depression. *Depression and anxiety*. 2020;**37**(9):908-15.
14. Soetrisno, Sulistyowati S, Ardhianto A, Hadi S. The effect of logotherapy on the expressions of cortisol, HSP70, Beck Depression Inventory (BDI), and pain scales in advanced cervical cancer patients. *Health Care for Women International*. 2017;**38**(2):91-9.
15. Rosenfeld B, Cham H, Pessin H, Breitbart W. Why is Meaning-Centered Group Psychotherapy (MCGP) effective? Enhanced sense of meaning as the mechanism of change for advanced cancer patients. *Psycho-oncology*. 2018;**27**(2):654-60.
16. Kang KA, Han SJ, Lim YS, Kim SJ. Meaning-Centered Interventions for Patients With Advanced or Terminal Cancer: A Meta-analysis. *Cancer Nurs*. 2019;**42**(4):332-40.
17. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *International journal of surgery.* 2021;**88**:105906.
18. Revised Cochrane risk-of-bias tool for randomized trials (RoB 2) short version (cribsheet) [Internet]. Cochrane Collaboration. 2019 [cited 15 September 2023]. Available from: https://methods.cochrane.org/bias/resources/rob-2-revised-cochrane-risk-bias-tool-randomized-trials.
19. Bababnejad Darikandeh S, Norozi A, Bagheri H. The Effectiveness of Logotherapy Based on Rumi's Thoughts in Death Anxiety and Depression among Women with Breast Cancer. *Community Health Journal*. 2023;**17**(1):76-86.
20. Ahmadinasab M, Malihialzackerini S, Mohaghegh F, Sodagar S, Sabet M. THE effectiveness of meaning-based existential therapy on anxiety and serum levels of tumor necrosis factor TNFα in women with breast cancer. *Iranian Journal of Breast Diseases*. 2022;**15**(1):87-102.
21. Raji Lahiji M, Sajadian A, Haghighat S, Zarrati M, Dareini H, Raji Lahiji M, et al. Effectiveness of logotherapy and nutrition counseling on psychological status, quality of life, and dietary intake among breast cancer survivors with depressive disorder: a randomized clinical trial. Supportive care in cancer : *official journal of the Multinational Association of Supportive Care in Cancer*. 2022;**30**(10):7997-8009.
22. Quílez-Bielsa E, Barrado-Moreno V, Lastra del Prado R, Arbonés-Mainar JM, Sebastian-Sanchez M, Ventura-Faci T. An adaptation of meaning-centered psychotherapy integrating "essential care": A pilot study. *Palliative & Supportive Care*. 2021;**20**(4):496-504.
23. Mehnert A, Koranyi S, Philipp R, Scheffold K, Kriston L, Lehmann-Laue A, et al. Efficacy of the Managing Cancer and Living Meaningfully (CALM) individual psychotherapy for patients with advanced cancer: A single-blind randomized controlled trial. *Psycho-oncology*. 2020;**29**(11):1895-904.
24. Fraguell-Hernando C, Limonero JT, Gil F. Psychological intervention in patients with advanced cancer at home through Individual Meaning-Centered Psychotherapy-Palliative Care: a pilot study. *Supportive Care in Cancer*. 2020;**28**(10):4803-11.
25. Putri SB, Jannah M. The effect of logotherapy on depression in breast cancer patients under chemotherapy. *Breast cancer*. 2019;2109(2):9.
26. Sun F-K, Hung C-M, Yao Y, Fu C-F, Tsai P-J, Chiang C-Y. The Effects of Logotherapy on Distress, Depression, and

Demoralization in Breast Cancer and Gynecological Cancer Patients: A Preliminary Study. *Cancer Nursing*. 2019;**44**(1):53-61.

27. Breitbart W, Pessin H, Rosenfeld B, Applebaum AJ, Lichtenthal WG, Li Y, et al. Individual meaning-centered psychotherapy for the treatment of psychological and existential distress: A randomized controlled trial in patients with advanced cancer. *Cancer*. 2018;**124**(15):3231-9.
28. Ryu JS, Choi SW, Yun SS, Koo BH, Choi IS, Kim SJ, et al. Preliminary Findings on the Effectiveness of Meaning-Centered Psychotherapy in Patients with Pancreatobiliary Cancer. *Yonsei Med J*. 2018;**59**(9):1107-14.
29. Rodin G, Lo C, Rydall A, Shnall J, Malfitano C, Chiu A, et al. Managing Cancer and Living Meaningfully (CALM): A Randomized Controlled Trial of a Psychological Intervention for Patients With Advanced Cancer. Journal of clinical oncology : *official journal of the American Society of Clinical Oncology*. 2018;**36**(23):2422-32.
30. Heshmati R, Heidary M, Adl F. Effectiveness of Group Logotherapy on Depression and anxiety In Patients With Cancer: A Clinical Trial Study. *North Khorasan Journal of Medical Sciences*. 2018;**10**(2):79-86.
31. van der Spek N, Vos J, van Uden-Kraan CF, Breitbart W, Cuijpers P, Holtmaat K, et al. Efficacy of meaning-centered group psychotherapy for cancer survivors: a randomized controlled trial. *Psychological medicine*. 2017;**47**(11):1990-2001.
32. Breitbart W, Rosenfeld B, Pessin H, Applebaum A, Kulikowski J, Lichtenthal WG. Meaning-centered group psychotherapy: an effective intervention for improving psychological well-being in patients with advanced cancer. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology*. 2015;**33**(7):749-54.
33. Hosseinzadeh-Khezri R, Rahbarian M, Sarichloo M-E, Lankarani KB, Jahanihashemi H, Rezaee F. Evaluation effect of logotherapy group on mental health and hope to life of patients with colorectal cancer receiving chemotherapy. *Bull Env Pharmacol Life Sci.* 2014;**3**:164-9.
34. Hamid N, Talebian L, Mehrabizade M, Yavari AH. effectiveness of logotherapy on depression, anxiety and quality of life in cancer patients. *Journal of Psychological Achievements*. 2012;**4**(2):199-224.
35. Azarmidokht R, Jaleh R, Mohammadali A. Effectiveness of group therapy on reducing depression in cancer patients. *Psychol methods*. 2012;**2**(7):37-46.
36. Breitbart W, Poppito S, Rosenfeld B, Vickers AJ, Li Y, Abbey J, et al. Pilot randomized controlled trial of individual meaning-centered psychotherapy for patients with advanced cancer. Journal of clinical oncology : *official journal of the American Society of Clinical Oncology*. 2012;**30**(12):1304-9.
37. Haghighi F, Khodaei S, Sharifzadeh GR. Effect of logotherapy group counseling on depression in breast cancer patients. *Modern Care, Scientific Quarterly of Birjand Nursing and Midwifery Faculty* 2012;**9**(3):165-72.
38. Henry M, Cohen SR, Lee V, Sauthier P, Provencher D, Drouin P, et al. The Meaning-Making intervention (MMi) appears to increase meaning in life in advanced ovarian cancer: a randomized controlled pilot study. *Psycho-oncology*. 2010;**19**(12):1340-7.
39. Abolghasami S, Saeadi S, Najafi NM. The effect of Guided Imagery and logo therapy on Depression, Anxiety and Hopefulness in Women with Cancer in Ahwaz. *Scientific quarterly research on women and culture.* 2011;**2**(5).
40. Breitbart W, Rosenfeld B, Gibson C, Pessin H, Poppito S, Nelson C, et al. Meaning-centered group psychotherapy for patients with advanced cancer: a pilot randomized controlled trial. *Psycho-oncology*. 2010;**19**(1):21-8.
41. Hozo SP, Djulbegovic B, Hozo I. Estimating the mean and variance from the median, range, and the size of a sample. *BMC Medical Research Methodology*. 2005;**5**(1):13.
42. Breitbart W, Rosenfeld B, Pessin H, Applebaum A, Kulikowski J, Lichtenthal WG. Meaning-centered group psychotherapy: an effective intervention for improving psychological well-being in patients with advanced cancer. *Journal of clinical oncology*. 2015;**33**(7):749.
43. Bahar A, Shahriary M, Fazlali M. Effectiveness of Logotherapy on Death Anxiety, Hope, Depression, and Proper use of Glucose Control Drugs in Diabetic Patients with Depression. *International journal of preventive medicine*. 2021;**12**:6.
44. Kim C, Choi H. The efficacy of group logotherapy on community-dwelling older adults with depressive symptoms: A mixed methods study. *Perspectives in Psychiatric Care*. 2021;**57**(2):920-8.
45. Dong C, Wang X, Cao F, Qiu L, Li S. Intervention effect of logotherapy on anxiety and depression in patients with chronic glomerulonephritis. *Chinese Journal of Practical Nursing*. 2022:1105-9.
46. Kadri R, Husain R, Omar SHS. Impact of Spiritual Meditation on Drug Addiction Recovery and Wellbeing: A Systematic Review. *International Journal of Human and Health Sciences* 2020;**4**(4):14.
47. Permana I. How Religosity and/or Spirituality Might Influence Self-Care in Diabetes Management : A Structured Review. *Bangladesh Journal of Medical Science*. 2018;**17**(2):185–93.
48. Wang S, Zhu Y, Wang Z, Zheng M, Li X, Zhang Y, et al. Efficacy of meaning-centered group psychotherapy in Chinese patients with cancer: A randomized controlled trial. *Palliative and Supportive Care*. 2023;**21**(5):1-9.