

Review

To what extent are psychological variables considered in the study of risk and protective factors for suicidal thoughts and behaviours in individuals with cancer? A systematic review of 70 years of research

Mareike Ernst^{a,b,c,*}, Tamara Schwinn^c, Judith Hirschmiller^c, Seonaid Cleare^b, Kathryn A. Robb^d, Elmar Brähler^{c,e}, Rüdiger Zwerenz^c, Jörg Wiltink^c, Rory C. O'Connor^{b,1}, Manfred E. Beutel^{c,1}

^a Department of Clinical Psychology, Psychotherapy and Psychoanalysis, Institute of Psychology, University of Klagenfurt, Klagenfurt am Wörthersee, Austria

^b Suicidal Behaviour Research Laboratory, School of Health and Wellbeing, University of Glasgow, Glasgow, United Kingdom

^c Department of Psychosomatic Medicine and Psychotherapy, University Medical Center of the Johannes Gutenberg-University Mainz, Mainz, Germany

^d Cancer Behaviour Research Group, School of Health and Wellbeing, University of Glasgow, Glasgow, United Kingdom

^e Department of Medical Psychology and Medical Sociology, University Hospital Leipzig, Leipzig, Germany

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ABSTRACT

Psychological variables substantially shape the risk of suicidal thoughts and behaviours (STBs). However, it is unclear to what extent they are considered in individuals with cancer. We synthesized the quantitative research landscape concerning psychological risk/protective factors of STBs in the (psycho-) oncological context.

This pre-registered review (PROSPERO-ID CRD42022331484) systematically searched the databases PubMed/Medline, CINAHL, PsycInfo, Cochrane Library, and Web of Science (as well as the grey literature and preprints). Risk of bias (RoB) was estimated using the ROBINS-I tool.

Of 11,159 retrieved records, 319 studies were eligible for inclusion. Of those, 163 (51.1%) had investigated psychological factors (affective: $n = 155$; social: $n = 65$; cognitive: $n = 63$; personality/individual differences: $n = 37$; life events: $n = 6$), in a combined 3,561,741 participants. The most common STBs were suicidal ideation ($n = 107$) or death wishes ($n = 20$) rather than behaviour (suicide deaths: $n = 26$; attempts: $n = 14$). Most studies had a serious RoB. Thus, a large body of research investigated STBs in cancer patients/survivors, but it rarely aligned with the theoretical or clinical developments in suicide research. We propose a conceptual model of STBs in cancer delineating moderation and mediation effects to advance the integration of the fields, and to inform future research and practice.

1. Introduction

A cancer diagnosis can trigger a psychological crisis and great despair. Empirical studies have found significantly elevated rates of suicidal thoughts and behaviours (STBs) in individuals with cancer, most recently a twice as high standardized mortality ratio (Favril, Yu, Geddes, & Fazel, 2023). Besides deaths by suicide (Amiri & Behnezhad, 2019; Heinrich et al., 2022), similar findings applied to suicide attempts (McFarland, Walsh, Napolitano, Morita, & Jaiswal, 2019) and suicidal ideation (Kolva, Hoffecker, & Cox-Martin, 2020). However, it is unclear

which individuals affected by cancer are most vulnerable: For instance, suicide risk was especially high in men compared to women (Amiri & Behnezhad, 2019; Parpa, Tsilika, Gennimata, & Mystakidou, 2015) and shortly after (six to twelve months) rather than a longer time after diagnosis (Du et al., 2020; Ravaoli et al., 2020). However, gender differences were not found in studies assessing suicidal ideation (Du, Shi, Yu, et al., 2020; Kolva et al., 2020), and elevated rates of suicidal ideation were also reported in long-term survivors (e.g., survivors of childhood cancer >25 years after diagnosis) (Burghardt et al., 2019).

Highlighting the importance of distinguishing between suicidal

* Corresponding author at: Department of Clinical Psychology, Psychotherapy and Psychoanalysis, Institute of Psychology, University of Klagenfurt, Universitätsstr. 65-67, 9020 Klagenfurt am Wörthersee, Austria.

E-mail address: mareike.ernst@aau.at (M. Ernst).

¹ Joint last authors

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ideation and behaviour, these findings also underscore the impact of other risk or protective factors. The empirical investigation of risk and protective factors is a bedrock of suicide prevention efforts (World Health Organization, 2014). As noted by Kraemer et al. (1997), the term risk factor is used broadly to encompass characteristics of a person or population associated with an unwelcome outcome, whereas protective factors implicate prevention and/or recovery. As such, the latter particularly come to bear in the context of resilience, i.e., the capacity for successful adaptation to adverse circumstances (Masten & Reed, 2002). These factors can be of different types (see also Glenn, Franklin, Kearns, Lanzillo, & Nock, 2016), some are mere correlates, whereas others are fixed markers (that cannot be changed) or variable risk factors (that can potentially be altered, including causal risk factors).

Within the context of cancer, studies have often focused on socio-demographic characteristics such as age and gender, and treatment and disease-related characteristics such as type of diagnosis and stage. Furthermore, suicidal ideation has been conceptualized as a direct side effect of particular treatment types, for example, with corticosteroids; while specific tumors, for example, adrenal and testicular cancer, have been linked to risk factors of suicidal ideation and behaviours such as irritability and agitation (for an overview, see Pitman, Suleman, Hyde, & Hodgkiss (2018)). By comparison, knowledge about psychological factors is scarce, and the extant evidence has not yet been summarized by comprehensive reviews/meta-analyses of STBs in cancer patients and survivors (Calati et al., 2021). For instance, a large, recent meta-analysis of suicide mortality risk in individuals with cancer that pooled data from >46 million patients statistically tested eight risk factors, but none of them were psychological in nature (Heinrich et al., 2022). Therefore, the present findings from cancer populations are hard to integrate with the large body of research that has previously highlighted the importance of psychological risk factors for suicide (O'Connor & Nock, 2014; Turecki et al., 2019).

This constitutes a research gap as a suicidal crisis is still a psychological event – even when considered against the background of serious and/or chronic physical illness (Rogers, Joiner, & Shahar, 2021). Although the role intense mental distress plays in shaping the suicide risk of individuals affected by cancer has recently received more attention (Bergerot & Pal, 2022), previous research has also shown that depression does not completely account for the elevated suicide risk in those with chronic illness (Ahmedani et al., 2017). It has been argued that psychological factors constitute a link (in the sense of mediating or moderating variables) (Van Orden et al., 2010) between chronic illness and STBs, i.e., that these variables determine how well a person can adapt to or cope with the disruption of life brought on by the illness and/or ongoing pain/discomfort, and losses and challenges associated with it, which ultimately shapes their risk of suicide. From a clinical perspective, these are particularly interesting because they not only inform the risk-based stratification of screening efforts but also highlight potentially modifiable factors that can be targeted by psychotherapeutic interventions (e.g., coping styles).

The present systematic review builds on the taxonomy used by O'Connor and Nock (2014) to synthesize the psychological factors derived from influential theories of suicide and on a recent conceptual outline of the affective, cognitive, and interpersonal-behavioural variables particularly pertinent to the relationship between chronic illness and STBs (Rogers et al., 2021). Integrating them, our classification system harnesses five categories to reflect the breadth of the field: personality and individual differences (e.g., impulsivity), cognitive (e.g., problem-solving and coping), social (e.g., exposure to suicide), and affective factors (e.g., pain), and negative life events (e.g., childhood adversities). As such, they address all elements of Lewin's foundational eq. $B = f(P, E)$ (Lewin, 1936) in which behaviour B varies as a function of both the person P and their environment E (over the life course). In a more differentiated sense, the most influential models of suicidal behaviour comprise (while assigning different weights) internal and external stressors, capacities to cope, the subjective experience, and

individual differences (including those acquired in the course of development) while acknowledging their dynamics and interactions. Theories within the ideation-to-action framework advance the notion that suicidal desire is not sufficient for suicidal behaviour to occur; but that there are other, specific risk factors for the transition from thoughts to behavioural actions (Klonsky, Saffer, & Bryan, 2018). As the first theory of this kind, Joiner's Interpersonal Theory of Suicide (IPTs) posited that suicidal desire arises from the simultaneous occurrence of perceived burdensomeness (to others) and thwarted belongingness (i.e., feelings of being left out/unconnected to others), and hopelessness with regard to whether these states will change. The risk of serious suicidal behaviour then increases significantly if the person also has acquired the capability for suicide (defined as the desensitization to pain and fearlessness of death) (Van Orden et al., 2010). More recently, the Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour provided a detailed framework in which suicidal ideation emerges against the background of a diathesis-stress model (the pre-motivational phase). Suicidal ideation and intent are primarily driven by unbearable feelings of defeat and entrapment (in the motivational phase), and further exacerbated by threat-to-self (TSM) and motivational moderators (MM), before volitional moderators (VM), including acquired capability, govern the transition to suicidal behaviour (in the volitional phase) (O'Connor & Kirtley, 2018).

While chronic illness can be understood as a triggering event or a sum of them, respectively, from which the processes assumed by the respective conceptualizations unfold, they are no specific models of STBs within chronic illness. Therefore, they cannot highlight illness-related or -unrelated variables of particular importance for prevention within this vulnerable group. At the same time, it is unclear the extent to which suicide prevention considerations in oncological settings have even engaged with psychological factors more broadly, and theory-derived factors more specifically. Therefore, our research question was: To what extent are psychological variables considered in original research of risk and protective factors of STBs in individuals with cancer? We address this question in both a quantitative (by counting what percentage of relevant studies included psychological variables of interest and which of the five categories are most commonly tested) and a narrative way (by summarizing the findings and integrating them with the state-of-the-science psychological theories of suicide). Going from there, we propose a conceptual model from which we derive recommendations for directions in future research and clinical practice.

2. Methods

2.1. Search strategy and selection criteria

Throughout this work, we followed the current PRISMA guidelines (Page et al., 2021). Study materials are available via the Open Science Framework (OSF): [OSF folder containing all study materials](#) In preparation for the search the PICO/PECOS (Guyatt et al., 2011; Morgan, Whaley, Thayer, & Schunemann, 2018) schema was defined as follows:

Participants/population: We considered reports on people of all ages with all types of cancer diagnoses and all stages, including acute illness and (long-term) survivors. We did not consider studies of STBs in family members, caregivers, or healthcare professionals.

Intervention/Exposure: As we did not focus on interventional studies, we conceived of the studied risk and protective factors as any of the potential modifiers of outcomes that were statistically tested. For the systematic search, we placed no restrictions on the types of factors assessed by the studies (however, after data extraction, we categorized them into psychological and other factors as described below).

Control: We did not place any restrictions on the original research regarding control groups. For data extraction, we considered comparisons to individuals without cancer or comparisons within cancer populations (e.g., of men and women, or individuals with different malignancies).

Outcome: As the main outcome, we considered all types of STBs (e.g., suicidal ideation, suicide attempts, and suicide deaths) in individuals affected by cancer. However, we specified that studies investigating *physician-assisted suicide* (other terms used in original studies: death preferences, “euthanasia”) were not eligible as we considered assisted dying to be distinct from suicide/suicide prevention in the context of a psychological crisis, also because studies stated that in some cases, the affected individuals were not competent to make this decision themselves.

Setting/time: We placed no restrictions on the context, but we extracted this information: Both regarding both a) the setting (e.g., whether the study was carried out in a hospital, whether it was a population survey) and b) the broader context (e.g., in which country it was conducted).

Study type/further in- and exclusion criteria: We considered observational as well as intervention studies (as long as they considered other modifiers of STBs or changes in STBs than the interventions themselves) and studies using different methods of participant recruitment/data collection (e.g., registry-based, community studies, hospital settings) and assessing the outcome of interest (e.g., individuals’ self-reports or data drawn from death registries). We also included studies that reported on other physical health conditions as well, as long as they reported specifically about (the risk of) STBs in a population affected by cancer. As our research question concerned the variables investigated in association with STBs by means of statistical tests, we included only quantitative original research. We did not include qualitative research, case reports or summary/review papers (but we used them for citation searching), or comments/opinion pieces that did not report original data. Studies had to be published in English, French, or German, and the full text had to be available.

The following electronic databases were searched: PubMed/Medline, CINAHL, PsycINFO, the Cochrane Library/Cochrane Central Register of Controlled Trials, and Web of Science. The search strategy was developed by expanding and specifying the search term provided in the PROSPERO registration of a previous, comprehensive review performed by Calati et al. (2018). It is included in the PROSPERO registration (CRD42022331484) submitted on May 09, 2022, before we conducted the main search and provided via the OSF as well. The systematic search (cut-off date: November 03, 2023) was supplemented by other sources including preprint servers, government and health authority websites, citation searching, and hand-searching Google Scholar (in particular to find relevant grey literature).

2.2. Study selection

Articles that did not meet the inclusion criteria after screening the abstract and title were excluded. Full-text records of the eligible type (original, quantitative research) and languages were exported from the systematic database search and supplemented by searches from other sources. All records were included in an EndNote library. Following the procedure described by Bramer et al. (2016), duplicates were removed. The remaining full texts were assessed by two members of the research group who independently screened all records against exclusion/inclusion criteria and documented their decisions using the same excel sheet (while blinded to each other’s decisions). They noted whether studies investigated STBs as a main outcome and statistically tested at least one factor (i.e., within a sample of individuals with cancer or as a modifier of the risk of STBs with cancer as part of an investigation including both individuals with and without cancer). The sheets were then merged, and disagreements were resolved through discussion including another senior member of the research group.

2.3. Data collection

Data from eligible full texts were first extracted independently by several members of the research group and then reviewed for its

accuracy and comprehensiveness by other members. Data was extracted in two steps. First, the following data were extracted: (1) authors; (2) title; (3) year of publication; (4) DOI; (5) variables tested as risk or protective factors of STBs. Data extracted under (5) was coded with respect to whether they included psychological factors. If so, the psychological factors were summarized in a separate column. As a basis for classification, we primarily drew on the relevant previous synthesis articles (O’Connor & Nock, 2014; Rogers et al., 2021). By contrast, for instance, sociodemographic information and “objective” health data such as the presence of metastases or time since cancer diagnosis were not considered psychological variables. Uncertainties related to this categorization were resolved through discussion, with a senior group member guiding the decisions. If a study *did not* test any psychological factors, we checked whether it reported any (6) psychological variables (e.g., as part of the sample characteristics) that could potentially have been tested.

If a study tested at least one psychological factor, we extracted further information: (7) country/region; (8) study design (longitudinal or cross-sectional); (9) study type (e.g., survey, registry-based study); (10) setting; (11) descriptor of the cancer sample (e.g., patients or survivors); (12) sample size (of the cancer sample); (13) age of the cancer sample (as range, mean, and standard deviation); (14) gender/sex proportions of the cancer sample; (15) main types of cancer included; (16) disease stage; (17) STBs studied (e.g., suicidal ideation, attempt, death by suicide); (18) if applicable, the instrument used to assess the outcome (e.g., PHQ-9, Beck Scale for Suicide Ideation); (19) if applicable, the prevalence of STBs within the cancer sample. For psychological factors, we also extracted (20) what kind of analysis was conducted (e.g., group comparisons, correlations, tests of predictors within regression models, etc.); (21) the association of the respective factor(s) with STBs (positive/negative/not statistically significant). (Note: we use the term “cancer sample” to refer to those study participants who had cancer; as many studies compared individuals with and without cancer.)

2.4. Methods for assessing risk to internal validity/risk of bias

Two members of the team independently rated the studies’ Risk of Bias (RoB). In case of disagreements, a senior team member additionally rated the respective paper/domain. Following the Cochrane recommendations, bias was rated outcome- and not study-specific. According to Cochrane Recommendations, we used the ROBINS-I tool (Higgins et al., 2022). For each of the following domains, the RoB was rated as “low”, “moderate”, “serious”, or “no information”: Bias due to confounding, bias in the selection of participants into the study, bias in the classification of exposure (the ROBINS-I tool originally concerns intervention studies, however, the present study focuses on exposure in terms of being affected by cancer), bias due to missing data, bias in the measurement of the outcome, and bias in the selection of the reported result. A study’s overall RoB corresponded to its most critically assessed individual category (i.e., if one domain was rated as “serious”, the overall RoB was coded as “serious” as well).

2.5. Methods of synthesis

Data are summarized narratively and quantitatively: In the following, we first report how many studies tested any psychological factors, both in terms of their overall number and their proportion of the total number of studies. Secondly, we created a taxonomy by taking the categories 1) personality and individual differences, 2) cognitive factors, 3) social factors, 4) negative life events from O’Connor & Nock, 2014 and adding the category 5) affective factors from Rogers et al. (2021) to summarize the types of psychological factors addressed by the different studies. This allowed for an overview as to which categories and single factors were best and worst represented in the research landscape. Before coding, we critically reviewed the conceptualization of the respective variables as included in the two guiding synthesis papers as

well as other seminal work (including operationalisations such as questionnaire measures) defining the constructs of interest, if necessary. While many factors can arguably fit in more than one category, we aimed for a restrictive coding scheme in which, where possible, a single factor was assigned to the most pertinent category to allow for meaningful differentiation. However, we also defined cases in which factors could receive more than one classification if their reduction to only one would constitute an undue misrepresentation of the construct. For instance, entrapment was defined as having both a cognitive (O'Connor and Nock (2014) list it as such) and an affective component (a category not included in O'Connor and Nock (2014)): while the perceived inability to escape from unbearable circumstances and/or inner turmoil can be understood as a cognitive evaluation, it is a distressing subjective experience at the same time; commonly measured using items such as "I feel trapped inside myself" and referred to as "feelings of entrapment" by leading experts (De Beurs et al., 2019). The same was true for fear of cancer recurrence, with e.g., Simard, Savard, and Ivers (2010) defining it as multidimensional because the emotional reaction is contingent on interpretations of/cognitions relating to both internal and external stimuli. As before, in cases of uncertainty, decisions were resolved through discussion.

3. Results

The process of study search and selection is visualized as a flowchart in Fig. 1. The initial search resulted in 11,159 records through database and register searching (PubMed/MEDLINE: $n = 2689$; CINAHL: $n = 1287$; PsycInfo: $n = 2308$, Web of Science Core Collection: $n = 4608$, Cochrane Library = 267). We removed duplicate records following the steps outlined by Bramer et al. (2016). Steps 1 and 2 were conducted automatically using Endnote version 20.4. For the next steps, one author manually checked for duplicate records. After the removal of duplicate records ($n = 3382$), and records not matching inclusion criteria or

fulfilling exclusion criteria, respectively, in the title and abstract screening ($n = 6974$), the full texts of 803 remaining records were assessed for eligibility.

We coded the following exclusion criteria: 1) The publication did not include/report about individuals with cancer; 2) The publication did not include STBs/report about STBs specifically; 3) The publication's format was not eligible (e.g., it did not report original data; 4) The publication did not test at least one risk/protective factor (as a modifier of the association of cancer with STBs, or within a cancer sample). Multiple criteria could apply to the same record. The results of the full-text screening (listing all assessed records and, if applicable, reasons for exclusion) are provided as part of the study materials (OSF, "report_fulltext_screening.csv"). In summary, 486 records were excluded at this stage. Seventeen fulfilled the first exclusion criterion; 215 fulfilled the second exclusion criterion; 72 fulfilled the third exclusion criterion; and 308 fulfilled the fourth exclusion criterion. As a result of the grey literature search, an additional 172 records were screened. Of those, 12 full-texts were assessed for eligibility which led to the inclusion of 2 more studies. Thus, 319 papers were eligible for inclusion in the systematic review.

All 319 studies and the extracted risk/protective factors as well as their coding into psychological and other factors is provided via the OSF ("data_extraction_coded.csv"). Of the 319 studies, 163 (51.1%) had empirically tested psychological factors. Another 20 (6.3%) studies had included psychological factors, but not tested them in association with STBs. In the following sections, we describe the characteristics and contents of the 163 studies that empirically tested psychological factors. Table 1 presents a summary. (The full-size table with all extracted information is provided via the OSF: "data_extraction_full.csv"). Taken together, they included >3,561,741 participants from six continents. Most were based on samples from Asia ($n = 60$), followed by North America ($n = 53$), Europe ($n = 43$), Australia and Oceania ($n = 10$), Africa ($n = 4$), and South America ($n = 2$) (some studies included

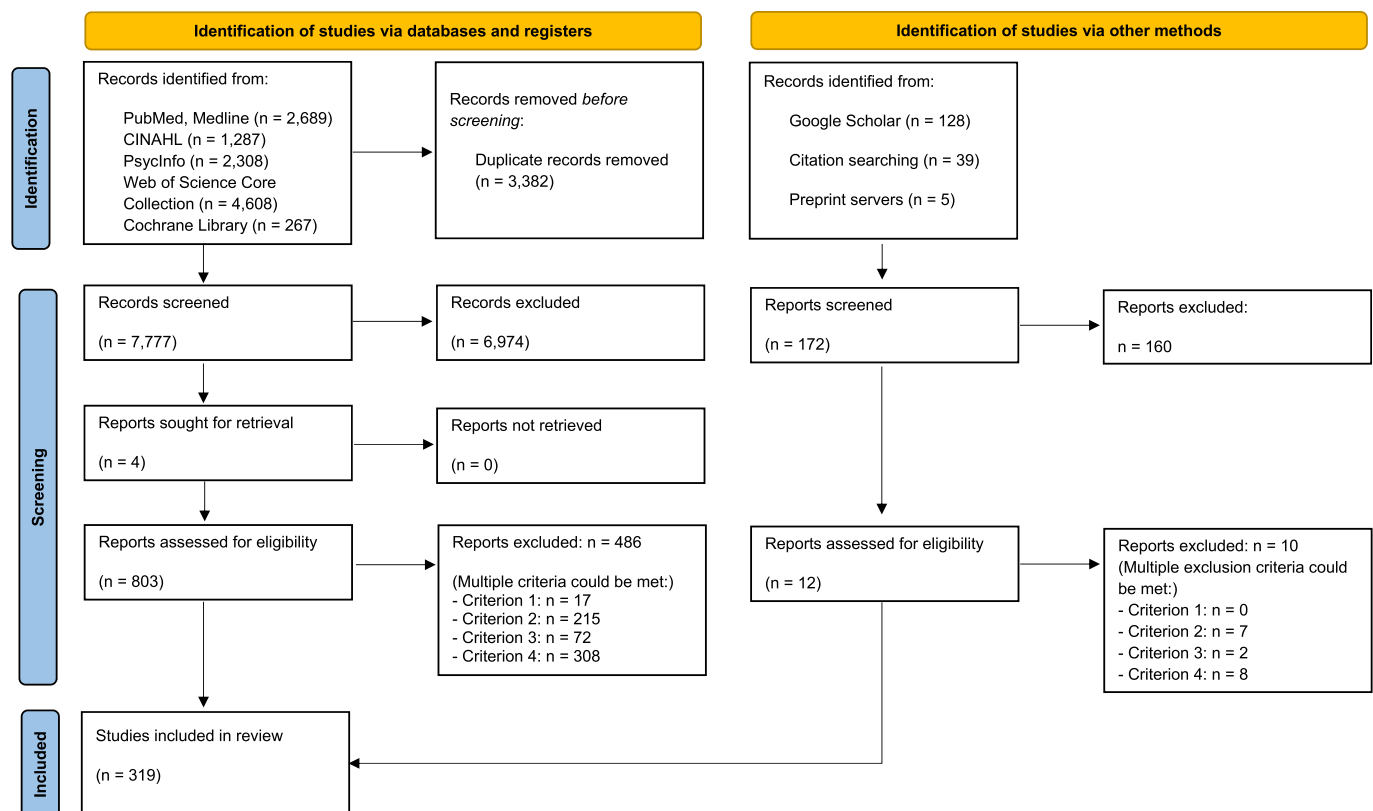


Fig. 1. PRISMA flowchart.

Table 1

Overview of the 163 studies that tested psychological risk/protective factors associated with suicidal thoughts and behaviours.

Authors, Year	Country / region	Sample size (N)	Main disease entities / sites	Suicidal thought / behaviour	Personality and individual differences	Cognitive factors	Social factors	Negative life events	Affective factors
Abdel-Rahman (2020)	USA	3034	Not reported	Suicidal ideation					x
Abdel-Rahman et al. (2020)	Canada	867	Not reported	Suicidal ideation			x		x
Aboumradi et al. (2021)	USA	214,649	Prostate	Suicide deaths					x
Akechi et al. (2000)	Japan	114	Lung, breast, head and neck	Suicidal ideation					x
Akechi et al. (2001)	Japan	220	Lung, breast, head and neck	Suicidal ideation					x
Akechi et al. (2004)	Japan	140	Lung, colon, other	Suicidal ideation	x	x	x		x
Akechi et al. (2010)	Japan	5431	Lung, head and neck, esophagus, breast, stomach	Suicidal ideation					x
Akechi et al. (2020)	Japan	79	Multiple myeloma	Suicidal ideation					x
Akechi et al. (2002)	Japan	1713	Lung, head and neck, colon	Suicidal ideation					x
Akechi, Okamura, et al. (2002)	Japan	89	Lung	Suicidal ideation			x		x
Andersen et al. (2020)	USA	186	Lung	Suicidal ideation					x
Bagur et al. (2015)	France	130	Lung, colon, gastric, pancreas, other	Suicidal ideation					x
Balci Sengul et al. (2014)	Turkey	102	Breast, lung, head and neck, gynecological, stomach, colorectal, other	Suicidal ideation; suicide attempts			x		x
Bobevski et al. (2022)	Germany	1463	Breast, prostate, lung	Suicidal ideation	x	x			x
Breitbart et al. (2000)	USA	92	Not reported	Death wishes	x	x	x		x
Brinkman et al. (2013)	USA	319	Brain	Suicidal ideation		x			x
Brinkman et al. (2014)	USA	9128	Leukemia, CNS, Hodgkin's disease, Non-Hodgkin lymphoma, neuroblastoma, soft tissue sarcoma, osteosarcoma	Suicidal ideation					x
Chae et al. (2019)	South Korea	320	Breast	Suicidal ideation			x		x
Chang et al. (2019)	Taiwan	286	Head and neck	Suicidal ideation					x
Chang, Huang, et al. (2022)	Taiwan	155	Mouth, lips, other	Suicidal ideation	x	x			x
Chang, Huang et al. (2022)	Taiwan	121	Breast	Suicidal ideation		x			x
Chang and Lai (2022)	UK	459,542	All sites	Suicide deaths; Self-harm		x			x
Chen et al. (2023)	China	213	Ovarian	Suicidal ideation					x
Cheng et al. (2014)	China	41	Not reported	Suicidal ideation		x			x
Cheung et al. (2017)	New Zealand	23	Colorectal, lung, bladder, prostate, pancreas, liver, skin, other	Suicide deaths			x		x
Chiang et al. (2022)	Taiwan	260	Gastric, esophagus, breast, lymphoma, lung, gynecologic, colon, pancreatic, head and neck, leukemia, hepatoma, bladder, other	Suicidal ideation					x
Chochinov et al. (1998)	Canada	196	Lung, gastrointestinal, genitourinary, breast	Suicidal ideation	x	x			x
Choi et al. (2014)	South Korea	378	Stomach	Suicidal ideation			x		x
Choi et al. (2020)	South Korea	36,220	Bladder, breast, CNS, colorectal, cervical, Hodgkin's and non-Hodgkin lymphoma, head and neck, kidney, urinary, liver, leukemia, lung, mesothelioma, melanoma, multiple myeloma, esophageal, ovary, pancreas, prostate, sarcoma, stomach, testicular, uterine, other	Suicide deaths					x

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Table 1 (continued)

Authors, Year	Country / region	Sample size (N)	Main disease entities / sites	Suicidal thought / behaviour	Personality and individual differences	Cognitive factors	Social factors	Negative life events	Affective factors
Choi and Park (2020)	South Korea	64,570	Not reported	Suicide deaths					x
Choi and Park (2021)	South Korea	39,027	Not reported	Suicide deaths					x
Choudhury and Shahsavari (2023)	USA	202	Gastrointestinal	Suicidal ideation			x		x
Ciaramella and Poli (2001)	Italy	100	Gastrointestinal, genito-urinary	Suicidal ideation					x
Costantini et al. (2014)	Italy	136	Gastrointestinal, breast, lung, other	Suicidal ideation	x	x			x
Diaz-Frutos et al. (2016)	Spain	202	Lung, colon-rectum, male and female genito-urinary	Suicidal ideation					x
Diaz-Frutos et al. (2016)	Spain	202	Lung, colon-rectum, male and female genito-urinary	Suicidal ideation	x	x	x	x	x
Du et al. (2022)	China	390	Not reported	Suicidal ideation	x	x	x		x
Dwyer et al. (2019)	Australia	118	Not reported	Suicide deaths		x	x		x
Ernst et al. (2020)	Germany	916	Leukemia, CNS, lymphoma, sarcoma, other	Suicidal ideation		x	x		x
Ernst et al. (2021)	Germany	633	Leukemia, CNS, lymphoma, sarcoma, other	Suicidal ideation		x	x		x
Ernst et al. (2021)	Germany	144	Not reported	Suicidal ideation		x	x		x
Fadoir et al. (2021)	USA	133	Not reported	Suicidal ideation	x	x	x	x	x
Fall et al. (2009)	Sweden	168,584	Prostate	Suicide deaths					x
Fang et al. (2012)	Sweden	534,154	Prostate, breast, colorectal, melanoma or other skin cancer, lymphatic or hematopoietic, lung, CNS, esophagus, liver, pancreas, other	Suicide deaths					x
Fang et al. (2014)	China	200	Lung, leukemia, lymphoma	Suicidal ideation		x			x
Fekih-Romdhane et al. (2022)	Tunisia	52	Breast	Suicidality		x	x		x
Friberg et al. (2023)	Denmark	37,527	Prostate	Suicide deaths					x
Gascon et al. (2021)	Canada	14,517	Breast, CNS, colorectal, esophagus, liver, pancreas, head and neck, lung, lymphatic, hematologic, melanoma/skin, prostate, other	Suicide deaths			x		x
Hagezom et al. (2021)	Ethiopia	410	Lung, colorectal, breast, cervical, prostate, blood, lymphoma, stomach	Suicidal ideation		x	x		x
Hatano et al. (2021)	Japan	971	Gastrointestinal, liver, pancreas, lung, other	Death wishes		x	x		x
Henriksson et al. (1995)	Finland	60	Not reported	Suicide deaths					x
Henry et al. (2018)	Canada	223	Head and neck	Suicidal ideation; suicide attempts; suicide deaths	x	x	x	x	x
Hickmann et al. (2016)	Switzerland; Germany	83	Brain, intra- and extraaxial tumors	Suicidal ideation			x		x
Hoodin et al. (2013)	USA	101	Leukemia, non-Hodgkin lymphoma, multiple myeloma, other	Suicidal ideation					x
Authors, Year	Country / region	Sample size (N)	Main disease entities / sites	Suicidal thought / behaviour	Personality and individual differences	Cognitive factors	Social factors	Negative life events	Affective factors
Huang et al. (2019)	USA	2811	Leukemia, Hodgkin lymphoma, non-Hodgkin lymphoma, CNS, sarcoma, neuroblastoma, retinoblastoma, other	Suicidal ideation					x
Hultcrantz et al. (2015)	Sweden	47,220	Hematological malignancies	Suicide deaths;					x

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Table 1 (continued)

Authors, Year	Country / region	Sample size (N)	Main disease entities / sites	Suicidal thought / behaviour	Personality and individual differences	Cognitive factors	Social factors	Negative life events	Affective factors
Hyer et al. (2021)	Australia	211,092	Colon, rectum, lung, pancreas, esophagus	suicide attempts Suicidal ideation					x
Jacobsen et al. (2010)	USA	123	Not reported	Death wishes					x
Johnson et al. (2020)	USA	175	Breast, head and neck, lymphoma, lung, prostate, other	Suicidal ideation					x
Jones et al. (2003)	Canada	224	Leukemia, gynecological, head and neck	Death wishes	x	x			x
Joshi et al. (2017)	Japan	1131	Gastric, colon, liver, lung, thyroid, breast, cervix	Suicidal ideation; suicide attempts					x
Jung and Yun (2022)	South Korea	612	Colon, breast, other	Suicidal ideation	x	x	x		
Kahn et al. (2023)	USA	3330	Head and neck, gastrointestinal, lung, musculoskeletal, melanoma, skin, breast, gynecological, genitourinary, central nervous system, endocrine, lymph/blood	Death by suicide					x
Kazlauskienė et al. (2022)	Lithuania	188	Breast	Suicidal ideation Suicide				x	x
Kelliher-Rabon et al. (2021)	USA	241	Not reported	attempts; suicidal ideation	x	x			x
Kelly et al. (2003)	Australia	252	Not reported	Death wishes		x	x		x
Kim et al. (2013)	South Korea	284	Breast	Suicidal ideation				x	x
Kittel et al. (2023)	USA	120	Breast, genitourinary, gynecological, hematological	Suicidal ideation					x
Klaassen et al. (2019)	Canada	676,470	Prostate, breast, colorectal, melanoma, lung, bladder, endometrial, thyroid, kidney, oral	Suicide deaths			x		x
Ko et al. (2018)	Taiwan	113	Colorectal, digestive, liver, head and neck, breast, gynecological	Suicidal ideation	x	x	x		x
Lai et al. (2022)	China	588	Nasopharyngeal, cholangiocarcinoma, lung, liver, colorectal, lymphoma, ovarian, breast, esophageal, stomach, thymus, pancreatic, cervical, other	Suicidal ideation		x			x
Latha and Bhat (2005)	India	54	Gastrointestinal tract	Suicidal ideation		x			x
Lee et al. (2014)	South Korea	2472	Not reported	Suicidal ideation					x
Lee et al. (2022)	Korea	60	Prostate, bladder, kidney, ureteral renal, other urologic	Suicidal ideation		x			x
Lehluante and Fransson (2014)	Sweden	3165	Prostate	Suicidal ideation			x		x
Leung et al. (2013)	Canada	4775	Breast, head and neck, pancreas, sarcoma, gastrointestinal, genitourinary, gynecological, lung, hematological, melanoma, other	Suicidal ideation		x	x		x
Li et al. (2021)	China	566	Breast	Suicidal ideation					x
Lin et al. (2009)	Taiwan	311	All diagnoses	Suicide deaths					x
Liu et al. (2020)	China	244	Breast, lung, nasopharynx, gastrointestinal, gynecological, hematological, other	Suicidal ideation	x	x			x
Liu et al. (2023)	China	200	Ovarian	Suicidal ideation	x	x	x		x
Lowery et al. (2013)	USA	100	Colorectal	Suicidal ideation					x
Lu et al. (2013)	Sweden	12,669	Testis, melanoma, brain, Hodgkin's disease, cervix, thyroid, colon and rectum, breast, ovary	Suicide deaths; Suicide attempts					x
Luo et al. (2022)	China	820	Lung, colorectal, stomach, esophageal, liver, nasopharyngeal, bile duct, lymphoma, thymus, ovarian, pancreatic, breast, cervical, other	Suicidal ideation		x			x

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Table 1 (continued)

Authors, Year	Country / region	Sample size (N)	Main disease entities / sites	Suicidal thought / behaviour	Personality and individual differences	Cognitive factors	Social factors	Negative life events	Affective factors
Lubas et al. (2020)	USA	7312	Leukemia, Hodgkin lymphoma, non-Hodgkin lymphoma, CNS, other	Suicidal ideation; suicide attempts; suicide deaths					x
Ma et al. (2022)	China	5670	Nasopharyngeal, digestive, lung, nervous system, soft tissue sarcoma, bone, breast, skin, lymphohematopoietic, head and neck, genital, unknown	Suicidal ideation, Suicide attempts		x	x		x
Madeira et al. (2011)	Portugal	130	Breast, digestive, ear, nose, throat, other	Suicidal ideation; Death wishes	x	x	x		x
Maneeton et al. (2012)	Thailand	108	Gynecological, gastrointestinal, head and neck, other	Suicidality			x		x
Massetti et al. (2018)	USA	4182	Not reported	Suicide deaths			x		x
McClain et al. (2003)	USA	160	Lung, colon, breast, pancreas	Death wishes; suicidal ideation	x		x		x
McClain-Jacobson et al. (2004)	USA	276	Not reported	Death wishes; suicidal ideation	x	x			
Men et al. (2022)	China	152,061	Lung, other	Self-harm					x
Men et al. (2021)	China	1461	Not reported	Suicide deaths			x		x
Men et al. (2021)	China	383	Lung, colorectal, head and neck, liver	Suicide deaths					x
Mitchell et al. (2017)	Australia	486,269	Lung, genital, prostate	Self-harm					x
Mohammadi et al. (2014)	Sweden	46,309	Lymphoma, myeloma, leukemia, other	Suicide deaths; Suicide attempts					x
Molla et al. (2022)	Ethiopia	416	Breast, genitourinary, gastrointestinal, gynecological, hematological, head and neck, lung, pancreatic, sarcoma, liver, skin	Suicidal ideation, Suicide attempts					x
Moreno-Montoya et al. (2017)	Colombia	132	Not reported	Suicidality	x	x			x
Munson et al. (2020)	USA	174	Prostate, head and neck, lymphoma, leukemia, lung, breast	Suicidal ideation; suicide attempts; suicide deaths			x		x
Mystakidou et al. (2006)	Greece	106	Breast, gastrointestinal, lung, urogenital	Death wishes					x
Mystakidou et al. (2005)	Greece	120	Lung, breast, gastrointestinal, urogenital, melanoma, other	Death wishes					x
Mystakidou et al. (2005)	Greece	120	Lung, breast, gastrointestinal, urogenital, melanoma, other	Death wishes					x
Nanni et al. (2018)	Italy	195	Breast, gastrointestinal, genitourinary, respiratory, other	Suicidal ideation	x	x	x		x
Nigussie et al. (2023)	Ethiopia	358	Breast, genitourinary, gastrointestinal, gynecological, hematological, head and neck, lung, pancreatic, skin, sarcoma, liver	Suicidal ideation, Suicide attempts			x		x
Nikendei et al. (2018)	Germany	1758	Digestive organs, breast and female genital organs, skin, other	Suicidal ideation					x
Nissim et al. (2010)	Canada	406	Lung, gastrointestinal	Death wishes		x			
Nugent et al. (2021)	USA	72	Head and neck	Self-harm			x		x
O'Mahony et al. (2005)	USA	116	Not reported	Death wishes	x		x		x
Ozdemiroglu et al. (2017)	Turkey	117	Gastrointestinal, lung, liver, gynecological, hematological, breast	Suicidal ideation	x	x			x
Papini et al. (2023)	North America	9664	Leukemia, lymphoma, CNS, kidney, neuroblastoma, bone, soft tissue sarcoma	Suicidal ideation		x	x		x
Park et al. (2016)	South Korea	457	Colon, breast, cervical, lung	Suicidality					x

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Table 1 (continued)

Authors, Year	Country / region	Sample size (N)	Main disease entities / sites	Suicidal thought / behaviour	Personality and individual differences	Cognitive factors	Social factors	Negative life events	Affective factors
Perry et al. (2018)	USA	212	Prostate	Suicidal ideation	x				x
Pranckeviciene et al. (2016)	Lithuania	211	Brain	Suicidal ideation			x		x
Pukkila et al. (2000)	Finland	33	Not reported	Suicide deaths					x
Raghubar et al. (2022)	USA	175	Acute lymphoblastic leukemia	Suicidal ideation					x
Recklitis et al. (2006)	USA	226	Lymphomas, leukemias, sarcomas, nephroblastoma, other	Suicidality	x	x			x
Recklitis et al. (2010)	USA	9126	Leukemia, Hodgkin's disease, CNS, bone, soft tissue sarcoma, non-Hodgkin's lymphoma, nephroblastoma, neuroblastoma	Suicidal ideation					x
Recklitis et al. (2014)	USA	693	Prostate	Suicidal ideation					x
Rice et al. (2020)	Canada, Australia	100	Prostate	Suicidal ideation		x			x
Rice et al. (2021)	Canada	105	Prostate	Suicidal ideation		x	x		x
Rodin et al. (2007)	Canada	326	Not reported	Death wishes	x	x	x		x
Rodin et al. (2009)	Canada	406	Gastrointestinal, lung cancer	Death wishes	x	x	x		x
Rosenfeld et al. (2014)	USA	128	Lung, gastro-intestinal, breast, other	Death wishes	x	x	x		x
Ruiz-Marin et al. (2021)	Spain	130	Breast, colon, lung, other	Suicidal ideation			x		
Sauer et al. (2022)	Germany	4372	Breast, colorectal, skin, pancreas, gastrointestinal, genitalia, digestive organs, urinary, lip, oral cavity, pharynx, hematological and lymphatic, respiratory, bone and soft tissue, other	Suicidal ideation					x
Schneider and Shenassa (2008)	USA	980	Not reported	Suicidal ideation			x		x
Senf et al. (2022)	Germany	226	Breast, prostate, testicular, colon, rectum, stomach, esophagus, pancreatic, urological, lung, gynecological, hematological, other	Suicidal ideation			x		x
Shaheen Al Ahwal et al. (2016)	Saudi-Arabia	70	Colorectal	Suicidal ideation	x				
Sharkey et al. (2022)	USA	166	Brain, leukemia, other	Suicidal ideation		x			
Shim and Hahm (2011)	South Korea	121	Stomach, colorectal, other	Death wishes	x	x	x		x
Shim and Park (2012)	South Korea	400	Stomach, liver, lung, colorectal, breast, cervix, other	Suicidality			x		x
Sonmez et al. (2020)	Cyprus	80	Breast, gastrointestinal, head and neck, genital, brain, hematologic, lung	Suicidality					x
Spencer et al. (2012)	USA	700	Gastrointestinal, breast thorax, other	Suicidal ideation	x	x			x
Stanbouly et al. (2023)	USA	29,231	Head and neck	Suicidal ideation					x
Sun et al. (2011)	USA	1065	Leukemia, Hodgkin lymphoma, non-Hodgkin lymphoma, multiple myeloma, other	Suicidal ideation					x
Sun et al. (2018)	Taiwan	96,470	Colorectal	Suicide deaths			x		x
Sun et al. (2020)	Taiwan	66,931	Head and neck	Suicide attempts					x
Suppli et al. (2017)	Denmark	45,325	Breast	Suicide deaths					x
Tang et al. (2016)	China	579	Cervical, ovarian, endometrial	Suicidal ideation	x	x	x		x
Tang et al. (2020)	China	1045	Lung, gastrointestinal, breast cancer, other	Suicidal ideation					x
Tanriverdi et al. (2014)	Turkey	105	Breast, other	Suicidal ideation; subjective risk			x		x
Thapa et al. (2023)	Nepal	162	Lung, digestive, breast, gynecologic, head and neck, hematologic, genitourinary, bone and soft tissue sarcoma	Suicidal ideation					x

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Table 1 (continued)

Authors, Year	Country / region	Sample size (N)	Main disease entities / sites	Suicidal thought / behaviour	Personality and individual differences	Cognitive factors	Social factors	Negative life events	Affective factors
Trevino et al. (2014)	USA	93	Breast, lung, pancreas, colon, brain, stomach, esophagus, bone, soft tissue, leukemia, lymphoma, other	Suicidal ideation			x		x
Trevino et al. (2014)	USA	603	Breast, lung, gastrointestinal, other	Suicidal ideation	x	x	x		x
Tripp et al. (2020)	Canada	406	Prostate	Suicidality		x	x		x
Uchitomi et al. (2002)	Japan	24	Digestive tract, respiratory tract, head and neck, gynecological, breast	Suicidal ideation					x
Valikhani et al. (2018)	Iran	74	Breast, gastrointestinal, genital, other	Suicidal ideation	x		x		
Vehling et al. (2017)	Germany	430	Breast, prostate, hematological, gastrointestinal, gynecological, lung, other	Suicidal ideation		x			x
Vehling et al. (2021)	Germany	2141	Breast, prostate, colorectal, lung, gynecological, hematologic, stomach/esphagus, kidney/urinary tract, head and neck, bladder, pancreas, melanoma	Suicidal ideation; suicide attempts					x
Villavicencio-Chavez et al. (2014)	Spain	101	Lung, colon, gastric, pancreas, other	Death wishes					x
Walker et al. (2008)	UK	2924	Colorectal, gynecologic, genitourinary, sarcoma, melanoma, breast, other	Suicidal ideation					x
Walker et al. (2022)	UK	2217	Breast, colorectal, gynecological, lung, prostate	Suicidal ideation					x
Webb et al. (2012)	England	591	Not reported	Suicide deaths					x
Wilson et al. (2005)	Canada	69	Not reported	Death wishes; suicidal ideation		x	x		x
Wilson et al. (2016)	Canada	377	Not reported	Death wishes	x	x	x		x
Xu et al. (2019)	China	303	Head and neck, chest, abdomen, breast, genital, other	Suicidal ideation		x			x
Xu et al. (2020)	China	544	Digestive tract, lung, breast, gynecologic, head and neck, leukemia, lymphoma, other	Suicidal ideation		x			x
Zendron et al. (2018)	Brazil	250	Prostate	Suicidality			x		x
Zhang et al. (2017)	China	151	Stomach	Suicidal ideation	x	x			x
Zhang et al. (2020)	China	603	Breast, lung, colorectal, nasopharynx	Suicidal ideation		x	x	x	x
Zhang et al. (2023)	China	505	Ovarian	Suicidal ideation		x			x
Zhong et al. (2017)	China	517	Lung, digestive tract, breast	Suicidal ideation	x		x		x
Zhou et al. (2015)	USA	656	Prostate	Suicidal ideation; suicide attempts			x		x
Zhou et al. (2020)	China	357	Abdomen, head and neck, gynecological, thyroid, bone and soft tissue, other	Suicidal ideation		x	x		x

Note. If studies included multiple samples, the sample size, age, and gender proportions noted here refer to the subsample affected by cancer.

samples from multiple continents). Across all studies that reported gender proportions of participants, 52% were women. In most studies, participants' mean age was in the fifties or sixties. Eleven studies were prospective, longitudinal investigations. Not all studies specified the disease stage, but most which did so reported investigating mixed samples (including people at different stages of the disease as well as in remission). When studies focused on a specific phase, it was most often advanced cancer, terminal illness or palliative care. We observed a broad range of study settings, with information about suicide deaths usually coming from large-scale registry studies, whereas suicidal ideation was often assessed in hospitals. Only very few reports came from community-based assessments. Further, the overwhelming majority of investigations focused on cancer patients rather than (long-term) survivors. Not all original investigations reported participants'

main diagnoses, but studies mostly investigated mixed samples, with only a few focusing on specific entities, e.g., prostate cancer.

A range of STBs were studied as outcomes, primarily suicidal thoughts: Suicidal ideation was the most common STB ($n = 107$). Most studies did not explicitly differentiate between active and passive suicidal ideation. The PHQ-9 (Löwe, Kroenke, Herzog, & Gräfe, 2004) was a common method of assessment (used in 24 studies) of suicidal ideation via the following single item: "Thoughts that you would be better off dead, or thoughts of hurting yourself in some way", thereby targeting passive death wishes (as well as thoughts of self-harm). In addition, a smaller number of studies, especially comparatively older ones, explicitly referred to and assessed death wishes ($n = 20$). Four studies tested associations with participants' subjective risk of suicide. Suicide deaths ($n = 26$) were studied more often than attempts ($n = 14$). Four studies

investigated self-harm (not differentiating/asking about intent). Twelve studies used a composite variable that combined suicidal thoughts and behaviours under the term “suicidality”.

Comparing the five categories, most studies focused on affective factors. They were empirically investigated in 155 (95.1%) of the 163 original studies, followed by social (65 studies, 39.9%) and cognitive factors (63 studies, 38.7%), with personality and individual differences (37 studies, 22.7%) and negative life events (6 studies, 3.7%) receiving less attention.

The overwhelming majority of studies that looked at affective factors tested different kinds of distress as risk factors for STBs. More broadly defined, subjective distress as a patient-reported outcome was often operationalized using the established distress thermometer (e.g., Chiang, Couper, Chen, Lin, & Wu, 2022; Fang et al., 2014). Further, studies tested associations with internalizing symptoms, especially anxiety and depression (e.g., Abdel-Rahman, Salas, Watanabe, & Li, 2020; Hagezom, Amare, Hibde, & Demeke, 2021; Sun, Lin, Shen, & Kao, 2020), pain and other Quality of Life (QoL) deficits (e.g., Maneeton, Maneeton, & Mahathep, 2012; Recklitis, Zhou, Zwemer, Hu, & Kantoff, 2014). A directly illness-related type of distress was captured in the form of fear of cancer recurrence (Zhang et al., 2020). The occurrence of STBs was also related to diagnoses of specific mental disorders/history of these disorders (e.g., Chang & Lai, 2022; Fang et al., 2012; Mohammadi et al., 2014), including drug and alcohol use disorders (e.g., Sun et al., 2020), especially in the context of registry-based studies that retrospectively analysed deceased individuals' medical and mental health records. Consideration of other affective states (e.g., in terms of negative or positive affect) was scarce, apart from a recent study that tested associations with anger (Rice et al., 2021).

Cognitive factors included different individual abilities including self-control (Valikhani, Sarafraz, & Moghimi, 2018) and coping (Tang et al., 2016), and also appraisals and subjective evaluations, such as treatment expectations (Nissim, Gagliese, & Rodin, 2009), confidence in the treatment (Zhou et al., 2020), and perceived control (Jung & Yun, 2022). Future-directed appraisals were only tested in the form of negative operationalizations such as hopelessness (e.g., Breitbart et al., 2000; Chochinov, Wilson, Enns, & Lander, 1998), and fear of cancer recurrence (already mentioned above for its affective component) (Zhang et al., 2020). Only a few studies investigated coping styles (Rice et al., 2020; Rodin et al., 2009) or self-related assessments such as self-efficacy (Spencer, Ray, Pirl, & Prigerson, 2012) as protective factors. Among the cognitive factors directly derived from current theories, entrapment (Bobevski et al., 2022; Zhang et al., 2023) and fearlessness about death (Fadoir et al., 2021) stood out as the ones without an interpersonal orientation (as opposed to perceived burdensomeness and thwarted belongingness), but they were only rarely investigated.

Loneliness (Du et al., 2022; Ernst et al., 2020; Rice et al., 2021) and related constructs such as thwarted belongingness were commonly investigated social factors. The latter was mostly assessed jointly with perceived burdensomeness (Fadoir et al., 2021; Tripp et al., 2020) using the Interpersonal Needs Questionnaire (Van Orden, Cukrowicz, Witte, & Joiner Jr, 2012). A social factor investigated as a protective influence was current emotional and tangible social support (Akechi et al., 2004; Chae et al., 2019; Fekih-Romdhane, Saadallah, Mbarek, Bouzaïene, & Cheour, 2022; Nigussie et al., 2023). Less often, studies tested relationship satisfaction and family cohesion (Fekih-Romdhane et al., 2022; Zhou et al., 2020), attachment (security) (Rodin et al., 2007; Valikhani et al., 2018), and exposure to suicide (Zendron, Zequi, Guimaraes, & Lourenco, 2018; Zhong et al., 2017). There were also investigations of contacts with health professionals/utilization of healthcare services (Abdel-Rahman et al., 2020; Spencer et al., 2012), the patient-doctor relationship (Trevino et al., 2014) or shared decision-making (Hatano et al., 2021). Under the umbrella of personality and individual differences, several studies investigated the Big Five facets openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (not always including all of them) (Henry et al., 2018;

Perry, Hoerger, Silberstein, Sartor, & Duberstein, 2018). Negative life events subsumed adverse childhood experiences (Henry et al., 2018; Zhang et al., 2020) and traumatic events over the lifespan (Kazlauskienė, Navickas, Lesinskiene, & Bulotiene, 2022).

More generally, we found that studies heavily focused on hypothesized psychological risk factors rather than protective factors, with only 37 studies (22.7%) investigating the latter (and mostly comprising social support).

The detailed ratings for every domain of bias for the 163 studies that tested psychological risk/protective factors are provided via the OSF, both as a table (“detailed_risk_of_bias.csv”) and as a traffic light plot (“rob_traffic_light_plot.pdf”). They are also summarized in Fig. 2. Most studies ($N = 107$, 65.6%) had a serious overall RoB, i.e., at least one domain was rated as “serious”. Regarding the single domains, bias due to selection of participants was most often rated as serious ($N = 86$, 52.8%). This RoB applied if participants were selected in a specific way that may lead to a biased association between risk/protective factors and STBs (e.g., if a sample was collected and the data to be analysed with respect to the research question was selected based on individuals' responses to screening questions indicating distress). This was followed by bias in the measurement of outcomes ($N = 30$, 18.4%), e.g., if STBs were assessed with non-validated/self-constructed item sets, and bias due to confounding ($N = 15$, 9.2%). An example of confounding in the present context would be if a study included only individuals with terminal cancer and the studied risk factor was hope/hopelessness (Rosenfeld et al., 2014).

4. Discussion

Against the background that cancer has been consistently associated with the full range of STBs, this study aimed to synthesize the extant research literature to answer the question of how well psychological risk and protective factors for STBs are represented in quantitative research in the oncological context. We found that in the past seven decades, there has been considerable research activity concerning suicide (prevention) in cancer patients and survivors. Roughly half of the eligible studies had investigated psychological factors – ranging from individual differences to negative life events – based on a combined sample of over three and a half million participants spanning diverse diagnoses and disease stages and addressing different STBs.

However, given that STBs constitute a manifestation of a psychological crisis, it is important that psychological factors are routinely addressed. Further, the original studies indicate several research gaps as well as key findings.

First, concerning the examined factors, affective variables were most common, especially in the form of different types of distress associated with a higher risk of STBs. This is perhaps unsurprising and echoes earlier reports (transcending the oncological context) of high prevalence rates of psychiatric diagnoses among those who die by suicide (Favril et al., 2023). However, as O'Connor and Nock (2014) note, the overwhelming majority of individuals with mental disorders do not become suicidal. As such, the strong focus on these types of factors is of limited benefit to identifying those at risk for suicidal thoughts or behaviour, especially as most of the tested affective factors were not derived from theories of suicide. Notable exceptions were psychache (Tripp et al., 2020) a specific conceptualization of psychological pain central to the Cubic Model of Suicide by Shneidman (1993), and entrapment, which the IMV Model posits to be the state from which suicidal thoughts first arise (O'Connor & Kirtley, 2018).

Hopelessness was another relevant factor (categorized as both affective and cognitive), driving the exacerbation of suicidal crises according to the IPTS (Van Orden et al., 2010); however, it was mostly not described or interpreted within this context. Perceived burdensomeness and thwarted belongingness, central constructs of the IPTS, were the theoretically derived concepts best represented in the literature. Their uptake in oncology was previously scrutinized by a scoping review that

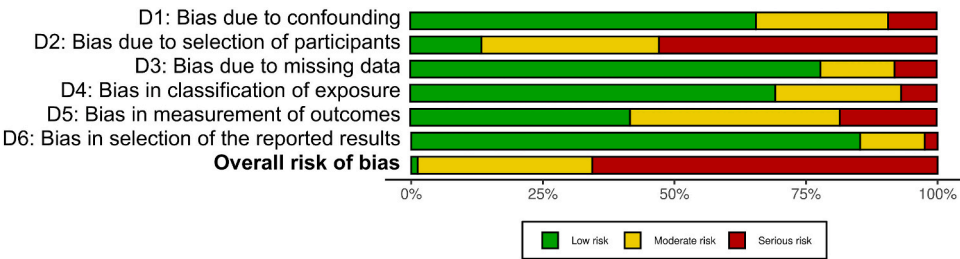


Fig. 2. Summary plot of studies' risk of bias in the different domains and overall risk of bias. The majority of studies had a serious overall risk of bias. This was primarily due to participant selection and measurement of outcomes (here: the assessment of suicidal thoughts and behaviours).

found four studies (Schomberg et al., 2021). While these constructs were often discussed in relation to the IPTS, loneliness (which substantially overlaps with thwarted belongingness) and perceived burdensomeness were also investigated separately and without being integrated into any sort of theory, especially in older studies (e.g., Breitbart et al., 2000). By comparison, research paid the least attention to personality and individual differences and negative life events. Among the latter, studies addressed childhood adversity which has previously been shown to be a specific risk factor for self-harm, mediated through acquired capability for suicide (Sachs-Ericsson, Rushing, Stanley, & Sheffler, 2016). However, the respective studies made no mention of the concept of acquired capability, and they did not model any behavioural actions (self-harm, suicide attempts or deaths) as an outcome, focusing on suicidal ideation only (Henry et al., 2018; Zhang et al., 2020). Along the same lines, the studies testing associations with exposure to suicide made no mention of it as a volitional moderator, that is, a specific risk factor within the IMV model that is important in the transition from suicidal thoughts to suicidal acts. Finally, there was a study highlighting past attempts among veterans, however, it did not explore self-harm or suicidal behaviour as a dependent variable either (but instead investigated suicidal ideation) (Johnson, Phillips, & Miller, 2020).

Taken together, the findings underscore that each one of the five categories of psychological factors contributes to the understanding of cancer patients' susceptibility to suicidal crises, but that there is, so far, little implementation of the most influential theoretical models from suicide research into oncology. They further highlight that diverse psychological factors previously shown to be relevant among other clinical and population samples also shape the risk of STBs in individuals with cancer. This is, of course, not surprising as cancer and its treatment

are life events that do not occur within a vacuum, but affect individuals who are subject to the same societal influences as others, and who do not differ fundamentally from others *without* cancer in all of their defining characteristics (e.g., in terms of personality). Thus, those variables are not causally linked to the illness or its treatment, but they come into play in this 'cancer' situation and alter their suicidogenic effects. However, there is a dearth of research investigating suicide risk in individuals with cancer through this lens while drawing on the substantial body of psychological research that has identified and theoretically integrated such factors.

Second, at the same time, there are psychological factors that may specifically be *brought about* by the experience of the illness and its treatment that confer an elevated risk for different kinds of STBs, some of which have also previously been included in relevant psychological models. By way of example, hopelessness or feeling trapped could be specifically induced by disease-related factors such as a poor prognosis. This illustrates that in contrast to a moderator, a mediator is not just some kind of background factor that contributes to a cancer patient's risk alongside or in interaction with the illness, but that is particularly relevant *because of* the illness.

We propose to conceive of these two types of variables as *moderators* and *mediators* of the link between cancer and STBs, respectively (Fig. 3). To do so, we describe their roles within a conceptual model, aligned with the IMV model, to map out the factors associated with the emergence of suicidal ideation and the transition to suicidal behaviour in the context of cancer. In this model, the illness and its treatment must be contextualized as the context has a bearing on the ways in which the disease and treatment - irrespective of their characteristics, such as the type of diagnosis and prognosis - affect the individual. The original IMV model

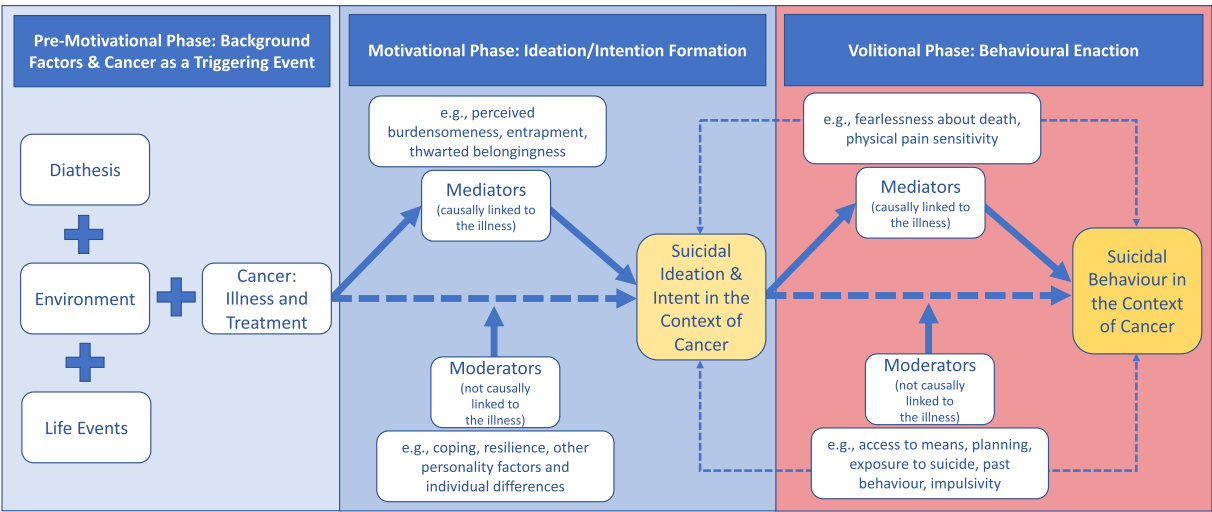


Fig. 3. A conceptual model integrating moderators and mediators of the association of cancer with suicidal thoughts and behaviours into an ideation-to-action framework, based on the Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour.

refers to the diathesis-stress model as “the backdrop” (O'Connor & Kirtley, 2018, p. 2), and it is against this backdrop that the illness and its treatment can become triggering life events. In this sense, the *context* refers to the actual situation the person finds themselves in; and locating the illness within the individual life course. Part of this relates to the previous experiences that confer vulnerability or resilience, from childhood adversities and formative relationship experiences more generally that are internalized and continuously updated and manifest as attachment styles, to more recent stressful/traumatic events. Furthermore, the developmental period itself has implications, not only because a person's age has significance for their overall physical health and fitness, but also for how “normative” cancer is: whether a diagnosis comes as a shock at a young age, or still constitutes a dire life event at an older age, but can then be connected to similar experiences of friends or family, i.e., of available (role) models with lived and living experience of the illness. By contrast, for younger people, cancer (survival) can be particularly hard to communicate and thus be an isolating experience, as e.g., childhood cancer survivors report (Ernst et al., 2021).

The conceptual model adopts the ideation-to-action framework (Klonsky et al., 2018), as it distinguishes the phase in which suicidal ideation and intent develop (the motivational phase) from the transition from suicidal thoughts to behaviours (the volitional phase). In the standard IMV model, the motivational phase is characterized by unbearable subjective experiences (defeat and humiliation) and the perception that there is no escaping them (entrapment), leading to an escalation of the crisis and to the development of suicidal thoughts. In the context of cancer, moderators of this association were consistent with the ones observed in other samples (e.g., coping, and social support). However, other variables found to be relevant could constitute mediators. Above, we mentioned hopelessness, but the disease and its treatment could also directly elevate perceived burdensomeness, both in an emotional sense and in a literal sense if the affected person has (new) functional limitations or other needs for which they have to rely on others. Since being seriously ill is a circumstance of life that cannot be changed at will, it is also understandable that the studies have confirmed entrapment as a relevant factor associated with STBs among people with cancer (Zhang et al., 2023). An individual may feel trapped by their illness. However, it is important to note that the moderators also have a bearing on the mediator paths as well - as the same circumstances of illness and treatment will not have the same implications on, for example, hopelessness for everybody, as people and their processing of the illness are more complex than that (Rodin et al., 2009).

Lastly, the volitional phase is the most critical part of the model with regard to the prevention of suicidal behaviour. Within the IMV model, volitional moderators are the variables that specifically govern the transition from thoughts and plans to behaviour; they comprise the aspects summarized under acquired capability, but also include the access to means and personality variables such as impulsivity. Here, the knowledge base with regard to the oncological context was particularly scarce, first, because fewer studies of psychological factors associated with suicide attempts and deaths were available, secondly, because (death-) registry-based types of studies often included only demographic or diagnostic information (e.g., limited to previous diagnoses), and thirdly, no study specifically differentiated individuals with ideation from those exhibiting behavioural enactment. Nonetheless, there was some evidence for potential moderators (such as drug- and alcohol-use disorders (Sun et al., 2020), which could be implicated in the disinhibition of impulses and foster dangerous, impulsive actions). A recent call which highlighted firearm safety, an important preventive measure for individuals with cancer, thus also addressed another volitional moderator (Williams, Tam, & Adjei Boakye, 2023). With regard to mediators, it is an open question whether repeated experiences of pain and discomfort due to illness and treatment might contribute to the acquired capability for suicide in similar ways that experiences of physical violence do. Therefore, the role of pain (Lubas et al., 2020) deserves more attention. Furthermore, levels of fearlessness about death might

vary as a function of an individual's prognosis and quality of life, i.e., circumstances of the illness could lead someone in physical pain to fear death less than a continuation of their suffering or a worsening of their state. To summarize, while moderators and mediators can both be deemed important within the proposed framework, mediators should perhaps be primarily considered in research and practice because they are intimately linked to the experience of cancer, meaning cancer may specifically amplify them.

Several key directions for future research emerge from this model, the first one of which is the need to understand and characterise suicidal crises as a process within an ideation-to-action framework (which entails clearly distinguishing between thoughts and behaviours as the dependent variable). To capture within-person variability over time, study designs with more than one measurement point are needed. For instance, using an intensive longitudinal design, Kleiman et al. (2017) showed that suicidal ideation and related risk factors (including loneliness) were highly variable. This observation helps to explain why the prediction of STBs still presents a major challenge. In the oncological context, assessment with a high temporal resolution would shed light on vulnerable periods, which is important as cancer entails more than a singular life event, but rather phases (including recovery and survival) that can vary greatly depending on the type of cancer and treatment. Secondly, while most studies investigated a wide range of risk factors, there was usually no consideration of their interplay, i.e., when they were investigated alongside each other, for instance, in regression models, this did not include the modelling of interaction terms, and mediation models were rarer still. However, such models would be more in line with the state-of-the-science in suicide research which is that STBs unfold as the result of a complex interdependence of biopsychosocial factors within a developmental context (Turecki et al., 2019). They would also go further in modelling individually different algorithms of risk and resilience, which would help us to understand potential differential effects of the disease and its treatment in younger and older individuals, different genders, disease entities, etc. By way of example, studies found sex/gender-dependent effects of risk factors such as loneliness and social support on STBs (in individuals not affected by chronic illness) (Ernst, Klein, Beutel, & Brähler, 2021; Richardson, Robb, McManus, & O'Connor, 2022). Thirdly, based on the available evidence, we mostly summarized factors conferring *increases* in risk, as is common for systematic reviews in suicide research. Franklin et al. (2017) reported only 495 effect sizes (14.4% of overall 3428 effect sizes) that pertained to factors coded as protective. We also found that only a few research efforts were (partly) geared towards elucidating potential protective factors and yielded effects with negative signs, i.e., insights into resilience or recovery. Future research should endeavour to address protective as well as risk factors to inform resource-oriented prevention and intervention efforts. A dedicated focus on positive psychological constructs, in particular, would be helpful because the absence of distress does not, in itself, imply well-being. This is important as positive emotions foster mental flexibility, problem-solving and other capacities (see the Broaden-and-Build Theory (Fredrickson, 2013)) which are both relevant for mental health in general and suicide prevention specifically as they map onto motivational moderators within the IMV model (O'Connor & Kirtley, 2018). However, while we broadly refer to some factors as “risky” and others as “protective”, it must be acknowledged that this classification is necessarily reductive, and might also be inaccurate because of their multidimensional embeddedness and interaction between factors (Shahar, Elad-Strenger, & Henrich, 2012). For instance, we understood previous diagnoses of mental disorders as an indication of risk because they signified the presence of serious mental distress (and they showed positive associations with STBs in the reviewed studies). However, there might be more to this variable as it also tells us about contact with the healthcare system. Compare, for example, two individuals with cancer who suffer from major depression, with one of them receiving the diagnosis and access to care, while the other does not - who would then be deemed more at risk?

This reductive approach is one of the limitations of this work, as is the classification of factors into five categories. While they were aligned with the most relevant theories and evidence and thus a helpful organizing framework, this taxonomy was not perfect as some constructs are more nuanced, not clearly protective or risky. There was also a preponderance of cross-sectional study designs, implicating that for many of the factors we extracted, their relationship with STBs remains opaque. Hence, it is not possible to determine whether they fulfil the precedence criterion to be described as a risk factor (instead of a correlate) (Kraemer et al., 1997). The focus on psychological factors further narrowed the scope, so that psychosomatic interdependencies and feedback loops were not represented (involving, for example, inflammatory processes that are implicated in depression (Miller & Raison, 2016)), and the psychological factors were not linked to the heterogeneity evident among the cancer patients/survivors. As part of this, we could not distinguish between the effects of the illness and those of the treatment. However, during the different phases of acute illness and (long-term) survival, they might be of varying significance to the affected person's mental health and well-being. While the original studies were very heterogeneous and included participants with a large range of cancer diagnoses and stages, some populations were underrepresented: STBs were, for the most part, investigated in patient samples rather than long-term survivors, although it is important to emphasize that an elevated risk for STBs persists decades after diagnosis (Barnes et al., 2022; Burghardt et al., 2019). Moreover, further attention to the (long-term) survival phase is also needed, especially in view of ageing populations and the ever-improving diagnosis and treatment options. The review also identified global gaps in our knowledge, with some geographic regions being underrepresented, especially South America and Africa. This is in line with Knipe, Padmanathan, Newton-Howes, Chan, and Kapur (2022)'s observation that low- and middle-income countries account for 80% of suicide deaths, but <15% of the research.

Further, this review provides a narrative and quantitative summary, but it did not pool effect sizes in terms of a meta-analysis. Future research focused on more thematically organized meta-analytic summaries would be helpful to guide clinical practice and to better understand which factors are more or less important (such as a recent research synthesis of the effects of social support (Du et al., 2020)). It also could not include qualitative research, thus neglecting a large body of work giving insight into the subjective experience of living with cancer as well as suicidal crises. However, as the goal of the present work was to summarize the empirically tested factors, thus also acknowledging researchers' decisions as to which variables to include, to investigate and to report on (in the sense of a deductive approach), it could not be aligned with qualitative research processes and reports. Finally, we aimed to summarize the current state of research within a rapidly evolving field. Thus, it may soon require updating. To this end, all processed data and materials are made available so that other researchers can directly build upon them.

Concluding, a large number of empirical studies have identified risk/protective factors for STBs in the context of cancer. Such investigations are located at the interface of disciplines, which gives rise to certain challenges. The present review highlights a need for better integration of psychologically oriented theories and findings into the medical context. This includes the conceptualization of suicidal crises in the context of cancer as a psychological phenomenon deserving of attention and commitment from the perspective of suicide prevention research. The proposed model included moderators and mediators and while they relate to different processes, addressing both of them could reduce STBs in individuals with cancer. In clinical practice, they could inform screening efforts as well as individual case formulations. Orienting future research towards them will advance our knowledge about the specific drivers of cancer patients' suicidal crises.

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Author contributions

Conceptualization: Mareike Ernst, Rory C. O'Connor, Manfred E. Beutel.

Writing - Original Draft: Mareike Ernst, Tamara Schwinn, Judith Hirschmiller.

Writing - Review & Editing: all authors.

Supervision: Rory C. O'Connor, Manfred E. Beutel.

Data curation, formal analysis, methodology, visualization: Mareike Ernst, Tamara Schwinn, Judith Hirschmiller.

All authors have access to the data gathered and analysed in the preparation of the manuscript. All authors have carefully read and approved the final version of the manuscript.

Declaration of competing interest

The authors have no conflicts of interest to declare.

Data availability

All data and materials are made available via the Open Science Framework (please see the links included in the manuscript).

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cpr.2024.102413>.

References

- Abdel-Rahman, O. (2020). Depression and Suicidal Ideation Among Patients With Cancer in the United States: A Population-Based Study. *JCO Oncol Pract*, 16, e601–e609.
- Abdel-Rahman, O., Salas, A. S., Watanabe, S. M., & Li, X. (2020). Burden of depression among Canadian adults with cancer; results from a national survey. *Expert Review of Pharmacoeconomics & Outcomes Research*, 1–6.
- Aboumr, M., Shiner, B., Mucci, L., Neupane, N., Schroeck, F. R., Klaassen, Z., ... Young-Xu, Y. (2021). Posttraumatic stress disorder and suicide among veterans with prostate cancer. *Psychooncology*, 30, 581–590.
- Ahmedani, B. K., Peterson, E. L., Hu, Y., Rossom, R. C., Lynch, F., Lu, C. Y., ... Prabhakar, D. (2017). Major physical health conditions and risk of suicide. *American Journal of Preventive Medicine*, 53, 308–315.
- Akechi, T., Nakano, T., Akizuki, N., Nakanishi, T., Yoshikawa, E., Okamura, H., & Uchitomi, Y. (2002). Clinical factors associated with suicidality in cancer patients. *Jpn J Clin Oncol*, 32, 506–511.
- Akechi, T., Okamura, H., Kugaya, A., Nakano, T., Nakanishi, T., Akizuki, N., ... Uchitomi, Y. (2000). Suicidal ideation in cancer patients with major depression. *Jpn J Clin Oncol*, 30, 221–224.
- Akechi, T., Okamura, H., Nakano, T., Akizuki, N., Okamura, M., Shimizu, K., ... Uchitomi, Y. (2010). Gender differences in factors associated with suicidal ideation in major depression among cancer patients. *Psychooncology*, 19, 384–389.
- Akechi, T., Okamura, H., Nishiwaki, Y., & Uchitomi, Y. (2002). Predictive factors for suicidal ideation in patients with unresectable lung carcinoma. *Cancer*, 95, 1085–1093.
- Akechi, T., Okamura, H., Yamawaki, S., & Uchitomi, Y. (2001). Why do some cancer patients with depression desire an early death and others do not? *Psychosomatics*, 42, 141–145.
- Akechi, T., Okuyama, T., Sugawara, Y., Nakano, T., Shima, Y., & Uchitomi, Y. (2004). Suicidality in terminally ill Japanese patients with cancer. *Cancer*, 100, 183–191.
- Akechi, T., Okuyama, T., Uchida, M., Kubota, Y., Hasegawa, T., Suzuki, N., ... Iida, S. (2020). Factors associated with suicidal ideation in patients with multiple myeloma. *Jpn J Clin Oncol*, 50, 1475–1478.
- Amiri, S., & Behnezhad, S. (2019). Cancer diagnosis and suicide mortality: A systematic review and meta-analysis. *Archives of Suicide Research*, 1–19.
- Andersen, B. L., Valentine, T. R., Lo, S. B., Carbone, D. P., Presley, C. J., & Shields, P. G. (2020). Newly diagnosed patients with advanced non-small cell lung cancer: A clinical description of those with moderate to severe depressive symptoms. *Lung Cancer*, 145, 195–204.

- Bagur, J., Massoubre, C., Casagrande, L., Faure-Contier, C., Trombert-Pavot, B., & Berger, C. (2015). Psychiatric disorders in 130 survivors of childhood cancer: preliminary results of a semi-standardized interview. *Pediatr Blood Cancer*, 62, 847–853.
- Balci Sengul, Kaya, V., Sen, C. A., & Kaya, K. (2014). Association between suicidal ideation and behavior, and depression, anxiety, and perceived social support in cancer patients. *Med Sci Monit*, 20, 329–336.
- Barnes, J. M., Johnson, K. J., Grove, J. L., Srivastava, A. J., Osazuwa-Peters, N., & Perkins, S. M. (2022). Risk of suicide among individuals with a history of childhood cancer. *Cancer*, 128, 624–632.
- Bergerot, C. D., & Pal, S. K. (2022). Shining a light on the psychological burden of cancer. *Nature Medicine*, 1–2.
- Bobevski, I., Kissane, D. W., Vehling, S., Mehnert-Theuerkauf, A., Belvederi Murri, M., & Grassi, L. (2022). Demoralisation and its link with depression, psychological adjustment and suicidality among cancer patients: A network psychometrics approach. *Cancer Medicine*, 11, 815–825.
- Bramer, W. M., Giustini, D., de Jonge, G. B., Holland, L., & Bekhuis, T. (2016). De-duplication of database search results for systematic reviews in EndNote. *Journal of the Medical Library Association*, 104, 240–243.
- Breitbart, W., Rosenfeld, B., Pessin, H., Kaim, M., Funesti-Esch, J., Galiotta, M., ... Brescia, R. (2000). Depression, hopelessness, and desire for hastened death in terminally ill patients with cancer. *JAMA*, 284, 2907–2911.
- Brinkman, T. M., Liptak, C. C., Delaney, B. L., Chordas, C. A., Muriel, A. C., & Manley, P. E. (2013). Suicide ideation in pediatric and adult survivors of childhood brain tumors. *Journal of neuro-oncology*, 113, 425–432.
- Brinkman, T. M., Zhang, N., Recklitis, C. J., Kimberg, C., Zeltzer, L. K., Muriel, A. C., ... Krull, K. R. (2014). Suicide ideation and associated mortality in adult survivors of childhood cancer. *Cancer*, 120, 271–277.
- Burghardt, J., Klein, E., Brähler, E., Ernst, M., Schneider, A., Eckerle, S., ... Panova-Noeva, M. (2019). Prevalence of mental distress among adult survivors of childhood cancer in Germany—Compared to the general population. *Cancer Medicine*, 8, 1865–1874.
- Calati, R., Fang, F., Mostofsky, E., Shen, Q., Di Mattei, V. E., Garcia-Foncillas, J., ... Courtet, P. (2018). Cancer and suicidal ideation and behaviours: Protocol for a systematic review and meta-analysis. *BMJ Open*, 8, Article e020463.
- Calati, R., Filipponi, C., Mansi, W., Casu, D., Peviani, G., Gentile, G., ... Lopez-Castroman, J. (2021). Cancer diagnosis and suicide outcomes: Umbrella review and methodological considerations. *Journal of Affective Disorders*, 295, 1201–1214.
- Chae, B. J., Lee, J., Lee, S. K., Shin, H. J., Jung, S. Y., Lee, J. W., ... Youn, H. J. (2019). Unmet needs and related factors of Korean breast cancer survivors: A multicenter, cross-sectional study. *BMC Cancer*, 19, 839.
- Chang, D. C., Chen, A. W., Lo, Y. S., Chuang, Y. C., & Chen, M. K. (2019). Factors associated with suicidal ideation risk in head and neck cancer: A longitudinal study. *Laryngoscope*, 129, 2491–2495.
- Chang, T. G., Huang, P. C., Hsu, C. Y., & Yen, T. T. (2022). Demoralization in oral cancer inpatients and its association with spiritual needs, quality of life, and suicidal ideation: a cross-sectional study. *Health Qual Life Outcomes*, 20, 60.
- Chang, W. H., & Lai, A. G. (2022). Cumulative burden of psychiatric disorders and self-harm across 26 adult cancers. *Nature Medicine*, 28, 860–870.
- Chen, J., Zhang, Y., Cheng, F., Xie, J., Zhang, K., & Hu, D. (2023). Symptom distress and suicidal ideation among Chinese ovarian cancer patients: A moderated mediation model of depression and suicide resilience. *Front Psychol*, 14, 1073995.
- Cheng, H. W., Chan, K. Y., Sham, M. K., & Li, C. W. (2014). Symptom burden, depression, and suicidality in Chinese elderly patients suffering from advanced cancer. *J Palliat Med*, 17, 10.
- Cheung, G., Douwes, G., & Sundram, F. (2017). Late-Life Suicide in Terminal Cancer: A Rational Act or Underdiagnosed Depression? *J Pain Symptom Manage*, 54, 835–842.
- Chiang, Y. C., Couper, J., Chen, J. W., Lin, K. J., & Wu, H. P. (2022). Predictive value of the Distress Thermometer score for risk of suicide in patients with cancer. *Support Care Cancer*, 30, 5047–5053.
- Chochinov, H. M., Wilson, K. G., Enns, M., & Lander, S. (1998). Depression, hopelessness, and suicidal ideation in the terminally ill. *Psychosomatics*, 39, 366–370.
- Choi, J. W., & Park, E. C. (2020). Suicide risk after cancer diagnosis among older adults: A nationwide retrospective cohort study. *J Geriatr Oncol*, 11, 814–819.
- Choi, J. W., Park, E. C., Kim, T. H., & Han, E. (2020). Mental Disorders and Suicide Risk among Cancer Patients: A Nationwide Cohort Study. *Arch Suicide Res*, 1–12.
- Choi, Y., & Park, E. C. (2021). Suicide after cancer diagnosis in South Korea: a population-based cohort study. *BMJ Open*, 11, Article e049358.
- Choi, Y. N., Kim, Y. A., Yun, Y. H., Kim, S., Bae, J. M., Kim, Y. W., ... Sohn, T. S. (2014). Suicide ideation in stomach cancer survivors and possible risk factors. *Support Care Cancer*, 22, 331–337.
- Choudhury, A., & Shahsavar, Y. (2023). Exploring the determinants influencing suicidal ideation and depression in gastrointestinal cancer patients. *Scientific Reports*, 13.
- Ciamarella, A., & Poli, P. (2001). Assessment of depression among cancer patients: the role of pain, cancer type and treatment. *Psychooncology*, 10, 156–165.
- Costantini, A., Pompili, M., Innamorati, M., Zezza, M. C., Di Carlo, A., Sher, L., & Girardi, P. (2014). Psychiatric pathology and suicide risk in patients with cancer. *J Psychosoc Oncol*, 32, 383–395.
- De Beurs, D., Fried, E. I., Wetherall, K., Cleare, S., O' Connor, D. B., Ferguson, E., ... O' Connor, R. C. (2019). Exploring the psychology of suicidal ideation: A theory driven network analysis. *Behaviour Research and Therapy*, 120, Article 103419.
- Diaz-Frutos, D., Baca-Garcia, E., Garcia-Foncillas, J., & Lopez-Castroman, J. (2016). Predictors of psychological distress in advanced cancer patients under palliative treatments. *Eur J Cancer Care (Engl)*, 25, 608–615.
- Diaz-Frutos, D., Baca-Garcia, E., Mahillo-Fernandez, I., Garcia-Foncillas, J., & Lopez-Castroman, J. (2016). Suicide ideation among oncologic patients in a Spanish ward. *Psychol Health Med*, 21, 261–271.
- Du, L., Shi, H. Y., Qian, Y., Jin, X. H., Li, Y., Yu, H. R., ... Chen, H. L. (2020). Association between social support and suicidal ideation in patients with cancer: A systematic review and meta-analysis. *European Journal of Cancer Care (Engl)*, Article e13382.
- Du, L., Shi, H. Y., Qian, Y., Jin, X. H., Yu, H. R., Fu, X. L., ... Chen, H. L. (2022). Development and validation of a model for predicting the risk of suicide in patients with cancer. *Archives of Suicide Research*, 1–16.
- Du, L., Shi, H. Y., Yu, H. R., Liu, X. M., Jin, X. H., Yan, Q., ... Chen, H. L. (2020). Incidence of suicide death in patients with cancer: A systematic review and meta-analysis. *Journal of Affective Disorders*, 276, 711–719.
- Dwyer, J., Dwyer, J., Hiscock, R., O'Callaghan, C., Taylor, K., Ross, M., ... Philip, J. (2019). Characteristics of patients with cancer who die by suicide: Coronal case series in an Australian state. *Psychooncology*, 28, 2195–2200.
- Ernst, M., Brähler, E., Wild, P. S., Faber, J., Merzenich, H., & Beutel, M. E. (2021). Loneliness predicts suicidal ideation and anxiety symptoms in long-term childhood cancer survivors. *International Journal of Clinical and Health Psychology*, 21, Article 100201.
- Ernst, M., Brähler, E., Wild, P. S., Jünger, C., Faber, J., Schneider, A., & Beutel, M. E. (2020). Risk factors for suicidal ideation in a large, registry-based sample of adult long-term childhood cancer survivors. *Journal of Affective Disorders*, 265, 351–356.
- Ernst, M., Klein, E. M., Beutel, M. E., & Brähler, E. (2021). Gender-specific associations of loneliness and suicidal ideation in a representative population sample: Young, lonely men are particularly at risk. *Journal of Affective Disorders*, 294, 63–70.
- Fadoir, N. A., Marie, L., Basu, N., Schuler, K., Granato, S., & Smith, P. N. (2021). Exploring interpersonal theory of suicide typologies in patients with cancer: A latent profile analysis. *Death Studies*, 1–10.
- Fall, K., Fang, F., Mucci, L. A., Ye, W., Andren, O., Johansson, J. E., ... Valdimarsdottir, U. (2009). Immediate risk for cardiovascular events and suicide following a prostate cancer diagnosis: prospective cohort study. *PLoS Med*, 6, Article e1000197.
- Fang, C. K., Chang, M. C., Chen, P. J., Lin, C. C., Chen, G. S., Lin, J., ... Li, Y. C. (2014). A correlational study of suicidal ideation with psychological distress, depression, and demoralization in patients with cancer. *Support Care Cancer*, 22, 3165–3174.
- Fang, F., Fall, K., Mittleman, M. A., Sparen, P., Ye, W., Adami, H. O., & Valdimarsdottir, U. (2012). Suicide and cardiovascular death after a cancer diagnosis. *The New England Journal of Medicine*, 366, 1310–1318.
- Favril, L., Yu, R., Geddes, J. R., & Fazel, S. (2023). Individual-level risk factors for suicide mortality in the general population: An umbrella review. *The Lancet Public Health*, 8, e868–e877.
- Fekih-Romdhane, D. F., Saadallah, F., Mbarek, M., Bouzaïene, H., & Cheour, M. (2022). Prevalence and correlates of hopelessness in Tunisian women with benign breast disease and breast cancer. *Journal of Psychosocial Oncology*, 40, 677–694.
- Franklin, J. C., Ribeiro, J. D., Fox, K. R., Bentley, K. H., Kleiman, E. M., Huang, X., ... Nock, M. K. (2017). Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. *Psychological Bulletin*, 143, 187–232.
- Fredrickson, B. L. (2013). Positive emotions broaden and build. In *Vol. 47. Advances in experimental social psychology* (pp. 1–53). Elsevier.
- Friberg, A. S., Carlsson, S. V., Vickers, A. J., Dalton, S. O., Larsen, S. B., Saltbæk, L., ... Johansen, C. (2023). Impact of previous depression on the risk of suicide among prostate cancer patients. *Acta Oncologica*, 62, 89–99.
- Glenn, C. R., Franklin, J. C., Kearns, J. C., Lanzillo, E. C., & Nock, M. K. (2016). Suicide research methods and designs. *The international handbook of suicide prevention*, 710–724.
- Gascon, B., Leung, Y., Espin-Garcia, O., Rodin, G., Chu, D., & Li, M. (2021). Suicide Risk Screening and Suicide Prevention in Patients With Cancer. *JNCI Cancer Spectr*, 5.
- Guyatt, G. H., Oxman, A. D., Kunz, R., Atkins, D., Brozek, J., Vist, G., ... Schünemann, H. J. (2011). GRADE guidelines: 2. Framing the question and deciding on important outcomes. *Journal of Clinical Epidemiology*, 64, 395–400.
- Hagezom, H. M., Amare, T., Hibdy, G., & Demeke, W. (2021). Magnitude and associated factors of suicidal ideation among cancer patients at Ayder Comprehensive Specialized Hospital, Mekelle, Ethiopia, 2019: Cross-sectional study. *Cancer Management and Research*, 13, 4341–4350.
- Hatano, Y., Morita, T., Mori, M., Maeda, I., Oyama, S., Naito, A. S., ... Investigators, E. (2021). Complexity of desire for hastened death in terminally ill cancer patients: A cluster analysis. *Palliative & Supportive Care*, 1–10.
- Heinrich, M., Hofmann, L., Baurecht, H., Kreuzer, P. M., Knüttel, H., Leitzmann, M. F., & Seliger, C. (2022). Suicide risk and mortality among patients with cancer. *Nature Medicine*, 28(4), 852–859.
- Henriksson, M. M., Isometsä, E. T., Hietanen, P. S., Aro, H. M., & Lönnqvist, J. K. (1995). Mental disorders in cancer suicides. *J Affect Disord*, 36, 11–20.
- Henry, M., Rosberger, Z., Bertrand, L., Klassen, C., Hier, M., Zeitouni, A., ... Frenkiel, S. (2018). Prevalence and risk factors of suicidal ideation among patients with head and neck cancer: Longitudinal study. *Otolaryngology and Head and Neck Surgery*, 159, 843–852.
- Hickmann, A. K., Nadji-Ohl, M., Haug, M., Hopf, N. J., Ganslandt, O., Giese, A., & Renovan, M. (2016). Suicidal ideation, depression, and health-related quality of life in patients with benign and malignant brain tumors: a prospective observational study in 83 patients. *Acta Neurochir (Wien)*, 158, 1669–1682.
- Higgins, T., Chandler, J., Cumpston, M., Li, T., Page, M., & Welch, V. (2022). Cochrane handbook for systematic reviews of interventions version 6.3 (updated February 2022). *Cochrane*.
- Hoodin, F., Zhao, L., Carey, J., Levine, J. E., & Kitko, C. (2013). Impact of psychological screening on routine outpatient care of hematopoietic cell transplantation survivors. *Biol Blood Marrow Transplant*, 19, 1493–1497.

- Huang, I. C., Bhakta, N., Brinkman, T. M., Klosky, J. L., Krull, K. R., Srivastava, D., ... Robison, L. L. (2019). Determinants and Consequences of Financial Hardship Among Adult Survivors of Childhood Cancer: A Report From the St. Jude Lifetime Cohort Study. *J Natl Cancer Inst*, 111, 189–200.
- Hultcrantz, M., Svensson, T., Derolf, A. R., Kristinsson, S. Y., Lindqvist, E. K., Ekblom, A., ... Björkholm, M. (2015). Incidence and risk factors for suicide and attempted suicide following a diagnosis of hematological malignancy. *Cancer Med*, 4, 147–154.
- Hyer, J. M., Kelly, E. P., Paredes, A. Z., Tsilimigras, D. I., Diaz, A., & Pawlik, T. M. (2021). Mental illness is associated with increased risk of suicidal ideation among cancer surgical patients. *Am J Surg*, 222, 126–132.
- Jacobsen, J. C., Zhang, B., Block, S. D., Maciejewski, P. K., & Prigerson, H. G. (2010). Distinguishing symptoms of grief and depression in a cohort of advanced cancer patients. *Death Stud*, 34, 257–273.
- Johnson, C. C., Phillips, K. M., & Miller, S. N. (2020). Suicidal ideation among veterans living with cancer referred to mental health. *Clinical Gerontologist*, 43, 24–36.
- Jones, J. M., Huggins, M. A., Rydall, A. C., & Rodin, G. M. (2003). Symptomatic distress, hopelessness, and the desire for hastened death in hospitalized cancer patients. *J Psychosom Res*, 55, 411–418.
- Joshi, P., Song, H. B., & Lee, S. A. (2017). Association of chronic disease prevalence and quality of life with suicide-related ideation and suicide attempt among Korean adults. *Indian J Psychiatry*, 59, 352–358.
- Jung, J. Y., & Yun, Y. H. (2022). Importance of worthwhile life and social health as predictors of suicide ideation among cancer patients. *Journal of Psychosocial Oncology*, 40, 303–314.
- Kahn, G. D., Tam, S. H., Felton, J. W., Westphal, J., Simon, G. E., Owen-Smith, A. A., ... Ahmedani, B. K. (2023). Cancer and psychiatric diagnoses in the year preceding suicide. *Cancer Med*, 12, 3601–3609.
- Kazlauskienė, J., Navickas, A., Lesinskiene, S., & Bulotiene, G. (2022). Factors affecting suicidal thoughts in breast cancer patients. *Medicina*, 58, 863.
- Kelliher-Rabon, J., Sirois, F. M., Barton, A. L., & Hirsch, J. K. (2021). Self-compassion and suicidal behavior: Indirect effects of depression, anxiety, and hopelessness across increasingly vulnerable samples. *Self and Identity*, 21, 223–243.
- Kelly, B., Burnett, P., Pelusi, D., Badger, S., Varghese, F., & Robertson, M. (2003). Factors associated with the wish to hasten death: a study of patients with terminal illness. *Psychol Med*, 33, 75–81.
- Kim, J. M., Jang, J. E., Stewart, R., Kim, S. Y., Kim, S. W., Kang, H. J., ... Yoon, J. S. (2013). Determinants of suicidal ideation in patients with breast cancer. *Psychooncology*, 22, 2848–2856.
- Kittel, J. A., Seplaki, C. L., van Wijngaarden, E., Richman, J., Magnuson, A., & Conwell, Y. (2023). Mental health outcomes and correlates in cancer patients entering survivorship after curative treatment. *Int J Psychiatry Med*, 53, 325–338.
- Klaassen, Z., Wallis, C. J. D., Chandrasekar, T., Goldberg, H., Sayyid, R. K., Williams, S. B., ... Kulkarni, G. S. (2019). Cancer diagnosis and risk of suicide after accounting for prediagnosis psychiatric care: A matched-cohort study of patients with incident solid-organ malignancies. *Cancer*, 125, 2886–2895.
- Kleiman, E. M., Turner, B. J., Fedor, S., Beale, E. E., Huffman, J. C., & Nock, M. K. (2017). Examination of real-time fluctuations in suicidal ideation and its risk factors: Results from two ecological momentary assessment studies. *Journal of Abnormal Psychology*, 126, 726–738.
- Klonsky, E. D., Saffer, B. Y., & Bryan, C. J. (2018). Ideation-to-action theories of suicide: A conceptual and empirical update. *Current Opinion in Psychology*, 22, 38–43.
- Knipe, D., Padmanathan, P., Newton-Howes, G., Chan, L. F., & Kapur, N. (2022). Suicide and self-harm. *The Lancet*, 399, 1903–1916.
- Ko, K.-T., Lin, C.-J., Pi, S.-H., Li, Y.-C., & Fang, C.-K. (2018). Demoralization Syndrome Among Elderly Patients with Cancer Disease. *International Journal of Gerontology*, 12, 12–16.
- Kolva, E., Hoeffcker, L., & Cox-Martin, E. (2020). Suicidal ideation in patients with cancer: A systematic review of prevalence, risk factors, intervention and assessment. *Palliative & Supportive Care*, 18, 206–219.
- Kraemer, H. C., Kazdin, A. E., Offord, D. R., Kessler, R. C., Jensen, P. S., & Kupfer, D. J. (1997). Coming to terms with the risks of risk. *Archives of General Psychiatry*, 54, 337–343.
- Lai, Q., Huang, H., Zhu, Y., Shu, S., Chen, Y., Luo, Y., ... Yang, Z. (2022). Incidence and risk factors for suicidal ideation in a sample of Chinese patients with mixed cancer types. *Supportive Care in Cancer*, 30, 9811–9821.
- Latha, K. S., & Bhat, S. M. (2005). Suicidal behaviour among terminally ill cancer patients in India. *Indian J Psychiatry*, 47, 79–83.
- Lee, K., Jung, G., Choi, N. Y., Kim, S., & Jo, J. K. (2022). Association between Psychological Suffering and Suicidal Thinking in Patients with Urologic Cancer Using Real-World Data. *Journal of Clinical Medicine*, 11, 7336.
- Lee, S. J., Park, J. H., Park, B. Y., Kim, S. Y., Lee, I. H., Kim, J. H., ... Sohn, M. S. (2014). Depression and suicide ideas of cancer patients and influencing factors in South Korea. *Asian Pac J Cancer Prev*, 15, 2945–2950.
- Lehluuante, A., & Fransson, P. (2014). Are there specific health-related factors that can accentuate the risk of suicide among men with prostate cancer? *Support Care Cancer*, 22, 1673–1678.
- Leung, Y. W., Li, M., Devins, G., Zimmermann, C., Rydall, A., Lo, C., & Rodin, G. (2013). Routine screening for suicidal intention in patients with cancer. *Psychooncology*, 22, 2537–2545.
- Lewin, K. (1936). *Principles of topological psychology*. Read Books Ltd.
- Li, Y., Liu, H., Sun, Y., Li, J., Chen, Y., Zhang, X., ... Cao, F. (2021). Characteristics and subtypes of depressive symptoms in Chinese female breast cancer patients of different ages: a cross-sectional study. *AIMS Public Health*, 8, 691–703.
- Lin, H. C., Wu, C. H., & Lee, H. C. (2009). Risk factors for suicide following hospital discharge among cancer patients. *Psychooncology*, 18, 1038–1044.
- Liu, L., Sun, Y., Wang, Y., Luo, N., Bai, R., Pan, M., ... Wu, H. (2023). Impact of alexithymia on suicidal ideation among patients with ovarian cancer: a moderated mediation model of self-perceived burden and general self-efficacy. *Supportive Care in Cancer*, 31.
- Liu, S. T., Wu, X., Wang, N., Zhao, Q. Q., Xiao, L., Fang, C. K., ... Zhang, L. L. (2020). Serial multiple mediation of demoralization and depression in the relationship between hopelessness and suicidal ideation. *Psychooncology*, 29, 1321–1328.
- Löwe, B., Kroenke, K., Herzog, W., & Gräfe, K. (2004). Measuring depression outcome with a brief self-report instrument: Sensitivity to change of the patient health questionnaire (PHQ-9). *Journal of Affective Disorders*, 81, 61–66.
- Lowery, A. E., Starr, T., Dhingra, L. K., Rogak, L., Hamrick-Price, J. R., Farberov, M., ... Passik, S. D. (2013). Frequency, characteristics, and correlates of pain in a pilot study of colorectal cancer survivors 1–10 years post-treatment. *Pain Med*, 14, 1673–1680.
- Lu, D., Fall, K., Sparen, P., Ye, W., Adami, H. O., Valdimarsdottir, U., & Fang, F. (2013). Suicide and suicide attempt after a cancer diagnosis among young individuals. *Ann Oncol*, 24, 3112–3117.
- Lubas, M. M., Mirzaei Salehabadi, S., Lavecchia, J., Alberts, N. M., Krull, K. R., Ehrhardt, M. J., ... Brinkman, T. M. (2020). Suicidality among adult survivors of childhood cancer: A report from the St. Jude Lifetime Cohort Study. *Cancer*, 126, 5347–5355.
- Luo, Y., Lai, Q., Huang, H., Luo, J., Miao, J., Liao, R., ... Zhang, L. (2022). Risk factor analysis and nomogram construction for predicting suicidal ideation in patients with cancer. *BMC Psychiatry*, 22.
- Ma, Z., Mao, Y., Wang, Y., Duan, Z., Qu, D., Li, C., ... Liu, Z. (2022). Suicidal ideation and attempted suicide among cancer patients during the COVID-19 pandemic. *J Med Virol*, 94, 5827–5835.
- Madeira, N., Albuquerque, E., Santos, T., Mendes, A., & Roque, M. (2011). Death ideation in cancer patients: contributing factors. *J Psychosoc Oncol*, 29, 636–642.
- Maneeton, B., Maneeton, N., & Mahathep, P. (2012). Prevalence of depression and its correlations: A cross-sectional study in Thai cancer patients. *Asian Pacific Journal of Cancer Prevention*, 13, 2039–2043.
- Massetti, G. M., Holland, K. M., Jack, S. P. D., Ragan, K. R., & Lunsford, N. B. (2018). Circumstances of suicide among individuals with a history of cancer. *Psychooncology*, 27, 1750–1756.
- Masten, A. S., & Reed, M.-G. J. (2002). Resilience in development. *Handbook of positive psychology*, 74, 88.
- McClain, C. S., Rosenfeld, B., & Breitbart, W. (2003). Effect of spiritual well-being on end-of-life despair in terminally-ill cancer patients. *Lancet*, 361, 1603–1607.
- McClain-Jacobson, C., Rosenfeld, B., Kosinski, A., Pessin, H., Cimino, J. E., & Breitbart, W. (2004). Belief in an afterlife, spiritual well-being and end-of-life despair in patients with advanced cancer. *Gen Hosp Psychiatry*, 26, 484–486.
- McFarland, D. C., Walsh, L., Napolitano, S., Morita, J., & Jaiswal, R. (2019). Suicide in patients with cancer: Identifying the risk factors. *Oncology*, 08909091, 33.
- Men, V. Y., Emery, C. R., Lam, T. C., & Yip, P. S. F. (2022). Suicidal/self-harm behaviors among cancer patients: a population-based competing risk analysis. *Psychol Med*, 52, 2342–2351.
- Men, V. Y., Emery, C. R., & Yip, P. S. F. (2021). Characteristics of cancer patients who died by suicide: A quantitative study of 15-year coronial records. *Psychooncology*, 30, 1051–1058.
- Men, V. Y., Lam, T. C., Yeung, C. Y., & Yip, P. S. F. (2021). Understanding the impact of clinical characteristics and healthcare utilizations on suicide among cancer sufferers: a case-control study in Hong Kong. *Lancet Reg Health West Pac*, 17, 100298.
- Miller, A. H., & Raison, C. L. (2016). The role of inflammation in depression: From evolutionary imperative to modern treatment target. *Nature Reviews Immunology*, 16, 22–34.
- Mitchell, R., Draper, B., Harvey, L., Brodaty, H., & Close, J. (2017). The association of physical illness and self-harm resulting in hospitalisation among older people in a population-based study. *Aging Ment Health*, 21, 279–288.
- Mohammadi, M., Moradi, T., Bottai, M., Reutfores, J., Cao, Y., & Smedby, K. E. (2014). Risk and predictors of attempted and completed suicide in patients with hematological malignancies. *Psychooncology*, 23, 1276–1282.
- Molla, A., Aderaw, M., Mulat, H., Fanta, B., Nenko, G., & Adane, A. (2022). Suicidal ideation, attempt and associated factors among people living with cancer in Ethiopia: a cross-sectional study. *Annals of General Psychiatry*, 21.
- Moreno-Montoya, J., Palacios-Espinosa, X., & Gracia-Ruiz, J. (2017). Association Between Religion and Suicidal Behaviors in Cancer Patients. *Rev Colomb Psiquiatr*, 46, 209–214.
- Morgan, R. L., Whaley, P., Thayer, K. A., & Schunemann, H. J. (2018). Identifying the PECO: A framework for formulating good questions to explore the association of environmental and other exposures with health outcomes. *Environment International*, 121, 1027–1031.
- Munson, S. O., Cabrera-Sanchez, P., Miller, S. N., & Phillips, K. M. (2020). Distress and factors associated with suicidal ideation in veterans living with cancer. *Federal Practitioner*, 37, S8.
- Mystakidou, K., Parpa, E., Katsouda, E., Galanos, A., & Vlahos, L. (2005). Pain and desire for hastened death in terminally ill cancer patients. *Cancer Nurs*, 28, 318–324.
- Mystakidou, K., Parpa, E., Katsouda, E., Galanos, A., & Vlahos, L. (2006). The role of physical and psychological symptoms in desire for death: a study of terminally ill cancer patients. *Psychooncology*, 15, 355–360.
- Mystakidou, K., Rosenfeld, B., Parpa, E., Katsouda, E., Tsilika, E., Galanos, A., & Vlahos, L. (2005). Desire for death near the end of life: the role of depression, anxiety and pain. *Gen Hosp Psychiatry*, 27, 258–262.
- Nanni, M. G., Caruso, R., Travado, L., Ventura, C., Palma, A., Berardi, A. M., ... Grassi, L. (2018). Relationship of demoralization with anxiety, depression, and quality of life: A Southern European study of Italian and Portuguese cancer patients. *Psychooncology*, 27, 2616–2622.

- Nigusse, K., Tesfaye, D., Abdisa, L., Tolosa, L., Bete, T., Gemechu, K., ... Dechasa, D. B. (2023). Suicidal ideation, attempt and associated factors among people with cancer attending cancer center, eastern Ethiopia. *Frontiers in Psychiatry*, 14, 1184921.
- Nikendei, C., Terhoeven, V., Ehrental, J. C., Maatouk, I., Wild, B., Herzog, W., & Friederich, H. C. (2018). Depression profile in cancer patients and patients without a chronic somatic disease. *Psychooncology*, 27, 83–90.
- Nissim, R., Flora, D. B., Cribbie, R. A., Zimmermann, C., Gagliese, L., & Rodin, G. (2010). Factor structure of the Beck Hopelessness Scale in individuals with advanced cancer. *Psychooncology*, 19, 255–263.
- Nissim, R., Gagliese, L., & Rodin, G. (2009). The desire for hastened death in individuals with advanced cancer: A longitudinal qualitative study. *Social Science & Medicine*, 69, 165–171.
- Nugent, S. M., Morasco, B. J., Handley, R., Clayburgh, D., Hooker, E. R., Ganzini, L., ... Slatore, C. G. (2021). Risk of Suicidal Self-directed Violence Among US Veteran Survivors of Head and Neck Cancer. *JAMA Otolaryngol Head Neck Surg*, 147, 981–989.
- O'Connor, R. C., & Kirtley, O. J. (2018). The integrated motivational-volitional model of suicidal behaviour. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 373.
- O'Connor, R. C., & Nock, M. K. (2014). The psychology of suicidal behaviour. *The Lancet Psychiatry*, 1, 73–85.
- O'Mahony, S., Goulet, J., Kornblith, A., Abbiatiello, G., Clarke, B., Kless-Siegel, S., ... Payne, R. (2005). Desire for hastened death, cancer pain and depression: report of a longitudinal observational study. *J Pain Symptom Manage*, 29, 446–457.
- Ozdemiroglu, F., Memis, C. O., Meydan, N., Dogan, B., Kilic, S. M., Sevincok, L., & Karakus, K. (2017). Self-esteem, pain and suicidal thoughts in a sample of cancer patients. *Psychiatry and Behavioral Sciences*, 7, 156–256.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Bmj*, 372, Article n71.
- Papini, C., Payad, A. A., Wang, M., Schulte, F. S., Huang, I. C., Chang, Y. P., ... Armstrong, G. T. (2023). Emotional, behavioral, and physical health consequences of loneliness in young adult survivors of childhood cancer: Results from the Childhood Cancer Survivor Study. *Cancer*, 129, 1117–1128.
- Park, S. A., Chung, S. H., & Lee, Y. (2016). Factors Associated with Suicide Risk in Advanced Cancer Patients: A Cross-Sectional Study. *Asian Pac J Cancer Prev*, 17, 4831–4836.
- Parpa, E., Tsilika, E., Gennimata, V., & Mystakidou, K. (2015). Elderly cancer patients' psychopathology: A systematic review. *Archives of Gerontology and Geriatrics*, 60, 9–15.
- Perry, L. M., Hoerger, M., Silberstein, J., Sartor, O., & Duberstein, P. (2018). Understanding the distressed prostate cancer patient: Role of personality. *Psychooncology*, 27, 810–816.
- Pitman, A., Suleman, S., Hyde, N., & Hodgkiss, A. (2018). Depression and anxiety in patients with cancer. *Bmj*, 361, Article k1415.
- Pranckeviciene, A., Tamasauskas, S., Deltuva, V. P., Bunevicius, R., Tamasauskas, A., & Bunevicius, A. (2016). Suicidal ideation in patients undergoing brain tumor surgery: prevalence and risk factors. *Support Care Cancer*, 24, 2963–2970.
- Pukkila, K., Hakko, H., Vaisanen, E., Sarkioja, T., & Rasanen, P. (2000). Does alcohol drinking have an influence on suicides in cancer sufferers? A population-based study of 1515 suicide victims. *Jpn J Clin Oncol*, 30, 568–570.
- Raghubar, K. P., Chambers, T., Hill, R. M., Taylor, O., Hockenberry, M., Hooke, M. C., ... Scheurer, M. E. (2022). Longitudinal investigation of suicidal ideation and associated factors during pediatric acute lymphoblastic leukemia chemotherapy. *Psychooncology*, 31, 1782–1789.
- Ravaoli, A., Crocetti, E., Mancini, S., Baldacchini, F., Giuliani, O., Vattiato, R., ... Falchini, F. (2020). Suicide death among cancer patients: New data from northern Italy, systematic review of the last 22 years and meta-analysis. *European Journal of Cancer*, 125, 104–113.
- Recklitis, C. J., Diller, L. R., Li, X., Najita, J., Robison, L. L., & Zeltzer, L. (2010). Suicide ideation in adult survivors of childhood cancer: a report from the Childhood Cancer Survivor Study. *J Clin Oncol*, 28, 655–661.
- Recklitis, C. J., Lockwood, R. A., Rothwell, M. A., & Diller, L. R. (2006). Suicidal Ideation and Attempts in Adult Survivors of Childhood Cancer. *Journal of Clinical Oncology*, 24, 3852–3857.
- Recklitis, C. J., Zhou, E. S., Zwemer, E. K., Hu, J. C., & Kantoff, P. W. (2014). Suicidal ideation in prostate cancer survivors: Understanding the role of physical and psychological health outcomes. *Cancer*, 120, 3393–3400.
- Rice, S. M., Kealy, D., Ogronczuk, J. S., Seidler, Z. E., Deney, L., & Olliffe, J. L. (2020). The cost of bottling it up: Emotion suppression as a mediator in the relationship between anger and depression among men with prostate cancer. *Cancer Management and Research*, 12, 1039–1046.
- Rice, S. M., Kealy, D., Ogronczuk, J. S., Seidler, Z. E., Montaner, G., Chambers, S., & Olliffe, J. L. (2021). The anxiety depression pathway among men following a prostate cancer diagnosis: Cross-sectional interactions between anger responses and loneliness. *American Journal of Men's Health*, 15, 15579883211023699.
- Richardson, C., Robb, K. A., McManus, S., & O'Connor, R. C. (2022). Psychosocial factors that distinguish between men and women who have suicidal thoughts and attempt suicide: Findings from a national probability sample of adults. *Psychological Medicine*, 1–9.
- Rodin, G., Lo, C., Mikulincer, M., Donner, A., Gagliese, L., & Zimmermann, C. (2009). Pathways to distress: The multiple determinants of depression, hopelessness, and the desire for hastened death in metastatic cancer patients. *Social Science & Medicine*, 68, 562–569.
- Rodin, G., Walsh, A., Zimmermann, C., Gagliese, L., Jones, J., Shepherd, F. A., ... Mikulincer, M. (2007). The contribution of attachment security and social support to depressive symptoms in patients with metastatic cancer. *Psychooncology*, 16, 1080–1091.
- Rogers, M. L., Joiner, T. E., & Shahar, G. (2021). Suicidality in chronic illness: An overview of cognitive-affective and interpersonal factors. *Journal of Clinical Psychology in Medical Settings*, 28, 137–148.
- Rosenfeld, B., Pessin, H., Marziliano, A., Jacobson, C., Sorger, B., Abbey, J., ... Breitbart, W. (2014). Does desire for hastened death change in terminally ill cancer patients? *Social Science & Medicine*, 111, 35–40.
- Ruiz-Marin, C. M., Molina-Barea, R., Slim, M., & Calandre, E. P. (2021). Marital Adjustment in Patients with Cancer: Association with Psychological Distress, Quality of Life, and Sleep Problems. *Int J Environ Res Public Health*, 18.
- Sachs-Ericsson, N. J., Rushing, N. C., Stanley, I. H., & Sheffler, J. (2016). In my end is my beginning: Developmental trajectories of adverse childhood experiences to late-life suicide. *Aging & Mental Health*, 20, 139–165.
- Sauer, C., Grapp, M., Bugaj, T. J., & Maatouk, I. (2022). Suicidal ideation in patients with cancer: Its prevalence and results of structural equation modelling. *European Journal of Cancer Care*, 31.
- Schneider, K. L., & Shenassa, E. (2008). Correlates of suicide ideation in a population-based sample of cancer patients. *J Psychosoc Oncol*, 26, 49–62.
- Schomberg, J., Teismann, T., Bussmann, S., Vaganian, L., Gerlach, A. L., & Cwik, J. C. (2021). The significance of the interpersonal-psychological theory of suicide in an oncological context—a scoping review. *European Journal of Cancer Care*, 30.
- Senf, B., Bender, B., & Fettel, J. (2022). Suicidal ideation, distress, and related factors in a population of cancer patients treated in a general acute hospital. *Support Care Cancer*, 30, 487–496.
- Shahar, G., Elad-Strenger, J., & Henrich, C. C. (2012). Risky resilience and resilient risk: The key role of intentionality in an emerging dialectics. *Journal of Social and Clinical Psychology*, 31, 618–640.
- Shaheen Al Ahwal, M., Al Zaben, F., Sehlo, M. G., Khalifa, D. A., & Koenig, H. G. (2016). Religious beliefs, practices, and health in colorectal cancer patients in Saudi Arabia. *Psychooncology*, 25, 292–299.
- Sharkey, C. M., Hardy, K. K., Gioia, A., Weisman, H., & Walsh, K. (2022). Suicidal ideation and executive functioning in pediatric cancer. *Psychooncology*, 31, 745–752.
- Shim, E. J., & Hahm, B. J. (2011). Anxiety, helplessness/hopelessness and “desire for hastened death” in Korean cancer patients. *Eur J Cancer Care (Engl)*, 20, 395–402.
- Shim, E. J., & Park, J. H. (2012). Suicidality and its associated factors in cancer patients: results of a multi-center study in Korea. *Int J Psychiatry Med*, 43, 381–403.
- Shneidman, E. S. (1993). Commentary: Suicide as psychache. *The Journal of Nervous and Mental Disease*, 181(3), 145–147.
- Simard, S., Savard, J., & Ivers, H. (2010). Fear of cancer recurrence: Specific profiles and nature of intrusive thoughts. *Journal of Cancer Survivorship*, 4, 361–371.
- Sonmez, I., Balikci, K., Denizgil, T., Aydin, O., & Andrieu, M. N. (2020). The trait anxiety as a predictor of the suicidal risk in patients with cancer. *Indian J Psychiatry*, 62, 87–90.
- Spencer, R. J., Ray, A., Pirl, W. F., & Prigerson, H. G. (2012). Clinical correlates of suicidal thoughts in patients with advanced cancer. *The American Journal of Geriatric Psychiatry*, 20, 327–336.
- Stanboully, D., Goudarzi, F., Ashshi, R. A., Patel, N., Chandra, S. R., & Chuang, S.-K. (2023). Is health insurance a risk factor for suicidal ideation among adults suffering from head and neck cancer in the US? *Oral surgery, oral medicine, oral pathology and oral radiology*, 135, 475–480.
- Sun, C. L., Francisco, L., Baker, K. S., Weisdorf, D. J., Forman, S. J., & Bhatia, S. (2011). Adverse psychological outcomes in long-term survivors of hematopoietic cell transplantation: a report from the Bone Marrow Transplant Survivor Study (BMTSS). *Blood*, 118, 4723–4731.
- Sun, L. M., Lin, C. L., Hsu, C. Y., & Kao, C. H. (2018). Risk of suicide attempts among colorectal cancer patients: A nationwide population-based matched cohort study. *Psychooncology*, 27, 2794–2801.
- Sun, L. M., Lin, C. L., Shen, W. C., & Kao, C. H. (2020). Suicide attempts in patients with head and neck cancer in Taiwan. *Psychooncology*, 29, 1026–1035.
- Suppli, N. P., Johansen, C., Kessing, L. V., Toender, A., Kroman, N., Ewertz, M., & Dalton, S. O. (2017). Survival After Early-Stage Breast Cancer of Women Previously Treated for Depression: A Nationwide Danish Cohort Study. *J Clin Oncol*, 35, 334–342.
- Tang, G. X., Yan, P. P., Yan, C. L., Fu, B., Zhu, S. J., Zhou, L. Q., ... Lei, J. (2016). Determinants of suicidal ideation in gynecological cancer patients. *Psychooncology*, 25, 97–103.
- Tang, L., Zhang, Y., & Pang, Y. (2020). Patient-reported outcomes from the distress assessment and response tool program in Chinese cancer inpatients. *Psychooncology*, 29, 869–877.
- Tanriverdi, D., Cuhadar, D., & Ciftci, S. (2014). Does the impairment of functional life increase the probability of suicide in cancer patients? *Asian Pac J Cancer Prev*, 15, 9549–9553.
- Thapa, S., Sharma, S., Shrestha, S., Ghimire, B. R., Dahal, S., Maharjan, R., ... Koirala, R. (2023). Distress Thermometer Score Is Useful For Predicting Suicidal Ideation in Patients With Cancer. *JCO Global Oncology*.
- Trevino, K. M., Abbott, C. H., Fisch, M. J., Friedlander, R. J., Duberstein, P. R., & Prigerson, H. G. (2014). Patient-oncologist alliance as protection against suicidal ideation in young adults with advanced cancer. *Cancer*, 120, 2272–2281.
- Trevino, K. M., Balboni, M., Zollfrank, A., Balboni, T., & Prigerson, H. G. (2014). Negative religious coping as a correlate of suicidal ideation in patients with advanced cancer. *Psychooncology*, 23, 936–945.
- Tripp, D. A., Mihajlovic, V., Fretz, K., Fervaha, G., Izard, J., Corby, R., & Siemens, D. R. (2020). Quality of life, depression, and psychosocial mechanisms of suicide risk in prostate cancer. *Canadian Urological Association Journal*, 14, E487–E92.

- Turecki, G., Brent, D. A., Gunnell, D., O'Connor, R. C., Oquendo, M. A., Pirkis, J., & Stanley, B. H. (2019). Suicide and suicide risk. *Nature Reviews. Disease Primers*, 5, 1–22.
- Uchitomi, Y., Kugaya, A., Akechi, T., Nakano, T., Inagaki, M., Matsuoaka, Y., ... Yamawaki, S. (2002). Lack of association between suicidal ideation and enhanced platelet 5-HT_{2A} receptor-mediated calcium mobilization in cancer patients with depression. *Biol Psychiatry*, 52, 1159–1165.
- Valikhani, A., Sarafraz, M. R., & Moghimi, P. (2018). Examining the role of attachment styles and self-control in suicide ideation and death anxiety for patients receiving chemotherapy in Iran. *Psychooncology*, 27, 1057–1060.
- Van Orden, K. A., Cukrowicz, K. C., Witte, T. K., & Joiner, T. E., Jr. (2012). Thwarted belongingness and perceived burdensomeness: Construct validity and psychometric properties of the Interpersonal Needs Questionnaire. *Psychological Assessment*, 24, 197.
- Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review*, 117, 575–600.
- Vehling, S., Kissane, D. W., Lo, C., Glaesmer, H., Hartung, T. J., Rodin, G., & Mehnert, A. (2017). The association of demoralization with mental disorders and suicidal ideation in patients with cancer. *Cancer*, 123, 3394–3401.
- Vehling, S., Mehnert-Theuerkauf, A., Glaesmer, H., Bokemeyer, C., Oechsle, K., Härter, M., & Koch, U. (2021). Thoughts of death and suicidality among patients with cancer: Examining subtypes and their association with mental disorders. *Psychooncology*, 30, 2023–2031.
- Villavicencio-Chavez, C., Monforte-Royo, C., Tomas-Sabado, J., Maier, M. A., Porta-Sales, J., & Balaguer, A. (2014). Physical and psychological factors and the wish to hasten death in advanced cancer patients. *Psychooncology*, 23, 1125–1132.
- Walker, J., Magill, N., Rosenstein, D. L., Frost, C., & Sharpe, M. (2022). Suicidal Thoughts in Patients With Cancer and Comorbid Major Depression: Findings From a Depression Screening Program. *Journal of the Academy of Consultation-Liaison Psychiatry*, 63, 251–259.
- Walker, J., Waters, R. A., Murray, G., Swanson, H., Hibberd, C. J., Rush, R. W., ... Sharpe, M. (2008). Better off dead: suicidal thoughts in cancer patients. *J Clin Oncol*, 26, 4725–4730.
- Webb, R. T., Kontopantelis, E., Doran, T., Qin, P., Creed, F., & Kapur, N. (2012). Suicide risk in primary care patients with major physical diseases: a case-control study. *Archives of General Psychiatry*, 69, 256–264.
- Williams, A. M., Tam, S. H., & Adjei Boakye, E. (2023). Firearm safety for patients diagnosed with cancer—a role in suicide prevention. *JAMA Oncology*, 9, 605.
- Wilson, K. G., Curran, D., & McPherson, C. J. (2005). A burden to others: a common source of distress for the terminally ill. *Cogn Behav Ther*, 34, 115–123.
- Wilson, K. G., Dalgleish, T. L., Chochinov, H. M., Chary, S., Gagnon, P. R., Macmillan, K., ... Fainsinger, R. L. (2016). Mental disorders and the desire for death in patients receiving palliative care for cancer. *BMJ Support Palliat Care*, 6, 170–177.
- World Health Organization. (2014). WHO. Mental Health: Suicide prevention. In.
- Xu, K., Hu, D., Liu, Y., Han, Y., Guo, X., Teng, F., & Zhou, Y. (2019). Relationship of Suicidal Ideation With Demoralization, Depression, and Anxiety: A Study of Cancer Patients in Mainland China. *J Nerv Ment Dis*, 207, 326–332.
- Xu, Q., Jia, S., Fukasawa, M., Lin, L., Na, J., Mu, Z., ... Jiang, C. (2020). A cross-sectional study on associations of physical symptoms, health self-efficacy, and suicidal ideation among Chinese hospitalized cancer patients. *BMC Psychiatry*, 20, 544.
- Zendron, M., Zequi, S. C., Guimaraes, G. C., & Lourenco, M. T. C. (2018). Assessment of suicidal behavior and factors associated with a diagnosis of prostate cancer. *Clinics (São Paulo, Brazil)*, 73, e441.
- Zhang, X., Zhang, J., Procter, N., Chen, X., Su, Y., Lou, F., & Cao, F. (2017). Suicidal Ideation and Psychological Strain Among Patients Diagnosed With Stomach Cancer: The Mediation of Psychopathological Factors. *J Nerv Ment Dis*, 205, 550–557.
- Zhang, Y., Ding, X., Chen, J., Liu, Y., Wang, G., & Hu, D. (2023). Moderating effects of suicide resilience and meaning in life on the association between entrapment and suicidal ideation in Chinese patients with ovarian cancer: A cross-sectional study. *BMC Psychiatry*, 23.
- Zhang, Y., Li, W., Zhang, Z., Sun, H., Garg, S., Yang, Y., & Wang, H. (2020). Suicidal ideation in newly-diagnosed Chinese cancer patients. *Frontiers in Psychiatry*, 11, 708.
- Zhong, B. L., Li, S. H., Lv, S. Y., Tian, S. L., Liu, Z. D., Li, X. B., ... Zhuo, C. J. (2017). Suicidal ideation among Chinese cancer inpatients of general hospitals: Prevalence and correlates. *Oncotarget*, 8, 25141–25150.
- Zhou, E. S., Hu, J. C., Kantoff, P. W., & Recklitis, C. J. (2015). Identifying suicidal symptoms in prostate cancer survivors using brief self-report. *J Cancer Surviv*, 9, 59–67.
- Zhou, Y., Hu, D., Zhang, K., Mao, J., Teng, F., Yu, T., ... Liu, Y. (2020). The mechanism of family adaptability and cohesion in suicidal ideation among Chinese cancer patients. *Journal of Psychosocial Oncology*, 38, 612–626.