Title

What factors are associated with informal carers' psychological morbidity during end-of-life home care? A systematic review and thematic synthesis of observational quantitative studies.

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Abstract

Background: Family carers are central in supporting patients nearing end–of-life (EOL). As a consequence they often suffer detrimental impacts on their own mental health. Understanding what factors may affect carers' mental health is important in developing strategies to maintain their psychological wellbeing during caregiving.

Aim: To conduct a systematic review and thematic evidence synthesis of factors related to carers' mental health during EOL caregiving.

Method: Searches of Medline, CINAHL, PsychINFO, Social Sciences Citation Index, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL) and Database of Abstracts of Reviews of Effects (DARE) 01.01.2009-24.11.2019. We included observational quantitative studies focusing on adult informal/ family carers for adult patients at EOL cared for at home considering any factor related to carer mental health (anxiety, depression, distress and quality of life) pre-bereavement. Newcastle-Ottawa Quality Assessment Scale was used. Thematic analysis with box score presentation and meta-analysis were done where data permitted.

Results: Findings from 63 included studies underpinned seven emergent themes.

1) **Patient condition** (31 studies): worse patient psychological symptoms and quality of life were generally associated with worse carer mental health. Patient depression was associated with higher depression in carers (SMD=0.59, 95% CI 0.32 to 0.87, I^2=77%). Patients' other symptoms and functional impairment may relate to carer mental health, but findings were unclear.
2) **Impact of caring responsibilities** (14 studies): impact on carers' lives, task difficulty and general burden had clear associations with worse carer mental health.
3) **Relationships** (8 studies): family dynamics and the quality of the carer-patient relationship may be important for carer mental health and are worthy of further investigation.
4) **Finance** (6 studies): insufficient resources may relate to carers' mental health and warrant further study.
5) **Carers' psychological processes** (13 studies): self-efficacy and preparedness were related to better mental health. However, findings regarding coping strategies were mixed.
6) **Support** (18 studies): informal support given by family and friends may relate to better carer mental health, but evidence on formal support is limited. Having unmet needs was related to worse mental health, while satisfaction with care was related to better mental health.
7) **Contextual factors** (16 studies): older age was generally associated with better carer mental health, and being female with worse mental health.

Limitations: Studies were mainly cross-sectional (56) rather than longitudinal (7) which raises questions about the likely causal direction of relationships. One third of studies had samples <100, so many had limited statistical power to identify existing relationships.

Conclusions and future work: Future work must adopt a comprehensive approach to improving carers' mental health, because factors relating to carer mental health cover a broad spectrum. The literature on this topic is diverse and difficult to summarise, and the field would benefit from a clearer direction of enquiry guided by explanatory models. Future research should (1) further investigate quality of relationships and finances; (2) better define factors under investigation; (3) establish, through quantitative causal analyses, why factors might relate to mental health; (4) utilise longitudinal designs more to aid understanding of likely causal direction of associations.

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List of tables and figures, boxes, appendices and supplementary material

Glossary

Carer

Family and informal carers/caregivers are used interchangeably throughout this review to refer to adult lay carers. The term 'lay carer' or 'carer' is defined according to the broad definition adopted by the National Institute for Health and Care Excellence (2004)[93]: '*Carers, who may or may not be family members, are lay people in a close supportive role who share in the illness experience of the patient and who undertake vital care work and emotion management*', which relates to unpaid carers who might be a partner, family member, friend or neighbour of the person they are caring for.

Abbreviations
EOL – End-of-life
PPI - Public Patient Involvement
RAP – Review Advisory Panel

Plain Language summary

Background: Family carers are central in supporting patients nearing end-of-life. However, their own mental health may often suffer as a result. It is important to understand what makes carers' mental health better or worse, to support them appropriately and help them stay in good health.
Aim: To synthesise what is known about what can affect carers' mental health during end-of-life caregiving.
Method: We identified research literature (01.01.2009-24.11.2019) that looked at factors that may make carers mental health better or worse when supporting someone nearing end–of-life. We focused on adult carers of adult patients cared for at home. Researchers worked with the help of a carer Review Advisory Panel to group similar factors into themes. This report presents research that used numerical measurements (for instance, surveys) to investigate factors related to carers' mental health.
Results: Findings from 63 studies were grouped into seven themes. 1) How the patient was: worse patient mental health and quality of life related to worse carer mental health. 2) How much caregiving affected carers' lives: greater impact, burden and feeling tasks were difficult related to worse mental health. 3) Relationships: good relationships between family members and between carer and patient seemed important for carer mental health. 4) Finance: having insufficient resources may affect carers' mental health. 5) Carers' internal processes (carers' thoughts and feelings): feeling confident and prepared for caregiving related to better mental health. 6) Support: carers' mental health seemed related to support given by family and friends and to getting sufficient, satisfactory support from formal services. 7) Background factors: older carers seemed generally to have better mental health, and female carers worse mental health overall.
Conclusions: Factors that may affect carers' mental health are many and varied. We therefore need a broad strategy to help carers stay in good mental health during caregiving.

1) Background and Introduction

Family and friends (hereafter 'carers') provide vital unpaid support for people at end-of-life (EOL), including physical and psychological support, coordinating care and monitoring. A national survey of carers of people with cancer in England found that they provided a median of 70 hours of care per week in the patient's final months of life[1]. Reviews have consistently shown carers to be a main factor in sustaining care at home at EOL[2, 3], which is likely to reduce acute inpatient care costs and pressures on care home beds, and to be in accord with patient preferences[4]. Carers' contributions therefore are likely to be of considerable benefit both to patient care and to health and social care services.

Our dependency on carers is likely to increase, given projected future demographic increases in people over 85 and those with life limiting illness[5], dependency in the final years of life[6] and number of deaths[7]. Health and social care services are likely struggle to meet increasing future demands. The Covid-19 pandemic saw increases in deaths at home in England and Wales, between waves of the pandemic, while deaths from leading causes in inpatient healthcare decreased, indicating an increased reliance on carers to provide home care when healthcare systems are under strain.[8]

However, caregiving for patients at EOL has substantial negative impacts on carers' own health. The greatest and most consistent impacts are on carers' psychological health[9], where the greatest gains may be made. The prevalence of carer anxiety and depression during palliative care have been reported as 34-72%[10-15] and 39-69%[14-17], respectively. Moreover, during the patients' final three months of life, the prevalence of clinically significant carer psychological morbidity was found to be 83% in a national census study of cancer deaths in England[9]. An estimated 500,000 carers provide end-of-life (EOL) care per annum in England[18]. Given the numbers affected, these high levels of psychological morbidity arguably represent a sizable public health problem with likely long-term effects. Carers' pre-bereavement psychological health is a main predictor of post-bereavement psychological health[19, 20]. If carers become unable to cope, this is likely to have negative impacts on the quality of patient care and increase likelihood of inpatient hospital admissions.

Research shows there is large individual variation in level of psychological morbidity from EOL caregiving. Understanding what predicts this variation provides important opportunities for identifying those at risk and pointers for intervention. An earlier, comprehensive review of the quantitative carer literature 1998-2008 by Stajduhar et al[20] identified potential predictors as: patient characteristics (including disease type and severity); carer sociodemographic characteristics (e.g. age, gender, ethnicity, socioeconomic status); carers' internal appraisals (e.g. of self efficacy, preparation) and coping strategies; characteristics of the caregiving context and disruptions and restrictions to activities. The review also noted a lack of research into relational variables and available support, and of features of interaction with the healthcare system and providers. Whilst valuable, this earlier review considered potential predictors only as one part of a wider review and only provided a narrative summary of findings.

A more systematic, detailed synthesis of the potential predictors is needed to give clearer pointers for action and illuminate two broad approaches to reduction in carer psychological morbidity. First, there are factors that cannot realistically be changed (e.g. age and gender), but whose effects can be mitigated through early, targeted support for those at higher risk. Second, there are factors that can be changed, e.g. self-efficacy, that can be subjected to more direct intervention to reduce likelihood of later psychological morbidity. What is non-modifiable or modifiable will partly depend on the stakeholder using the information: for instance, policymakers may through legislation help modify work and financial factors that may put carers at risk, while practitioners may improve carers' self-efficacy through information tailored to their individual caregiving situation.

Two points can be made from the above. First, there are likely to be a range of potential predictors that require different strategies, therefore we need a comprehensive rather than piecemeal understanding of what may predict carer psychological morbidity, to enable a coordinated and integrated approach to maximise impact. Second, any findings need to be communicated to different stakeholders in ways that are meaningful and relevant to them, so that they can use this information to help enact change within their own remits.

The review of quantitative, observational studies reported here is part of a larger project to synthesise the qualitative and quantitative literature on potential predictors of carer psychological morbidity and to communicate these to stakeholders with capacity to act on this information through formats and media they find most useful. The project is novel in its comprehensiveness and detail, and in its focus on engaging with stakeholders.

The present review will help establish whether research indicates that there is a measurable, significant relationship between a potential predictor and carer psychological morbidity. However, it cannot directly establish likelihood of causality, nor give insight into carer experiences, or the reasons why a factor may cause distress. This will be covered in further papers on our reviews of the intervention and qualitative literature, respectively. The way the findings are presented here is informed by our Public Patient Involvement (PPI) work with a carer Review Advisory Panel (RAP), whose role was to assess the validity, relevance and accessibility of findings to carers. The collaboration with the carer RAP and a wider end-of-project stakeholder consultation will be reported in detail elsewhere.

This project focuses on factors associated with carer mental health during home care, as this is the setting where most care takes place, where the carer is most involved in a breadth and depth of care tasks, and where most patients want care to take place.

2) Aims and Objectives

The overall aim of the project is helping to reduce psychological morbidity among carers during EOL by

- conducting quantitative and qualitative evidence synthesis of factors that increase or decrease carer psychological morbidity during EOL caregiving
- integrating of these syntheses into a coherent framework of factors
- translating of the findings into accessible, bespoke information for key stakeholders to help them better target efforts to reduce carer psychological morbidity

The objective of the current review is conducting a comprehensive evidence synthesis of observational quantitative studies to identify factors associated with carer psychological morbidity during caregiving at home for adults at end-of-life, where morbidity is defined as anxiety, depression, distress or reduced quality of life.

The remaining qualitative and intervention syntheses, integration of findings into a framework, and the work with stakeholders, are reported in separate reports [links to be provided]

3) Methods

We conducted a systematic search and evidence synthesis of the literature. To accommodate the wide ranging literature, findings were synthesised thematically using box scores, supported by meta-analysis where data permitted. The review was registered with PROSPERO (PROSPERO 2019 CRD42019130279) and was carried out in accordance with the reporting guidelines: Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Meta-Analysis of Observational Studies in Epidemiology (MOOSE).

3.1 Search and selection strategy

Studies were identified through an electronic search of the literature 2009-2019 in the following databases:

- Medline [Ovid Online]
- CINAHL Plus [EBSCO]
- PsycINFO [Ovid Online]

- Social Sciences Citation Index [Institute for Scientific Information ; Clarivate Analytics platform]
- EMBASE [Ovid]
- Cochrane Central Register of Controlled Trials (CENTRAL) [
- Database of Abstracts of Reviews of Effects (DARE) [University of York Centre for Reviews and Dissemination]

Following piloting, searches were completed in December 2019, using MESH terms relevant to caregivers supplemented with string carer terms, including variations on '*family care giver' and 'informal carer'. These were combined with MESH terms for* '*palliative care*' supplemented by string terms *'end-of-life' and 'end of life'.* The search strategy can be viewed in full in Appendix 1.

Study inclusion was based on the following inclusion criteria:

Population: adult informal/family carers caring for adult patients at the end-of-life (end-of-life was defined as the likelihood that the patient would die within a year). Focus was on home, community and outpatient settings. Organisation for Economic Co-operation and Development (OECD) countries, to ensure health care structures were comparable with the UK.

Intervention: factors associated with psychological morbidity in end-of-life carers; studies which reported on the relationship between factors and outcomes.

Outcome: mental health outcomes in carers focused on anxiety, depression, distress and quality of life (whether self reported or clinically defined) in home, community and outpatient settings. Psychological wellbeing was defined as the primary outcome for quality of life, with general quality of life used as a proxy measure where a psychological wellbeing quality of life score was not available.

Study: Observational studies.

Studies were excluded based on the following criteria:
(a) factors or outcomes related to bereavement only
(b) inpatient settings, given the focus on factors associated with carer mental health during home care
(c) in languages other than English or Scandinavian, which would require further translation
(d) systematic reviews

Finally, the review was limited to published peer reviewed empirical studies.

Ten percent of both titles/abstracts and full texts were screened independently by two reviewers. Over 90% agreement was established in each case, indicating that no further modifications to the inclusion and exclusion criteria were required. Subsequent studies on title/abstract and full texts were screened by one reviewer.

The above represents some tightening and simplification of the search and selection process due to time pressures, and on advice from the project's external Study Steering Committee (and notification to NIHR HS&DR), including limitation to most recent decade, fewer databases, OECD country and English or Scandinavian publications, omission of dissertations and grey literature, and single screening once consistency was established. Similar simplification was applied to the data extraction below.

3.2 Data extraction and QA process

Data extraction

A data extraction template to extract information on both factors and mental health outcomes was developed jointly by two reviewers and subsequently tested independently by the two reviewers on a 10% sample of included studies. Differences were resolved by discussion and the data extraction template subsequently clarified to mitigate for any further inconsistencies between reviewers. Data extraction was then carried out by one reviewer and a random sample of 10% of remaining studies checked by another. No discrepancies between reviewers were identified in the checking process.

Where a study reported findings for both the overall outcome measure of quality of life and the mental health/emotional subdomain of quality of life (psychological wellbeing), only findings related to the mental health/emotional subdomain of quality of life were extracted, to reflect the focus on psychological morbidity.

Where a study reported findings for the overall domain of a factor as well as the individual subdomains of the factor (e.g. caregiver burden), findings were reported for the overall scale only to avoid ‘over representing’ factors as much as possible (i.e. providing ‘multiple counts’ of the same factor) However, where only subdomain findings were reported by the study, these were extracted.

Findings relating to the relationship between individual mental health outcomes were not extracted, in keeping with the project aims to identify factors associated with carers’ mental health.

Statistical information was only extracted for bivariate relationships to avoid potential collinearity. Where studies reported multivariate analysis only, a narrative summary of the findings was documented.

Quality Assessment

An adapted version of the Newcastle-Ottawa Quality Assessment Scale for cohort and case-control studies[21] was used to perform quality assessment of cohort/longitudinal studies and cross-sectional studies of included studies (see Appendix 2).This modified version was adapted from the NOS scale used in another study[22] to appropriately assess the quality of cross-sectional studies.

Quality assessment was carried out independently by two reviewers on 10% of the studies. Over 90% agreement was achieved so subsequent studies were quality assessed by one reviewer and a random sample of 10% of studies checked by another. No discrepancies between reviewers were identified in the checking process.

Thematic Synthesis with PPI

Individual factors were synthesised thematically into sub-themes using box scores[23]. This was conducted in ways that were meaningful to the carer Review Advisory Panel in order for them to assess the relevance of findings. For example: (1) renaming factors reported in studies in language that made sense to carers; reporting findings from correlation studies so they referred consistently to improved or worsened mental health to allow easier interpretation and (2) thematic groupings of factors.

Each sub-theme was then synthesised further by mapping individual sub-themes under one of the overarching thematic groupings identified in the qualitative synthesis [link to be provided]: patient condition, impact of caring responsibilities, relationships, finances, carer internal processes and support. These were informed by the carer RAP as useful ways of presenting the evidence.

Meta-analysis

The outcome data were converted to standardised mean difference (SMD) using comprehensive meta-analysis (CMA) software. Effect sizes were then pooled using DerSimonian-Laird random-effects[24]. Results of each mental health outcome (i.e. anxiety, depression, distress or quality of life) were presented in the forest plots with the SMD calculated using Hedges' g and then interpreted according to Cohen's criteria[25]. Where data from five or more studies were pooled in a meta-analysis, a random effects model was performed. For pooled data of less than five studies, a fixed effects model was calculated. Heterogeneity was quantified using the I2 statistic with values 25%, 50%, and 75% indicating low, moderate, and high heterogeneity, respectively[26]. If more than 10 studies were included in a meta-analysis, funnel plots and Begg's and Egger's test were used to examine potential for publication bias[27]. All meta-analyses were conducted in R version 4.0.3 (R Foundation for Statistical Computing) using the 'meta' or 'metafor' packages[28,29].

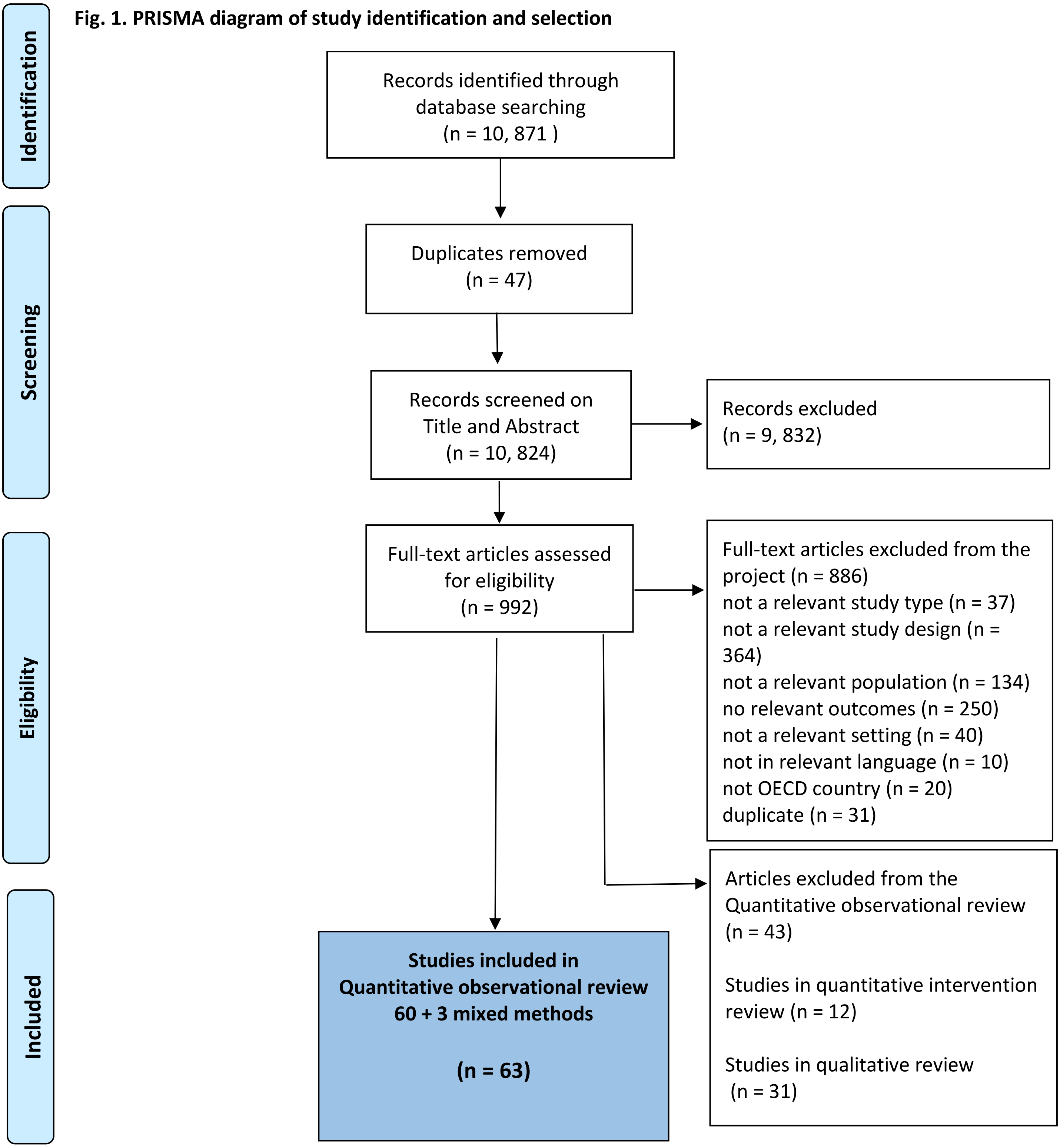
The opportunity for meta-analysis was limited due to the wide range of factors and the range of mental health outcomes considered. There were therefore few instances where studies considered sufficiently similar factors and their relation to the same outcome, to permit meta-analysis.

4) Results

4.1 Hits and paper selection

The PRISMA diagram details the study identification and selection process (Fig. 1).

Fig. 1. PRISMA diagram of study identification and selection



Sixty-three studies met the study inclusion criteria for observational studies. Characteristics of the 63 included studies are specified in Table 1. Studies were excluded where: a substantial proportion of the patient population were considered unlikely to be end-of-life e.g. a study which reported metastases in less than 50% of a cancer study population; factors or outcomes related to bereavement only; the outcome measured was anticipatory grief; or the outcome was a composite measure encompassing mental health outcomes included in our review, but where it was impossible to extrapolate findings specifically related to our outcomes, e.g. a study with the outcome measure Profile of Mood States (POMS), which captures the mood states of anger, depression, fatigue, tension, and vigour together; a substantial proportion of the patient population were unlikely to be cared for at home at the time of the study e.g. a study looking at the impact of patient stay in an intensive care unit on carers. Finally, due the large volume of primary research papers returned, dissertations and conference abstracts were excluded on ‘study type’; systematic reviews were excluded on ‘study design’.

Table 1. Observational review study summary table

Reference & country	Study aims	Study design & data collection; QA score	Participants (number; demographics; carer-patient relationships)	Patient condition	Factors investigated in bivariate analysis	Outcomes (anxiety, depression, distress, QoL)
Aoun et al. (2015)[30] Australia	- Compare the profile and differences in wellbeing outcomes of family caregivers of people with brain cancer with those of people with all other cancers who participated in the CSNAT (The Care Support Needs Assessment Tool) Intervention. - Assess the feasibility of the CSNAT Intervention to identify and address support needs of family caregivers of people with brain cancer in home-based palliative care.	Cross-sectional Secondary analysis; 4	*N* = 500; Mean age, years = 60 73% female; 69% spouse/partner, 21% son/daughter	Mixed cancer: Lung (22.4%) Breast (9.6%) Colorectal (8.8%) Prostate (8%) Pancreas (7.2%) Primary brain cancer (6%)	Patient condition (primary brain cancer vs. other cancers)	QoL: SF12v2 MH
Areia et al. (2019)[15] Portugal	- Determine the prevalence of psychological morbidity with regard to psychological distress, depression, anxiety, somatization, and complicated anticipatory grief in family caregivers of people living with terminal cancer. - Describe which factors may be related to psychological distress, depression, anxiety, somatization, and complicated anticipatory grief.	Cross-sectional Survey; 6	*N* = 112 Mean age, years (SD) = 44.5 (15.3) 82.1% female; 42.9% other (not spouse or child), 37.5% adult child	Mixed cancer: Gastrointestinal (24.5%) Respiratory (20.9%) Other solid tumors (20.9%) Central nervous system (11.8%) Breast (9.1%)	Unmet needs in caregiver	Anxiety: BSI anxiety subscale Depression: BSI depression subscale Distress: GSI (calculated by summing up items proposed in short version of BSI)

Bachner & Carmel. (2009a)[31] Israel	- Assess caregivers' perceived level of open communication about illness and death (= mortality communication) with their terminally ill relatives. - Examine the contribution of different caregiver characteristics and situational variables to explain open communication	Cross-sectional Survey; 3	*N* = 236 Mean age, years (SD) = 55.4 (13.7) 77.5% female; 47.9% son/daughter 44.9 % spouse	Cancer	Quality of patient-caregiver relationship (communication)	Depression: BDI-II (modified)
*Bachner et al. (2009b)[32] Israel	Compare response levels as well as the relative strength of association between mortality communication (= candid discussion of the terminal illness and impending death between caregivers and their loved ones) and psychological distress among caregivers of terminal cancer patients within two distinct care contexts (i.e. home hospice vs inpatient hospital settings).	Cross-sectional Survey; 3	*N* = 126 Mean age, years (SD) = 56.61 (14.38) 79.2% female 48.5% spouse, 44.6% son/daughter	Cancer		BDI-II (modified)
Bachner et al. (2011)[33] Israel	- Compare the relative strength of association between mortality communication (candid discussion of the terminal illness and impending death between caregivers and their loved ones), fear of death, and psychological distress (depressive symptomatology, emotional exhaustion) among secular (non-religious) and religious Israeli Jewish	Cross-sectional Survey; 2	*N* = 236; Age = 55.37 (13.69); 77.5% female; 47.9%, son/daughter 44.9% spouse	Cancer	Caregiver coping pattern (secular vs. religious)	Depression: BDI-II (modified)

	caregivers of terminal cancer patients.					
Boele et al. (2013)[34] The Netherlands	- Determine whether apart from tumour characteristics, health-related quality of life (HRQOL) and neurological symptoms of the patient as perceived by caregivers are related to the informal caregiver's HRQOL and feelings of mastery. - Investigate if a structured intervention consisting of psychoeducation and cognitive behavioural therapy leads to improvements in the mental component of HRQOL and mastery of caregivers.	Cross-sectional Secondary analysis; 4	*N* = 56; Mean age, years = 50.66; 64.3% female; carer-patient relationship not reported	Cancer: 30.4% Grade 3 glioma 69.6% Grade 4 glioma	Patient condition Patient quality of life Patient symptoms	QoL: SF-36 – MH
Burridge et al. (2009)[35] Australia	Examine how carers' and patients' perceived stage of cancer (PSOC) changes over the patients' final year in comparison with the perceptions of carer–patient dyads; whether carers' anxiety and depression scores are correlated with their PSOC, and whether these scores differ by gender.	Cohort Survey; 4	*N* = 57 Mean age, years (SD) = 57 (12.7); 76% female; 76% spouse	Cancer: Lung (30%) Digestive tract (26%) Other (26%) Breast (18%)	Patient stage of disease (perceived stage of cancer)	Anxiety: HADS-A Depression: HADS-D
Burton et al. (2012)[36] USA	Expand understanding of caregiver burden and psychosocial- spiritual outcomes among understudied groups of caregivers - cancer, congestive heart failure, and chronic obstructive pulmonary	Cross-sectional Survey; 7	*N* = 139; Mean age, years (SD) = 57 (14.88) 81.29% female 69.78% white;	Mixed: cancer COPD CHF % composition not given	Patient disease burden Patient disease severity Caregiver coping patterns Caregiver support	Anxiety: POMS-anxiety Depression: CES-D 10

	disease caregivers - by including differences in outcomes by disease in a diverse population.		56.83% spouse/partner, 43.17% other (child, friend or sibling)		Caregiver age Caregiver employment status Caregiver gender Caregiver marital status	
Buscemi et al. (2010)[37] Spain	Analyse the possible relationship between the needs of primary caregivers of patients with terminal cancer and burden, stress, and anxiety.	Cross-sectional Survey; 2	*N* = 59 Mean age, years (SD) = 53.35 (15.66); 81.4% female; 57.6% spouse, 35.6% son/daughter	Mixed cancer: Lung (33.9%) Other (33.8%) Colon (13.6%) Breast (11.9%) Liver (6.8%)	Unmet needs in caregiver Caregiver burden (BCOS)	Anxiety: HADS-A Depression: HADS-D
Butow et al. (2014)[38] Australia	- Describe the QoL of caregivers of women with ovarian cancer. - Describe the most frequent and severe unmet needs in caregivers. - Identify caregiver and patient predictors of caregiver quality of life.	Cohort Survey; 8	*N* = 99; Mean age, years (SD) = 59 (13.2); 20% female; 78% husband/partner, 16% child	Ovarian cancer (100%)	Patient stage of disease Caregiver gender Relationship to patient Rural location	QoL: SF12v2 MH Distress: HADS (combined score)
Catt et al. (2012)[39] UK	To evaluate and compare oncologist-led follow-up with a multidisciplinary group follow-up method from the perspective of patients and caregivers after patient radical treatment for high-grade glioma.	Cohort Survey; 6	*N* = 32; Mean age, years = 51; 56.25% female; 87.5% spouse/partner, 62.5% offspring	Single cancer: High grade glioma	Caregiver education Caregiver employment status Caregiver gender Relationship to patient Patient treatment Caregiver lifestyle adjustments Caregiver workload	Distress: GHQ-12
Duimering et al. (2019)[40] Canada	To assess carers of their patient population, evaluate their expressed caregiving burden and quality of life, and	Cross-sectional Survey; 6	*N* = 200; Mean age, years (SD) = 58.7 (14.0); 60.8% female;	Mixed cancer: Lung 25% Prostate 19.3% Breast 18.8%	Caregiver gender Relationship to patient	QoL: CQOLC

	determine baseline engagement with support services.		60.6% spouse, 28.8% child	Colorectal 5.7% Renal 4.5% Bone 4.5%	Caregiver employment status Caregiver socioeconomic status Rural location Caregiver lives with patient Patient disease burden Patient treatment Caregiver workload Caregiver workload Caregiver support	
*Ellis et al. (2017)[41] USA	Examined the relationship between the number of co-existing health problems (patient comorbidities and caregiver chronic conditions) and quality of life among patients with advanced cancer and their caregivers, and assessed the mediating and moderating role of meaning-based coping on that relationship.	Cross-sectional Secondary analysis; 9	*N* = 484; Mean age, years (SD) = 56.5 (13.4) 56.8% female 79.6% white; 70% spouse, 15.3% son/daughter	Mixed cancer: Breast (32.4%) Lung (29.1%) Colorectal (25.4%) Prostate (13.0 %)		QoL: FACT-G (version 4)
Exline et al. (2012)[42] USA	Examine the relevance of forgiveness to carers, and relation to unresolved offences and depression.	Cross-sectional Survey; 3	*N* = 142; Mean age, years (SD) = 60.3 (13.8) 74% female 82% white; 44% child, 42% spouse	Mixed: Cancer (43%) Dementia/ Alzheimers (32%) Heart disease (23%) Lung disease (18%)	Quality of patient-caregiver relationship	Depression: CES-D
Fasse et al. (2015)[43] France	- Describe depressive symptoms and depression among spouses who care for palliative cancer patients. - Identify the most important	Cross-sectional Survey; 9	*N* = 60 (all spouses); Mean age, years (SD) = 62.39 (12.99) 36.7% female	Mixed cancer: Breast (36.6%) Lung (16.7%) Cervix (10%) Other (36.6%)	Quality of patient-caregiver relationship Caregiver coping patterns	Depression: BDI-short form

	factors explaining depression among these individuals.				Patient disease severity Caregiver gender	
Flechl et al. (2013)[44] Austria	To investigate the experiences of 52 caregivers of deceased glioblastoma multiforme (GBM) patients treated in Austria.	Cross-sectional Survey; 1	*N* = 52; Mean age, years = 60 67% female; 88% partner	Glioblastoma (100%)	Caregiver finances Caregiver age Patient age Duration of care	QoL: measure from researchers' own questionnaire
*Franchini et al. (2019)[45] Italy	To investigate impact of possible predictors of carers' QoL.	Cross-sectional Survey; 6	*N* = 570; Mean age, years (SD) = 58.8 (13.9) 77.4% female 46.1% partner, 38.4% offspring	Mixed cancer: Gastrointestinal (33.5%) Thoracic (16.1%) Genitourinary (16.3%) Breast (10.5%)		QoL: CQOLC
*Francis et al. (2011)[46] USA	- Investigate how relationships between advanced cancer caregivers and others – specifically family members and the patient's health care providers – are associated with the emotional distress or wellbeing experienced by caregivers during the early treatment phase of cancer care. - Examine moderating effects by race (African American and white) in the association between these relationships and emotional distress.	Cross-sectional Secondary analysis; 7	*N* = 397; Median age, years = 51 78.3% female 68.3% white; 100% family members (no further breakdown)	Mixed cancer: stage IV (or Stage III lung, pancreatic or liver cancer) % composition not reported		Anxiety: POMS - Tension/anxiety Depression: POMS - Depression-dejection subscale
Götze et al. (2014)[12] Germany	- Examine the level of psychological distress and the quality of life of palliative cancer patients and their family caregivers.	Cross-sectional Survey; 8	*N* = 106; Mean age, years (SD) = 64.1 (11.1) 67.9% female; 75% partner, 16% son/daughter	Mixed cancer: Prostate cancer (17.0%) Lung cancer (14.2%) Pancreas (13.2%) Colon (11.3%)	Patient symptoms Quality of patient-caregiver relationship	Anxiety: HADS –A Depression: HADS –D

	- Investigate the impact of sociodemographic and care-related factors on psychological distress of palliative patients and their family caregivers.					Distress: HADS (combined score)
Govina et al. (2019)[47] Greece	To determine the factors associated with the anxiety and depression of family members caring for patients undergoing palliative radiotherapy.	Cross-sectional Survey; 7	*N* = 100; Mean age, years (SD) = 53.3 (12.6) 76% female; 59% spouse, 27% child	Mixed cancer: Lung (48%) Breast (22%) Urogenital (20%)	Patient gender Caregiver gender Patient condition Patient treatment Patient lives with caregiver Previous experience of informal caregiving Caregiver mode of transport Caregiver marital status Patient educational level Caregiver educational level Additional caring responsibilities Relationship to the patient Caregiver employment status Caregiver age Caregiver burden Patient medical history	Anxiety: HADS-A (Greek) Depression: HADS-D (Greek)
Grant et al. (2013)[48] USA	Describe burden, skills preparedness, and quality of life for caregivers of patients with	Cohort Survey; 8	*N* = 163; Mean age, years = 57.23 64% female 71% white;	Non-small cell lung cancer (100%)	Patient stage of disease	Distress: Psychological distress thermometer

	non-small cell lung cancer (NSCLC) and describe how the findings informed the development of a caregiver palliative care intervention that aims to reduce caregiver burden, improve caregiving skills, and promote self-care.		68% spouse/partner, 16% daughter			QoL: City of Hope QOL Scale-Family version - psychological wellbeing domain
Hampton & Newcomb (2018)[49] USA	To determine the relationship between self-efficacy and perceived stress in adult carers providing EOL care.	Cross-sectional Survey; 4	*N* = 78; Mean age, years (SD) = 61.21 (13.91) 74.4% female 74% white; carer-patient relationship not reported	Mixed: Cancer (37.2%) Heart problems (17.9%) Dementia (11.5%)	Self-efficacy	Anxiety: PSS
Hannon et al. (2013)[50] Canada	- Assess satisfaction with care in patients with advanced cancer and their caregivers in an ambulatory oncology setting and to examine whether there were important differences between patient and caregiver reports. - Identify factors associated with patient and caregiver satisfaction with care.	Cross-sectional Secondary analysis; 7	*N* = 191; Mean age, years (SD) = 56.1 (12.1) 66% female; 84.3% spouse/partner, 11.5% son/daughter	Mixed cancer: Gastrointestinal (37.7%) Genitourinary (17.8%) Breast (17.3%) Lung (16.2%) Gynaecological (11%)	Quality of care	QoL: CQOLC
Henriksson & Arestedt. (2013)[51] Sweden	Explore factors associated with preparedness and to further investigate whether preparedness is associated with caregiver outcomes.	Cross-sectional Secondary analysis; 8	*N* = 125; Mean age, years (SD) = 57.7 (15.8) 60.8% female; 58.4% spouse, 22.4% adult children	Mixed: Cancer (88.8%) Other (11.2%)	Preparedness for caregiving	Anxiety: HADS-A Depression: HADS-D
Hoefman et al. (2015)[52] Australia	To study construct validation of the Carer Experience Scale (CES) and the CarerQol and to	Cross-sectional Survey; 6	*N* = 97; Mean age, years (SD) = 62.3 (11.9)	Not reported	Time for respite Caregiver support	QoL: CarerQOl-CarerQOl-7D

	investigate the effect of caregiving on caregivers in end-of-life care.		71% female 98% white; 59% partner, 29% child		Positive aspects of caregiving Control over care situation Quality of patient-caregiver relationship Caregiver burden Additional caring responsibilities Caregiver finances	dimension-MH question
Huang & McMillan (2019)[53] USA	To apply the Actor-Partner Interdependence Model (APIM) to elucidate importance of mutual effects within dyads with advanced cancer examining contribution of depression on their individual (own) QOL and their carers' QOL.	Cross-sectional Secondary analysis; 6	*N* = 660; Mean age, years (SD) = 65.49 (13.81) 74% female 96% white; 57% spouse, 11% daughter	Mixed cancer % composition not reported	Patient symptoms	Depression: CES-D QoL: SF-12 MH
*Hudson et al. (2011)[54] Australia	To examine the psychological and social profile of family caregivers on commencement of receiving palliative care services.	Cross-sectional Secondary analysis; 6	*N* = 301; Mean age, years (SD) = 56.52 (13.89) 73.1% female; 47.8% spouse, 37.2% adult children	Mixed cancer: Gastrointestinal tract cancer (20.3%) Lung cancer (13.6%) Head and neck cancer (10.6%) Urogenital cancer (10.6%)		Anxiety: HADS-A Depression: HADS-D
Ito & Tadaka (2017)[55] Japan	To identify the associated factors of QOL among family carers of patients with terminal cancer at home in Japan.	Cross-sectional Survey; 8	*N* = 74; Mean age, years (SD) = 63.6 (12.2) 79.7% female; 35.1% wife, 28.4% daughter	Mixed cancer: Lung 29.7% Colon 18.3% Liver 14.9% Brain 12.2% Prostate 12.2%	Patient age Patient gender Patient condition Patient symptoms Patient treatment	QoL: CQOLC - Japanese

				Stomach 8.1% Pancreas 8.1%	Patient disease burden Caregiver support Duration of care Caregiver age Caregiver gender Relationship to patient Family dynamics Caregiver finances Caregiver employment status Caregiver health status Caregiver sleeping hours Self-efficacy Caregiver support Quality of care Accessible information	
Jacobs et al. (2017)[56] USA	Understand the prevalence of psychological symptoms (depression & anxiety) in patients and carers and to determine whether their distress is interdependent.	Cross-sectional Survey; 10	*N* = 275; Mean age, years (SD) = 57.37 (13.61) 69.1% female 93% white; 66.2% spouse/partner, 18.4% son/daughter	Mixed cancer: Lung (54.6%) Non-colorectal gastrointestinal (45.4%)	Patient symptoms	Anxiety: HADS-A Depression: HADS-D
Janda et al. (2017)[57] Australia	To address research gap in quantifying association between patients' and their immediate carers' wellbeing	Cross-sectional Survey; 6	*N* = 84 Age: 38% <=60years 37% 61-70 years 21% 70+ years 73% female; 81% spouse/partner, 12% son/daughter	Pancreatic cancer (100%)	Patient quality of life Relationship to patient Caregiver age Caregiver gender Caregiver education Caregiver support Patient symptoms	Anxiety: HADS-A Depression: HADS-D QoL: FACT-GP

Janssen et al. (2012)[58] The Netherlands	To assess caregiver burden and positive aspects of caregiving in family caregivers of patients with advanced COPD, CHF or CRF	Cross-sectional Survey; 8	*N* = 159; Mean age, years (SD) for each condition group COPD = 62.9(11.5), CHF = 67.3 (11.5), CRF = 59.1 (15.2) 73% female; 83% spouse, 12% child	Mixed non-cancer: COPD (45.9%) CHF (28.3%) CRF (25.8%)	Patient condition (COPD vs CHF vs CRF)	Distress: FACQ PC
*Kapari et al. (2010)[59] UK	To identify the risk factors for poor caregiving and bereavement outcomes by assessing both patients and caregivers on a range of measures	Cohort Survey; 9	*N* = 100; Mean age years = 65.3 75% female 89% white British; 85% spouse/partner	Mixed: Cancer 96% (lung 22% prostate 12% breast, ovarian, colon 5% bowel 5% bladder 2% other cancer 40%) MND (2%) COPD (1%) Liver failure (1%)		Distress: CIS-R
*Kenny et al. (2010)[60] Australia	To investigate associations between health and a range of caregiving context variables	Cross sectional Survey; 5	*N* = 178; Mean age, years (SD) = 61.7 (13.5) 71% female; 59% spouse, 29% child/grandchild	Mixed: Cancer 89% (main categories: colorectal 15% lung 14% prostate 13%) Non cancer 11% (main categories cardiac failure 2.3% chronic airway limitation 1.7% pulmonary fibrosis 1.7%)		QoL: SF-36

Kershaw et al. (2015)[61] USA	To investigate actor and partner effects of advanced cancer patients' and their family caregivers' mental health, physical health and self efficacy over time, and to investigate the effects of patients' and caregivers' self efficacy on their own and the other dyad members' mental health and physical health over time	Cohort Secondary analysis; 11	*N* = 484; Mean age, years (SD) = 56.7 (12.6) 57% female 83% white; 74% spouse, 19% relative	Mixed cancer: Breast cancer 37% Lung 24% Colorectal 23% Prostate 16%	Caregiver age Caregiver gender Relationship to patient Patient disease burden Patient condition	Distress: FACT-G emotional wellbeing
Kobayakawa et al. (2017)[61] Japan	To determine the prevalence of delirium and suicidal ideation among patients with cancer and determine whether these and other factors influence caregivers' psychological distress.	Cross-sectional Survey; 6	*N* = 532; Mean age, years (SD) = 61.8 (12.1) 74% female; 53% spouse	Mixed cancer: lung 21% stomach, oesophagus 17% colon, rectum 12% liver, bile duct, pancreas 23% breast 5% prostate, kidney, bladder 8%	Caregiver gender Relationship to patient Caregiver educational level Caregiver finances Caregiver health status Caregiver support Patient symptoms Health professionals understanding of patient needs Control over care situation Patient treatment Acceptance of patient condition	Depression: Single, self created question
Loggers & Prigerson (2014)[63] USA	Authors interested in whether and how, the EOL experiences of adult patients with rare cancers differed from that of individuals with common cancers.	Cohort Interviews; 7	*N* = 618; Age and gender not reported; Spouse & adult child % composition not reported	Mixed cancer: lung 35.2% colorectal 18.2% breast 18.0% pancreatic 11.6% Rare cancers N=195:	Patient condition	QoL: SF-36 Distress: SCID

				gastroesophageal 19.0% ovarian & cervical 15.4% hepatocellular, biliary, gallbladder 13.3% head & neck 11.3% Sarcoma & gastrointestinal stromal tumour 10.8% leukaemia, multiple myeloma, Hodgkin lymphoma 10.3% Central nervous system 7.7% Other 12.3%		
Malik et al. (2013)[64] UK	- Compare experiences of caring between heart failure (HF) and lung cancer (LC) caregivers looking after breathless patients. - Determine which factors are associated with caregiver burden and positive rewards to caring in those looking after breathless patients	Cross-sectional Survey; 4	*N* = 101; Mean age, years (SD) for each condition group Heart failure = 65.8 (12.7) Lung cancer = 59.9 (12.8) 78% female; 72% spouse/partner, 20% childe	Heart failure (50.5%) Lung cancer (49.5%)	Patient condition Caregiver burden	Anxiety: HADS-A Depression: HADS-D QoL: SF-36 – MH
McIlfatrick et al. (2018)[65] UK & Ireland	To identify modifiable psychosocial factors associated with caregiver burden and to evaluate the support needs of caregivers when caring for people living with advanced HF at the end of life.	Cross-sectional Survey and semi-structured interviews; 5	*N* = 84; Mean age, years (SD) = 63.9 (14.3) 80% female; 52% spouse/partner, 22% son/daughter	Heart failure (100%)	Patient symptoms Patient quality of life Preparedness for caregiving Caregiver age	Anxiety: GAD-7 Depression: PHQ-9 QoL: MLHFQ

Mollerberg et al. (2019)[66] Sweden	- Determine whether family sense of coherence was associated with hope, anxiety and symptoms of depression in persons with cancer in the palliative phase and their family members. ("Sense of coherence" consists of comprehensibility (ability to understand the situations clearly), manageability (belief that one has access to sufficient resources to manage challenging situations), meaningfulness (belief that all challenges are worthy of engagement)).	Cross-sectional Survey; 7	*N* = 165; Mean age, years (SD) = 62.1 (13.6) 64.8% female 67.9% spouse/partner	Mixed cancer: Breast 16.2% Colon 15.1% Prostate 10.6% Kidney 10.6% Other 47.5%	Family dynamics	Anxiety: HADS-A Depression: HADS-D
Nielsen et al. (2017)[67] Denmark	To investigate pre-loss grief symptoms and the associations with situational, intrapersonal, and interpersonal factors in family caregivers of end-of-life cancer patients.	Cross-sectional Survey; 7	*N* = 2865; Mean age, years = 60.5 69% female; 63.6% spouse/partner 29% son/daughter	Mixed cancer: Lung 25.1% Colorectal 13.1% Breast 7.0% Prostate 7.5% Haematological 3.7% Other 43.6%	Pre-loss grief	Depression: BDI
*Nipp et al. (2016)[68] USA	To describe rates of depression and anxiety symptoms in family carers of patients with incurable cancer and identify factors associated with family carer psychological distress.	Cross-sectional Survey; 8	*N* = 275; Mean age, years (SD) = 57.4 (13.6) 69.1% female 93.1% white; 66.2% spouse, 18.5% son/daughter	Mixed cancer: Lung 54.2% Non-colorectal gastrointestinal 45.8%		Anxiety: HADS-A Depression: HADS-D
Nissen et al. (2016)[69] USA	To identify family-type clusters in an American sample of carers of terminally ill cancer patients and to examine the relationship	Cross-sectional Secondary analysis; 5	*N* = 598; Mean age, years (SD) = 52.89 (14.05) 72% female	Mixed cancer: % composition not reported	Family dynamics	QoL: SF-36 mental health

	between these clusters and carer QOL, social support and carer burden.		82% white; 58% spouse			
O'Hara et al. (2010)[70] USA	Not directly stated, but paper considers whether patient intervention affected carer outcomes, and whether patient measures affected carer outcomes (univariate correlations for latter).	Cohort Survey; 7	*N* = 198; Mean age, years (SD) for each group Intervention = 59.9 (13.0) Control = 58.0 (11.9) 77% female; 96% white; 71% spouse/partner	Mixed cancer: Gastrointestinal 42.4% Lung 36.4% Genitourinary 13.1% Breast 8.1%	Patient quality of life Patient symptoms Quality of care	Distress: MBCBS emotional subscale
Ownsworth et al. (2010)[71] Australia	To investigate the association between functional impairments of individuals with cancer and caregiver psychological well-being, and examine the moderating effect of social support.	Cross-sectional Survey; 7	*N* = 29 Mean age, years (SD) = 60.1 (11.7) 71.4% female; 88.8% spouse/partner	Brain tumour (100%) benign (stage 1 or 2 tumour)(52%) malignant (stage 3 or 4) (48%)	Patient disease burden	QoL: WHOQOL-BREF-psychological domain
*Parker-Oliver et al. (2017)[72] USA	To explore potential variables affecting depression and anxiety in informal hospice caregivers.	Cross-sectional Secondary analysis; 6	*N* = 395 Mean age, years (SD) = 60.6 (12.6) 81.52% female; 49.1% adult child, 30.4% spouse	Mixed: Cancer 37.22% Dementia 30.13% No additional information on the remainder of the sample given.		Anxiety: GAD-7 Depression: PHQ-9
Perez-Ordonez et al. (2016)[73] Spain	To identify the relationship between coping and anxiety in primary family caregivers of palliative cancer patients treated in a Pain and Palliative Care Unit.	Cross-sectional Interviews; 6	*N* = 50 Mean age, years (SD) = 55 (13.9) 94% female; 52% daughter, 28% spouse	Mixed cancer: Others (46%) Lung (14%) Prostate (12%) Bladder (12%)	Caregiving coping patterns Patient disease burden Caregiver burden	Anxiety: Anxiety subscale of Goldberg Scale
*Reblin et al. (2016)[74]	To describe relationship quality categories among end- of-life	Cross-sectional Survey;	*N* = 131	Cancer		Anxiety: HADS-A

USA	caregivers and to test the effects of relationship quality categories on caregiver burden and distress within a stress process model.	7	Mean age, years (SD) = 65.3 (10.74) 65% female 97% white; 100% spouse	% composition not reported		Depression: GDS-SF
Rivera et al. (2010)[75] USA	To examine predictors of depression symptoms in caregivers of hospice cancer patients.	Cross-sectional Secondary analysis; 7	*N* = 578 Mean age, years (SD) = 64.95 (14.01) 73.7% female 95.8% white; 42.4% wife, 25.2% other	Mixed cancer: Lung/mesothelioma (36%) Pancreas (8.7%) Colorectal (6.6%)	Patient psychological symptoms Patient quality of life Caregiver gender Relationship to patient Caregiver ethnicity Caregiver support Patient condition Patient disease burden Caregiver age Caregiver health status	Depression: CES-D 10
Seekatz et al. (2017)[76] Germany	To determine screening-based symptom burden and supportive needs of patients and caregivers with regard to the use of specialized palliative care (SPC).	Cohort Survey; 4	*N* = 46 Mean age, years (SD) = 53.3 (14.1) 56.5% female; 57% spouse/partner, 22% child	Mixed cancer: Glioblastoma (68.4%) Brain metastases (31.6%)	Patient treatment	Distress: Hornheider Questionnaire (adapted)
*Shaffer et al. (2017)[77] USA	To examine correlates of mental and physical health among caregivers of patients with newly-diagnosed incurable lung or non-colorectal gastrointestinal cancer.	Cross-sectional Secondary analysis; 9	*N* = 275 Mean age, years (SD) = 53.37 (13.61) 69.1% female; 66.4% spouse	Mixed cancer: Lung cancer (54.2%) Non-colorectal gastrointestinal cancer (45.8%)		QoL: SF-36 mental health
Siminoff et al. (2010)[78] USA	To investigate depressive symptomatology in stage III or	Cross-sectional Secondary analysis;	*N* = 190 Mean age, years (SD) = 55 (13.4)	Non-small cell lung cancer (100%)	Patient psychological symptoms Family dynamics	Depression: CES-D -20

	IV lung cancer patients and their identified caregiver.	7	75% female; 54.7% spouse, 18.9% child			
Stutzki et al. (2014)[79] Germany	To determine the prevalence and stability of WTHD and end-of-life attitudes in ALS patients, identify predictive factors, and explore communication about wish to hasten death (WTHD).	Cohort Survey; 8	*N* = 35 Mean age, years (SD) = 56.4 (12.7) 61% female; 79% partner, 14.5% son/daughter	Amyotrophic lateral sclerosis (ALS) (100%)	Patient disease severity	QoL: Numerical Ratings Scale - individual QOL
Thielemann & Conner (2009)[80] USA	To examine the role of social support as a mediating factor between caregiver demands and caregiver depression in spousal caregivers of patients with advanced lung cancer.	Cross-sectional Secondary analysis; 8	*N* = 164 Mean age, years (SD) = 61.9 (10.8) 60.4% female 98.2% white; 100% spouse	Lung cancer (100%)	Caregiver age Caregiver gender Caregiver ethnicity Caregiver educational level Length of patient-caregiver relationship Duration of care Caregiver burden Caregiver support	Depression: CES-D
*Trevino et al. (2019)[81] USA	To conduct secondary exploratory analyses of the relationship between individual and dyadic estimations of the patients' life expectancy and patient and caregiver QOL.	Cross-sectional Secondary analysis; 8	*N* = 162 Age, years 65+ (42.6%) less than 65 (57.4%) 66% female 89.5% white; 64.2% spouse/partner	Mixed cancer: Aggressive cancer (50%) - this includes lung cancer, GI cancers (except colon) and GU cancers (except prostate). Less Aggressive (50%) - this includes breast, prostate and colon cancers		Depression: DSM-IV (SCID) QoL: SF12v2 - emotional
*Valeberg et al. (2013)[82] Norway	To examine the level of symptom burden in a sample of cancer patients in a curative and palliative phase. In addition to determine a) whether the	Cross-sectional Secondary analysis; 6	*N* = 159 Mean age, years (SD) = 57.0 (12.3) 39% female; 89% spouse, 6% friend	Mixed cancer: Breast (46%) Prostate (18%) Other (18%) Colorectal (13%)		Anxiety: HADS-A Depression: HADS-D

	patients’ symptom burden and patients’ demographic variables, and b) the caregivers’ demographic variables’ impact on the caregivers’ quality of life and mental health.			Gynecologic (5%)		QoL: SF36-mental health
Wadhwa et al. (2013)[83] Canada	To evaluate the QOL and mental health of caregivers of patients with advanced cancer who are receiving ambulatory oncology care and associations with patient, caregiver and care-related characteristics.	Cross-sectional Secondary analysis; 7	*N* = 191 Median age, years (range) = 57 (22-83) 64.9% female 83.2% white; 83.8% spouse/partner, 5.2% son/daughter	Mixed cancer: GI (37.7%) Genitourinary (17.8%) Breast (17.3%) Lung (16.2%) Gynaecology (11%)	Caregiver gender Caregiver age Caregiver employment status Relationship to patient Caregiver burden Impact on work Patient treatment Patient symptoms Patient quality of life Caregiver health status Patient lives with caregiver Caregiver ethnicity Caregiver education Caregiver finances Caregiver workload Caregiver support Patient age Patient gender Patient disease burden	QoL: SF36-mental health
*Washington et al. (2015)[84] USA	To generate an in-depth understanding of the extent to which informal hospice caregivers experience symptoms of anxiety and to	Cross-sectional Secondary analysis; 7	*N* = 433 Mean age, years (SD) = 60.8 (12) 77.1% female 91.5% white;	Not reported		Anxiety: GAD-7

	identify the characteristics of caregivers who experience clinically significant (i.e., moderate or higher) levels of anxiety.		50.8% adult child, 30.7% spouse/partner			
Washington et al. (2018a)[85] USA	To examine the relationships between sleep problems, anxiety, and global self-rated health among hospice family caregivers.	Cross-sectional Secondary analysis; 7	*N* = 395 Mean age, years (SD) = 60.6 (12.6) 81.52% female; 49.10% adult child, 30.40% spouse	Mixed: Cancer (37.22%) Dementia (30.13%) No additional information on the remainder of the sample given.	Caregiver sleep problems	Anxiety: GAD-7
*Washington et al. (2018b)[86] USA	To evaluate mediational relationships among burden experienced by hospice FCGs because of symptom management demands, caregivers' coping responses, and caregivers' psychological distress.	Cross-sectional Survey; 5	*N* = 228 Mean age, years (SD) = 61.35 (12.65) 80.5% female Carer-patient relationship not reported.	Not reported		Anxiety: GAD-7 Depression: PHQ-9
Wasner et al. (2013)[87] Germany	The personal experience-based approaches toward quality of life, burden of care, and psychological well-being of PMBT patients' caregivers are examined.	Cross-sectional Survey and interviews; 4	*N* = 23 Mean age, years (range) = 51 (34-80) 81.5% female; 70.4% spouse, 29.6% parents or adult child	Primary Malignant Brain Tumour (100%)	Patient disease burden Patient quality of life Caregiver burden Caregiver gender	Anxiety: HADS-A Depression: HADS-D QoL: SEIQoL-DW
Wilkes et al. (2018)[88] USA	To determine the extent to which burden related to patients' symptom subtypes (emotional/psychological and physical) could predict informal hospice caregiver depression, and to illustrate the differences between caregivers who experience suicidal ideation and those who do not.	Cross-sectional Survey; 7	*N* = 229 Mean age, years = 61.4 80.5% female; 43.8% adult child, 33.6% spouse/long term partner	Mixed: heart disease, lung disease, cancer, dementia included. % composition not reported.	Patient symptoms	Depression: PHQ-9

Wittenberg-Lyles et al. (2013)[89] USA	To investigate the features of oral literacy in recorded care planning sessions between informal caregivers and hospice team members as they related to the caregiving experience.	Cross-sectional Secondary analysis; 5	*N* = 18 Mean age, years (range) = 64.5 (49-86) 78% female 94% white; 77% adult child, 11% spouse	Not reported	Communication with care professionals	Anxiety: CSAI QoL: CQOL-R
Wittenberg-Lyles et al. (2014)[90] USA	To compare how caregivers in pairs (informal collective caregivers) experience anxiety and depression compared to solo caregivers and how these outcomes changed over time. Specifically after controlling for social support and quality of life, does being in a caregiver pair affect anxiety or depression?	Cross-sectional Survey; 6	*N* = 304 Age 45.07% ≥ 61 years 47.04% 41-60 years 7.89% 21-40 years 76% female 91.4% white; 67.7% adult child, 24% spouse	Not reported	Caregiver support	Anxiety: GAD-7 Depression: PHQ-10

4.2 Narrative summary of evidence

The evidence is synthesised under seven themes that emerged from the qualitative synthesis in the project [link to be provided]. The order of themes does not imply importance. Rather, themes are presented in the same order across all syntheses in the project for consistency. The first six themes correspond with, and provide quantitative evidence for all the themes identified in the qualitative synthesis. Additionally, the quantitative evidence identified a further, broad theme of contextual factors. This included for example age, gender or socioeconomic status, which are factors that carers' are perhaps less likely to consider in qualitative reflections on their own carer experience. Table 2 shows a summary of the bivariate evidence synthesised under each of the seven themes, along with the studies underpinning each theme and the corresponding overall quality assessment score per theme.

Table 2: Summary of overarching themes from bivariate evidence

Sub-themes	**Studies underpinning overarching theme**
PATIENT CONDITION	**Overall Quality Assessment Score (mean +/- SD): 6.65 +/- 1.78**
Patient condition Patient disease burden Patient disease severity Patient Quality of Life (QoL) Patient stage of disease Patient symptoms Patient treatment	Aoun et al (2015)[30]; Boele et al (2012)[34]; Burridge et al (2009)#[35]; Burton et al (2012)[36]; Butow et al (2014)#[38]; Catt et al (2012)#[39]; Duimering et al (2019)[40]; Fasse et al (2015)[43]; Götze et al (2014)[12]; Govina et al (2019)[47]; Grant et al (2013)#[48]; Huang & Macmillan (2019)[53]; Ito & Tadaka (2017)[55]; Jacobs et al (2017)[56]; Janda et al (2017)[57]; Janssen et al (2012)[58]; Kershaw et al (2015)#[61]; Kobayakawa et al (2017)[62]; Loggers & Prigerson (2014)[63]; Malik et al (2013)[64]; McIlfatrick et al (2018)[65]; O'Hara et al (2010)#[70]; Ownsworth et al (2010)[71]; Perez-Ordonez et al (2016)[73]; Rivera et al (2010)[75]; Seekatz et al (2017)[76]; Simonoff et al (2010)[78]; Stutzki et al (2014)#[79]; Wadhwa et al (2013)[83]; Wasner et al (2013)[87]; Wilkes et al (2018)[88].
IMPACT OF CARING RESPONSIBILITIES	**Overall Quality Assessment Score (mean +/- SD): 5.57 +/- 2.10**
Caregiver workload Caregiver lifestyle adjustments Caregiver sleeping hours Caregiver sleep problems	Buscemi et al (2010)[37]; Catt et al (2012)#[39]; Duimering et al (2019)[40]; Flechl et al (2013)[44]; Govina et al (2019)[47]; Hoefman et al (2015)[52]; Hudson et al (2011)[54]; Ito & Tadaka (2017)[55]; Malik et al (2013)[64]; Perez-Ordonez et al (2016)[73]; Thielemann & Conner (2009)[80]; Wadhwa et al (2013)[83]; Washington et al (2018a)[85]; Wasner et al (2013)[87].
RELATIONSHIPS	**Overall Quality Assessment Score (mean +/- SD): 6.00 +/- 2.20**
Family dynamics Quality of patient-caregiver relationship	Bachner & Carmel (2009a)[31]; Exline et al (2012)[42]; Fasse et al (2015)[43]; Götze et al (2014)[12]; Hoefman et al (2015)[52]; Mollerberg et al (2019)[66]; Nissen et al (2016)[69]; Simonoff et al (2010)[78].
FINANCES	**Overall Quality Assessment Score (mean +/- SD): 5.83 +/- 2.48**
Caregiver finances Caregiver mode of transport Impact on work	Flechl et al (2013)[44]; Govina et al (2019)[47]; Hoefman et al (2015)[52]; Ito & Tadaka (2017)[55]; Kobayakawa et al (2017)[62]; Wadhwa et al (2013)[83].
CARER INTERNAL PROCESSES	**Overall Quality Assessment Score (mean +/- SD): 6.23 +/- 1.83**
Acceptance of patient condition Coping patterns Control over the care situation Self-efficacy or Self-esteem Positive aspects of caregiving Pre-loss grief	Bachner et al (2011)[33]; Burton et al (2012)[36]; Fasse et al (2015)[43]; Govina et al (2019)[47]; Hampton et al (2018)[49]; Henriksson & Arestedt (2013)[51]; Hoefman et al (2015)[52]; Hudson et al (2011)[54]; Ito & Tadaka (2017)[55]; Kobayakawa et al (2017)[62]; McIlfatrick et al (2018)[65]; Nielsen et al (2017)[67]; Perez-Ordonez et al (2016)[73].

Preparedness for caregiving Previous experience of informal caregiving Time for respite	
SUPPORT	**Overall Quality Assessment Score (mean +/- SD): 6.17 +/- 1.72**
Accessible information Caregiver support Communication with care professionals Health professionals understanding of patient needs Quality of Care Unmet needs in caregiver	Areia et al (2019)[15]; Burton et al (2012); Buscemi et al (2010); Duimering et al (2019); Götze et al (2014); Hannon et al (2013); Hoefman et al (2015); Ito & Tadaka (2017); Janda et al (2017); Kobayakawa et al (2017); O'Hara et al (2010)#; Rivera et al (2010); Thielemann & Conner (2009); Wadhwa et al (2013); Wittenberg-Lyles et al (2013); Wittenberg-Lyles et al (2014).
CONTEXTUAL FACTORS	**Overall Quality Assessment Score (mean +/- SD): 6.63 +/- 2.22**
Caregiver age, education or gender Caregiver employment, health, marital status Caregiver ethnicity Caregiver socio-economic status Composition of household Length of patient-caregiver relationship Patient age, educational level or gender Patient lives with caregiver Relationship to patient Rural location	Burton et al (2012)[36]; Butow et al (2014)#[38]; Catt et al (2012)#[39]; Duimering et al (2019)[40]; Fasse et al (2015)[43]; Flechl et al (2013)[44]; Govina et al (2019)[47]; Ito & Tadaka (2017)[55]; Janda et al (2017)[57]; Kershaw et al (2015)#[61]; Kobayakawa et al (2017)[62]; McIlfatrick et al (2018)[65]; Rivera et al (2010)[75]; Thielemann & Conner (2009)[80]; Wadhwa et al (2013)[83]; Wasner et al (2013)[87].
# = cohort or longitudinal study. Maximum score for quality assessment of cohort or longitudinal studies = 12 Maximum score for quality assessment of cross-sectional studies = 10	

Supplement 1 shows the total number of bivariate investigations (tests for relationships both within individual studies and across studies) which found a statistically significant positive, a significant negative or a non-significant relationship between a factor and a carer mental health outcome (anxiety, depression, distress or quality of life). A ‘positive’ relationship means that the factor is statistically associated with improved mental health, i.e. lower anxiety, depression, distress or better quality of life. Similarly, a ‘negative’ relationship means a factor is statistically associated with higher anxiety, depression, distress or worse quality of life. Results for the outcomes anxiety, depression, distress or quality of life have been grouped in this table to provide a general overview of factors that may have a positive or negative impact on carer mental health. Supplement 2 shows bivariate findings reported for each type of outcome separately, along with references to the research studies that looked at each individual factor and identified a positive impact, negative impact or no change on carer mental health for each different type of mental health outcome (anxiety, depression, distress, quality of life).

Studies that only reported multivariate analysis results are briefly summarised separately under each theme. Their reporting is more complex because the significance of each factor in this case is highly dependent on the other factors considered in the same analysis (and their collinearity) and with the variable set varying widely from study to study, making comparisons difficult. However, it is important that these results are also reported. For consistency, we report the results for the final model presented. Further, we only report significant results, as the volume of non-significant relationships in this part of the literature was large and their presentation became unwieldy with little gain in information for the reader.

Narrative summary of themes

Patient condition

The largest body of research relates to patient condition: 31 studies (Table 2) reported on 95 bivariate investigations across all four mental health outcomes. Individual factors that contribute to this theme include the patient's diagnosis, patient disease burden (i.e. physical and cognitive functioning, quality of life, stage or rate of decline, physical and psychological symptoms), and treatment.

Some studies indicated that a diagnosis of primary brain cancer (one investigation[30]), rare cancers (one investigation[63]) or lung cancer (two investigations[47]) is related to worse carer mental health compared to other cancer diagnoses. However, one investigation comparing rare cancers with other cancers found no difference[63], and three investigations considering a range of cancers, including lung and brain, found no difference between cancer diagnoses[55,61,75]. Further, no differences were reported in three investigations comparing lung cancer with heart failure[64]. One investigation found patient diagnosis of chronic obstructive pulmonary disease (COPD) to be associated with worse carer mental health when compared with chronic heart failure or renal failure[58]. Findings on diagnosis, however, are likely to be highly dependent on what the comparators are, and whether two large comparison groups are considered or a range of smaller size diagnostic groups. Further, diagnosis in itself may mean little without added knowledge of patient stage or disease burden.

Three investigations found a relationship between greater patient functional impairment and worse carer mental health[40,71,73]. However, a further nine investigations of functional impairment showed no association[36, 55,75,83,87]. There was no relationship identified between patient cognitive impairment and carer mental health (three investigations[87]).

Three investigations indicated that a more advanced patient stage of disease is related to worse carer mental health[38,48,79], while a further four investigations found no relationship with carer mental health[35,38,48]. These findings include factors related to patient disease trajectory and patient rate of decline, so may tell us little without considering the impact of these factors on patient stage of disease.

Two investigations into patient disease severity found no relationship with carer mental health[36].

In six investigations better patient general quality of life was related to significantly better carer mental health[57,65,70,83]. In a seventh investigation, general quality of life was reported to be associated with mental health, although the direction of the relationship was not clarified[75]. One investigation found that better patient psychological quality of life was also associated with better carer mental health[34]. Three investigations found no significant relationship, however[87].

Two investigations found patients' overall symptoms to relate to worse carer mental health[70,88], but one of these incorporated an element of the carer's stress into the patient symptom measure, thus making an association with mental health outcomes more likely[88]. A third investigation found no relationship[55]. Physical symptoms show a mixed picture: greater drowsiness, fatigue and pain were related to worse carer mental health[83], whereas loss of appetite, breathlessness and nausea showed no relationship (one investigation each per symptom)[83].

Patients' psychological symptoms appear to show a consistent relationship with carer mental health. Higher patient anxiety and depression were related to worse carer mental health in eight[12,56,57,65,83] and 10 investigations[12,53,56,57,65,78,83], respectively. Only three investigations of patient depression found no relationship[53,70,75]. Worse patient global distress[75], psychological and psychiatric symptoms[62] also related to worse carer mental health (one investigation each). In contrast, one investigation of patient sense of wellbeing showed no association[83].

Regarding patient treatment, carers had worse mental health if the patient had been admitted to hospital or long term care within the previous seven days[40], had received no cancer therapy[83], and no surgery[47] (one investigation each), which could imply, respectively, deterioration or that 'nothing could be done'. However, other investigations found no association with receiving no surgery[47] (one investigation), or with receipt of chemotherapy[47] (two investigations) or medical care provided[55] (one investigation). Other treatment variables showing no relationships were patient awaiting new line of treatment[83], frequent visits to emergency outpatient clinics[62], type of oncology follow up[39], and patient receipt of Specialist Palliative Care[76] (one investigation each).

Some corresponding findings were reported in studies only reporting multivariate analyses. Patient quality of life[41] and better functioning[45] were related to better carer quality of life, and patients' need for help at night[60] and problems sleeping[82] to worse carer mental health. Worse patient mental health was related to worse carer mental health[68,77]. There was also worse carer depression where patients had worse social wellbeing, patients used more emotional support seeking, less acceptance coping and perceived that the primary goal of their cancer treatment was 'to cure my cancer' [68], whereas patients' use of less emotional support seeking was associated with higher carer anxiety[68].

Impact of caring responsibilities

A smaller body of research, based on 14 studies (Table 2) and 36 bivariate investigations across all four mental health outcomes, concerns the impact of caregiving in terms of life changes and care demands, a construct similar to objective burden. Where studies investigated impact using carer burden measures, we need to exercise some caution, due to the wide variety of these measures, some of which incorporate emotional impact. In our selection and synthesis we therefore sought to avoid studies using burden measures that essentially measure subjective burden or psychological impact, as these may in effect be synonymous with the outcomes we were investigating.

Studies consistently indicated that the impact of caring responsibilities are associated with worse mental health. Five investigations found that negative changes to carers' lives from caregiving were associated with worse mental health (using Bakas Caregiving Outcomes Scale)[37,47]. Two investigations each found that difficulty of caregiving tasks and time spent on tasks were also related to worse health (using Oberst Caregiving Burden Score-D and OCBS-T, respectively)[47]. One investigation found that impact on the carers' schedule (using the Carer Reaction Assessment) had a similar relationship with mental health[54]. In terms of overall burden, three investigations using the Zarit Burden Inventory[64], three using the Burden Scale for Family Caregivers[87], and one using the Caregiver Strain Index[73], all found increased burden to be associated with worsening mental health.

Studies have also found that making greater lifestyle adjustments[39], greater demands on carer[80], assistance with Activities of Daily Living[40] and medical tasks[40], number of days spent caregiving[83], physical strain from caregiving[52] and sleep problems[85] relate to worse mental health (one investigation each), although one investigation found no relationship with carer sleeping hours[55].

Other demands on carer time[52] or childcare responsibilities[39] may relate to worse mental health, found by one investigation each. However, two further investigations that considered if carers had children of minor age[47] and one whether they cared for others[83], found no relationship. No relationships with mental health were found in one investigation of the number of caregiving hours per week[80] and three considering duration of care[44,55,80].

Studies only reporting multivariate analyses also found that higher carer burden was associated with worse quality of life (Caregiver Burden Inventory)[45] and mental health (Caregiving Burden Interview – Zarit[59]; Caregiver Reaction Assessment[74]), and similarly that more impairment to daily life was associated with worse mental health[59].

Relationships

There is evidence that the family dynamics and the quality of the carer-patient relationship are related to carer mental health, although this is based on a relatively small number of studies (n=8) (Table 2) reporting only 16 bivariate investigations across all four mental health outcomes.

Two investigations within the same study found better carer mental health where carers felt that the family had high ability to cope with stressors (measured by Family Sense of Coherence Scale)[66]. Investigations in another study using the Family Environment Scale found carer mental health to be worse both when the patient and when the carer perceived there to be low family cohesion (i.e. low commitment, help and support family members give to one another)[78]; low family expressiveness (i.e. low encouragement of direct expression feelings)[78]; and high family conflict (i.e. openly expressed anger and conflict)[78]. Correspondingly, one further study also reported worse carer mental health both when the patient and when carer perceived there to be unresolved family conflicts[42], whereas another found better mental health when supportiveness of family relationships was high[69].

Looking specifically at the patient-carer relationship, one study found that carer dissatisfaction with the relationship was associated with worse carer mental health[12], whereas a second found no relationship in terms of the carer getting on with the patient[52]. Good carer communication with the patient about their illness and approaching death was related to better carer mental health[31].

Finally, one study found worse carer mental health where the carer had an insecure-anxious attachment style[43], whereas no relationships was found if they had an insecure-avoidant attachment style[43].

Studies only reporting multivariate analyses have also found that carers with good family relationships had better mental health[46], and one study considering mediators concluded that carers with supportive relationships had better mental health through decreased carer burden[74].

Finances

Although there were relatively few studies considering the role of financial factors (six) and only eight bivariate investigations relating to three of the four mental health outcomes (quality of life, anxiety and depression), the majority of studies indicate a relationship between finances and carer mental health.

Having a sufficient family budget was related to better carer mental health (one study)[55], whereas having financial difficulties due to the patient's disease[44] or to providing informal care[52] were related to worse carer mental health (one study each). Changes to work situation in terms of reduction, change or ending of work (one study)[55] was also associated with worse mental health.

However, level of income in itself (two studies)[62,83] showed no relationship. Having a private car as means of transport was, perhaps surprisingly, related to worse mental health in one investigation, but showed no relationship with another mental health measure within the same study[47]. Level of income or possessions may in themselves be less informative, what matters may be whether they provide sufficient or insufficient resources during caregiving. Findings may also depend on the populations studied. For example, a study population in which everyone is generally affluent may show different patterns of association with carer mental health compared with study populations with a range of incomes.

Carer internal processes

Thirteen studies (Table 2) reporting 36 bivariate investigations relating to quality of life, anxiety and depression have considered how carers' internal, psychological processes and coping strategies are related to their mental health, and have investigated a wide range of variables.

In terms of coping strategies the picture is quite mixed and mostly showing little association with mental health, which may reflect the challenge of using questionnaires to ask carers about dispositions to cope with hypothetical situations. Difficulty accepting the patient's condition[62] or 'dysfunctional' coping strategies[73] (including lack of acceptance, avoidance) were associated with worse mental health in one study each. Worse mental health was also found in relation to disengagement through substance misuse in one investigation[43]. However, other investigations considering denial (one investigation)[43], cognitive avoidance (two investigations)[36] or mental disengagement (one investigation)[43] found no relationship.

Being optimistic was associated with better mental health (one study)[54], whereas using humour[43], having a 'fighting spirit' coping style[36] or using emotion-focused strategies[73] (e.g. seeking a positive outlook and acceptance) showed no relationship (one study each). Having a secular outlook was related to better mental health in one study[33], while religious coping showed no significant association in a second[43].

Suppression of competing activities (staying focused on the problem) has been found to relate to worse mental health (one study)[43]. Conversely, problem focused coping strategies[73] or active coping to solve a problem[43] was found to be unrelated to mental health (one study each).

Finally, in terms of coping strategies, seeking emotional social support[43] or venting of emotions[43] was associated with worse mental health in one study, although it may be important to consider here which is cause and effect. Seeking information support was unrelated to mental health in the same study[43].

Three investigations found that carer self efficacy (confidence in one's ability to carry out a task) was related to better carer mental health[49 55]. Conversely, if carers felt helpless or guilty because they could do nothing for the patient, they had worse mental health (one investigation)[62]. However, carers' sense of control over the care situation was not found to relate to mental health (one investigation)[52].

Two investigations found that preparedness for caregiving was also associated with better health[51 65], although one investigation found no relationship[51]. Further, if carers had provided care to a loved one in the past, they reported worse health (two investigations)[47], indicating that the experience gained from past caregiving may not be protective.

Pre-loss grief[67], and perhaps surprisingly, higher carer self-esteem[54] were related to worse mental health (one study each), whereas fulfilment from caring and being happy to care (both investigated in the same study)[52], showed no relationship.

Having enough time for oneself was associated with better mental health in one study[52], but activities outside caring measured within the same study showed no association[52].

Studies that reported only multivariate analyses have also found higher carer preparedness to relate to better quality of life[45] and also report mixed results for coping. Carer meaning-based coping was associated with better quality of life[41] and carers' use of escape/ avoidance coping to worse mental health[86]. Active coping was in fact associated with worse mental health, and substance abuse with better mental health in a further study[59]. Carers with stronger religious/ spiritual beliefs had better mental health[59]. Among studies considering coping strategies as mediators, Washington et al[86] concluded that the relationship between patients' psychological symptoms (reported above) and carers' mental health was partially explained by carers' increased use of escape/avoidance coping, whereas Ellis et al[41] reported that the number of carers' chronic conditions had an indirect negative effect on their quality of life mediated by meaning-based coping.

Support

The second largest body of research has been conducted on support, based on 18 studies (Table 2) reporting on 42 bivariate investigations across all four mental health outcomes.

Accessible information for patients and for carers are both related to better carer mental health (one study)[55].

In terms of support for carers themselves, there is some evidence that the presence of informal support is positive. Carers who have social support from family and friends (two studies)[52 80], who have a sub-caregiver (one study)[55] and who are satisfied with physical, emotional and informational support (one study)[75] have better mental health. However, no relationship with mental health was found for carers who had receipt of informal help (one investigation)[83], availability of someone to stay with the patient (one investigation)[62], who worked in pairs (two investigations)[90], or where support was perceived (two investigations)[36].

In terms of formal support for carers, one study found better mental health for carers who received support services[55] or requested home care for the patient[55]. However, other studies have found no relationship for formal[40,83] or institutional help[52]. One investigation within one study found that carers who had professional psychological help, in fact, had worse health, whilst two further investigations found no relationship[57]. We need to consider what may be cause or effect here, as carers with higher distress may be more likely to seek psychological help. Carers interested in accessing future support services[40], and those who received no help from home-visit practitioners in managing symptoms[62], had worse mental health (one study each). Type and frequency of formal support services showed no association in one study[55].

Unmet needs in the carer appears to be important. Three investigations relating to carers' unmet psychological, social and physical needs in one study[37] and one investigation considering number of carers' unmet needs by health professionals in another study[15] found they were related to worse carer mental health.

Features of communication with practitioners during care planning sessions made little difference. An investigation in one study found that a faster dialogue pace was related to worse carer mental health[89], whereas another investigation found no relationship[89]. No associations were found for language complexity, length of interaction or the team taking turns to speak[89].

Carer satisfaction with patient care (two studies)[50 55] and patient satisfaction with care (one study)[50] were associated with better carer mental health, whilst carer perception of problems with patient unmet needs was related to worse mental health (one study)[70]. Perhaps counterintuitively, carers in the same study who perceived more problems with the patient's emotional and spiritual support, had better mental health[70]. No associations were found for practitioners' lack of understanding of patient symptom severity[62] or whether services received were considered necessary by the carer[55] (one study each).

One study reporting only multivariate analysis found that carers with good healthcare providers had better mental health[46].

Contextual factors

The third largest body of research relates to contextual factors (16 studies reporting 104 bivariate investigations across all four mental health outcomes). Studies have considered a range of carer and patient contextual factors. Older carers were found to have better mental health in seven investigations[47,57,61,65,83], while eight investigations found no relationship[36,39,44, 47,55,75,80,]. Female carers in general[83,43,47,87,39] or wives[75], had worse health in seven investigations, although 14 investigations found no similar gender differences[36,38,40,55,57, 61,62,75,80].

Otherwise there are no clear patterns for contextual variables. Being unemployed[83] or employed but on leave[40], was related to worse carer mental health (one study each). Conversely, these two studies found retirement to be associated with better mental health[40 83], although this variable may be closely associated with age. However, six investigations found no association for employment status[36,47,55,39]. Poor carer physical health was found to be related to worse mental health in one study[62], but four studies found no relation for physical or general health[55,61,75,83]. In terms of race or ethnicity, being white was associated with better carer mental health in one study[75], while two other studies did not find an association between ethnicity and mental health[80 83]. Whilst carers with higher socioeconomic status were found to have better mental health in one study[40], nine investigations found no relationship between education level and health[39, 47,57,62,80,83].

One study found higher patient age to be associated with better carer mental health[55], but two others found no association[44 83]. Patient being male was related to worse health in two investigations[47], but two studies found no relationship with patient gender[55,83]. If the patient was living with the carer, this has both been found to show a relationship[40,47] and no relationship with worse mental health[47,83] (two investigations each). The carer’s relationship with the patient has shown quite mixed results. Whilst being a spouse has been found to relate to better mental health[83] and not being a spouse/partner to worse health[39] (one study each), being a son/daughter[40] and not being a spouse/daughter[75] have also been associated with better mental health. Further, 11 investigations found no association for relationship with the patient[38,47,55,57,61,62,75].

No association with carer mental health was found for carer marital status (4 investigations)[36,47], composition of the household (1 investigation)[55], length of patient-carer relationship (1 investigation)[80], patient education level (2 investigations)[47] or living in a rural area (3 investigations)[38,40].

Studies reporting only multivariate analyses also found that younger carers had worse mental health[68,72,77] and carers of younger patients’ worse quality of life[82]. Caring for a patient with a diagnosis other than cancer was also associated with worse mental health[72]. Again female carers reported worse mental health[68,82], although one study found that the relationship between gender and anxiety was age dependent, with females reported to have significantly higher probability of being anxious than males until about the age of 60 years[84]. One study reported that carers who reported poorer self-rated global health had worse mental health[72]. Three studies found worse mental health among spousal carers compared with other relationships[68,72,77]. One study reported employed carers had better mental health than unemployed carers[84]. One study each reported that African Americans had better mental health compared with white carers[46]; that English speakers had better mental health compared with those who did not speak English at home[60]; and that those with a Catholic faith had worse mental health than other denominations/ religions[68].

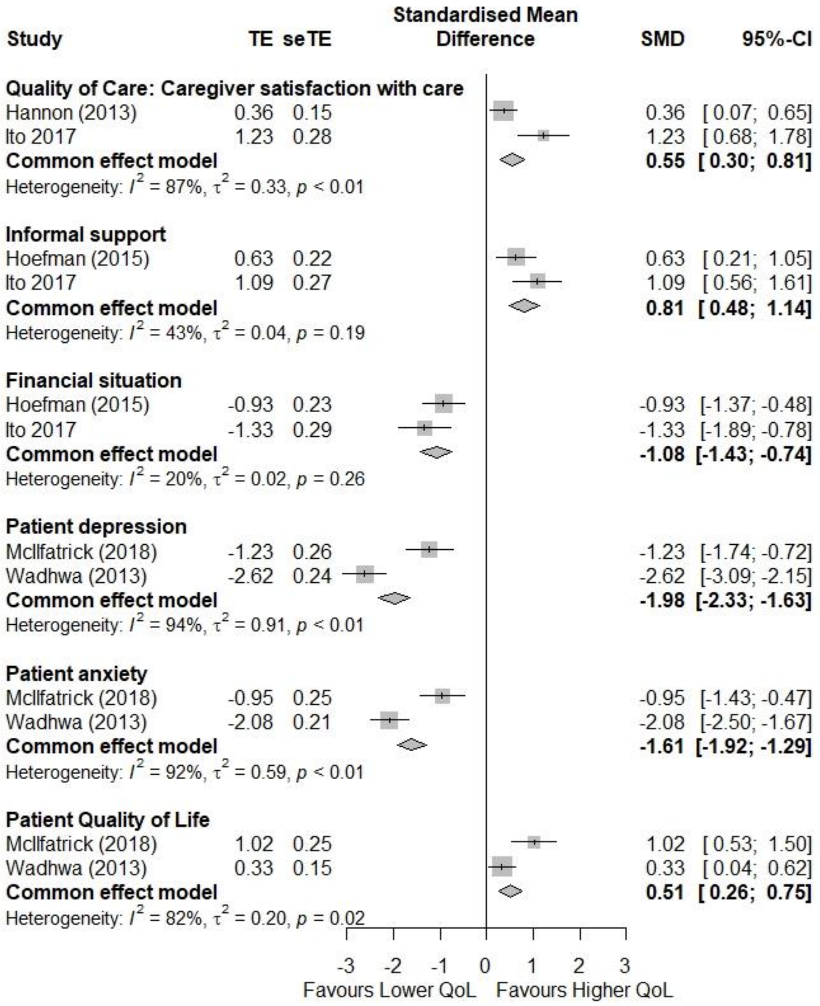
Meta-analyses

As reported earlier, the opportunity for meta-analysis was limited due to the wide range of factors and the range of mental health outcomes considered. Whilst we felt justified in grouping findings for different mental health outcomes for a narrative thematic summary, stricter criteria had to be applied for meta-analysis. We therefore only performed meta-analysis on studies that considered the same mental health outcome (i.e. anxiety, depression, distress or quality of life) to try and avoid introducing a high level of random variation into the analysis. Similarly, whilst a wider interpretation of similarity of factors should be permissible for thematic grouping in a narrative summary, we need to be stricter in ensuring studies included in a meta-analysis are indeed considering comparable factors. There were therefore few instances where studies considered sufficiently similar factors and their relation to the same outcome, to permit meta-analysis.

Quality of life

For the studies in the meta-analysis higher quality of life in carers was highly associated with receiving informal support (0.81, 0.48 to 1.14, I2=43, n=2 studies)[52,55] and moderately associated with carer satisfaction (SMD=0.55, 95% CI 0.30 to 0.81, I^2=87%, n=2)[50,55], along with higher patient quality of life (0.51, 0.26 to 0.75, I^2=82%, n=2)[65,83]. Financial strain (SMD= - 1.08, 95% CI -1.43 to -0.74, I^2=20%, n=2 studies)[52,55], patient depression (SMD= - 1.98, 95% CI -2.33 to -1.63, I^2=94%, n=2 studies)[65,83] and patient anxiety (SMD= - 1.61, 95% CI -1.92 to -1.29, I^2=92%, n=2 studies)[65,83] were all found to be highly associated with lower quality of life (Table 3).

Table 3: Meta analysis of factors associated with quality of life

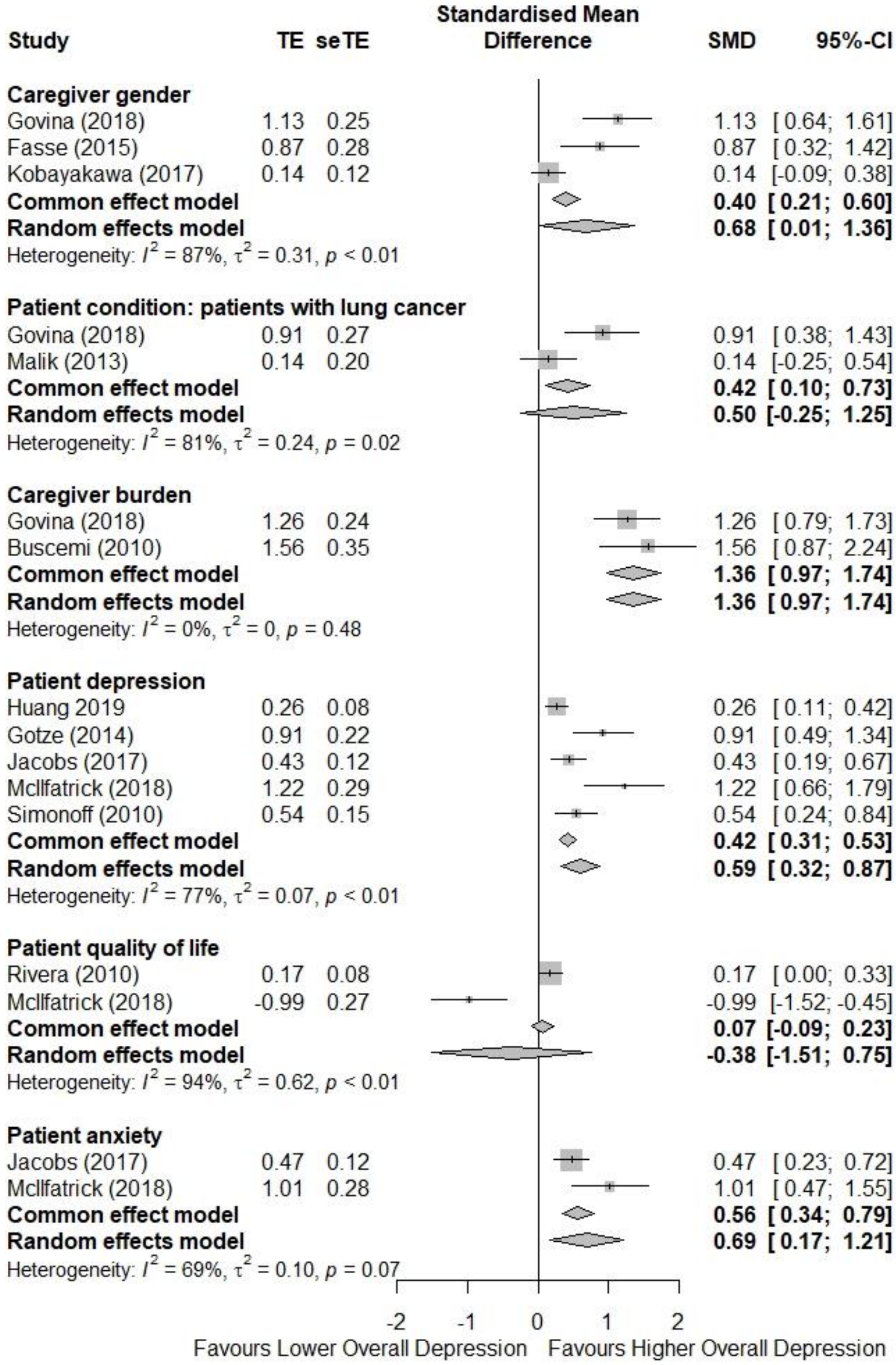


Study	TE	seTE	SMD	95%-CI
Quality of Care: Caregiver satisfaction with care				
Hannon (2013)	0.36	0.15	0.36	[0.07; 0.65]
Ito 2017	1.23	0.28	1.23	[0.68; 1.78]
Common effect model			**0.55**	**[0.30; 0.81]**
Heterogeneity: $I^2 = 87\%$, $\tau^2 = 0.33$, $p < 0.01$				
Informal support				
Hoefman (2015)	0.63	0.22	0.63	[0.21; 1.05]
Ito 2017	1.09	0.27	1.09	[0.56; 1.61]
Common effect model			**0.81**	**[0.48; 1.14]**
Heterogeneity: $I^2 = 43\%$, $\tau^2 = 0.04$, $p = 0.19$				
Financial situation				
Hoefman (2015)	-0.93	0.23	-0.93	[-1.37; -0.48]
Ito 2017	-1.33	0.29	-1.33	[-1.89; -0.78]
Common effect model			**-1.08**	**[-1.43; -0.74]**
Heterogeneity: $I^2 = 20\%$, $\tau^2 = 0.02$, $p = 0.26$				
Patient depression				
McIlfatrick (2018)	-1.23	0.26	-1.23	[-1.74; -0.72]
Wadhwa (2013)	-2.62	0.24	-2.62	[-3.09; -2.15]
Common effect model			**-1.98**	**[-2.33; -1.63]**
Heterogeneity: $I^2 = 94\%$, $\tau^2 = 0.91$, $p < 0.01$				
Patient anxiety				
McIlfatrick (2018)	-0.95	0.25	-0.95	[-1.43; -0.47]
Wadhwa (2013)	-2.08	0.21	-2.08	[-2.50; -1.67]
Common effect model			**-1.61**	**[-1.92; -1.29]**
Heterogeneity: $I^2 = 92\%$, $\tau^2 = 0.59$, $p < 0.01$				
Patient Quality of Life				
McIlfatrick (2018)	1.02	0.25	1.02	[0.53; 1.50]
Wadhwa (2013)	0.33	0.15	0.33	[0.04; 0.62]
Common effect model			**0.51**	**[0.26; 0.75]**
Heterogeneity: $I^2 = 82\%$, $\tau^2 = 0.20$, $p = 0.02$				

Depression

The studies in the meta-analysis indicated that negative changes to carers' lives from caregiving (using Bakas Caregiving Outcomes Scale) were highly associated with higher depression levels in carers (SMD= 1.36, 95% CI 0.97 to 1.74, I^2=0%, n=2 studies)[37,47]. Being a female carer (SMD= 0.40, 95% CI 0.21 to -0.60, I^2=87%, n=3 studies)[43,47,62], patient anxiety (SMD= 0.56, 95% CI 0.34 to 0.79, I^2=69%, n=2 studies)[56,65] and patient depression (SMD= 0.59, 95% CI 0.32 to 0.87, I^2=77%, n=5 studies)[12,53,56,65,78] were all moderately associated with higher depression in carers. Carers caring for patients with lung cancer were found to be moderately associated with higher depression levels than carers of those with other conditions (SMD= 0.42, 95% CI 0.10 to 0.73, I^2=81%, n=2 studies)[47,64], although these results should be interpreted with caution as the comparison group in each study related to a different patient condition (patients with other cancers[47] and patients with heart failure[64])(Table 4) .

Table 4: Meta analysis of factors associated with depression

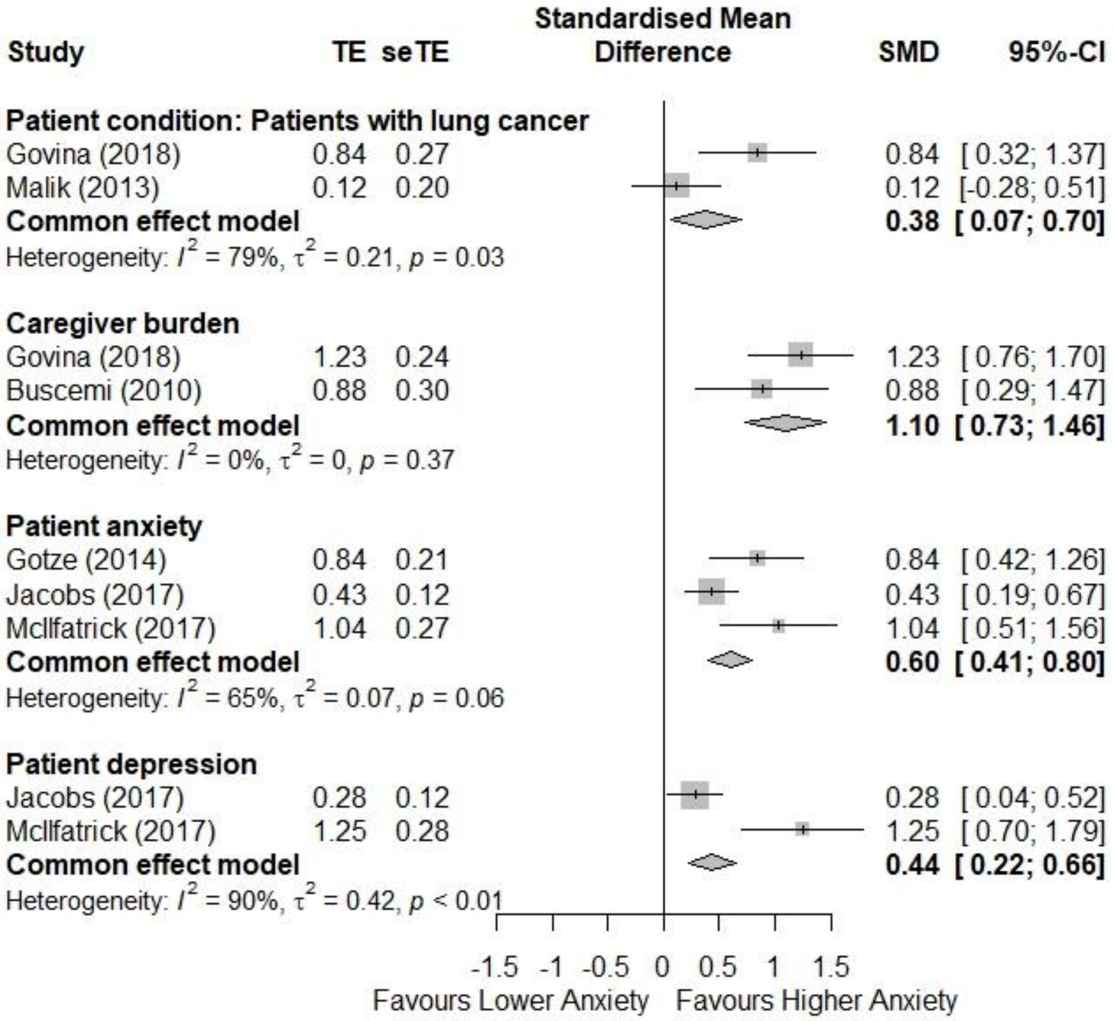


Study	TE	seTE	SMD	95%-CI
Caregiver gender				
Govina (2018)	1.13	0.25	1.13	[0.64; 1.61]
Fasse (2015)	0.87	0.28	0.87	[0.32; 1.42]
Kobayakawa (2017)	0.14	0.12	0.14	[-0.09; 0.38]
Common effect model			**0.40**	**[0.21; 0.60]**
Random effects model			**0.68**	**[0.01; 1.36]**
Heterogeneity: $I^2 = 87\%$, $\tau^2 = 0.31$, $p < 0.01$				
Patient condition: patients with lung cancer				
Govina (2018)	0.91	0.27	0.91	[0.38; 1.43]
Malik (2013)	0.14	0.20	0.14	[-0.25; 0.54]
Common effect model			**0.42**	**[0.10; 0.73]**
Random effects model			**0.50**	**[-0.25; 1.25]**
Heterogeneity: $I^2 = 81\%$, $\tau^2 = 0.24$, $p = 0.02$				
Caregiver burden				
Govina (2018)	1.26	0.24	1.26	[0.79; 1.73]
Buscemi (2010)	1.56	0.35	1.56	[0.87; 2.24]
Common effect model			**1.36**	**[0.97; 1.74]**
Random effects model			**1.36**	**[0.97; 1.74]**
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $p = 0.48$				
Patient depression				
Huang 2019	0.26	0.08	0.26	[0.11; 0.42]
Gotze (2014)	0.91	0.22	0.91	[0.49; 1.34]
Jacobs (2017)	0.43	0.12	0.43	[0.19; 0.67]
Mcllfatrick (2018)	1.22	0.29	1.22	[0.66; 1.79]
Simonoff (2010)	0.54	0.15	0.54	[0.24; 0.84]
Common effect model			**0.42**	**[0.31; 0.53]**
Random effects model			**0.59**	**[0.32; 0.87]**
Heterogeneity: $I^2 = 77\%$, $\tau^2 = 0.07$, $p < 0.01$				
Patient quality of life				
Rivera (2010)	0.17	0.08	0.17	[0.00; 0.33]
Mcllfatrick (2018)	-0.99	0.27	-0.99	[-1.52; -0.45]
Common effect model			**0.07**	**[-0.09; 0.23]**
Random effects model			**-0.38**	**[-1.51; 0.75]**
Heterogeneity: $I^2 = 94\%$, $\tau^2 = 0.62$, $p < 0.01$				
Patient anxiety				
Jacobs (2017)	0.47	0.12	0.47	[0.23; 0.72]
Mcllfatrick (2018)	1.01	0.28	1.01	[0.47; 1.55]
Common effect model			**0.56**	**[0.34; 0.79]**
Random effects model			**0.69**	**[0.17; 1.21]**
Heterogeneity: $I^2 = 69\%$, $\tau^2 = 0.10$, $p = 0.07$				

Anxiety

For the studies in the meta-analysis negative changes to carers' lives from caregiving (using Bakas Caregiving Outcomes Scale) were highly associated with higher anxiety levels in carers (SMD= 1.10, 95% CI 0.73 to 1.46, I2=0%, n=2 studies)[37,47]. Patient anxiety (SMD= 0.60, 95% CI 0.41 to 0.80, I^2=65%, n=3 studies)[12,56,65] and patient depression (SMD= 0.44, 95% CI 0.22 to 0.66, I^2=90%, n=2 studies)[56,65] were found to be moderately associated with higher carer anxiety. Carers caring for patients with lung cancer were found to be moderately associated with higher anxiety levels than carers of those with other conditions (SMD= 0.38, 95% CI 0.07 to 0.70, I^2=79%, n=2 studies)[47,64], although as previously reported, these results should be interpreted with caution as the comparison group in each study related to a different patient condition (patients with other cancers[47] and patients with heart failure[64]) (Table 5).

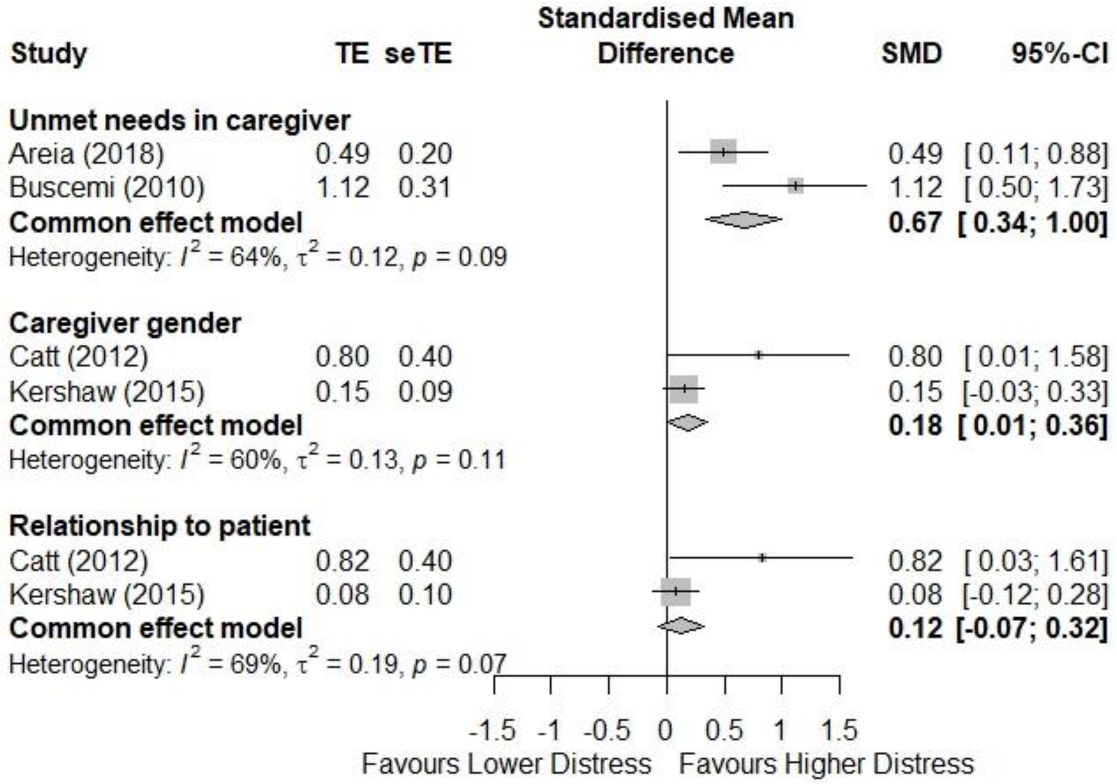
Table 5: Meta analysis of factors associated with anxiety



Distress

Studies in the meta-analysis indicated that unmet needs in carers was highly associated with higher carer distress (SMD= 0.64, 95% CI 0.32 to 1.00, I^2=64%, n=2 studies)[15,37]. Being a female carer was also associated with higher carer distress (SMD= 0.18, 95% CI 0.01 to 0.36, I^2=60%, n=2 studies)[39,61] (Table 6).

Table 6: Meta analysis of factors associated with distress



4.3 Quality Assessment

The NOS quality assessment criteria adapted for cross-sectional studies were applied to 56 of the 63 included studies; the remaining seven studies were assessed using the NOS quality assessment criteria adapted for cohort/longitudinal studies. The predominance of cross-sectional studies over longitudinal studies means we can be less certain overall of the causal direction of any relationships found.

Cross-sectional studies were most likely to meet criteria relating to: assessment of validated outcomes (49/56 studies – 87.5%); ascertainment of validated predictors (47/56 studies – 83.9%); adequacy of statistical tests applied (46/56 studies – 82.1%) and selection of sample (42/56 studies –

75.0%). They were least likely to meet criteria relating to: reporting an a priori hypothesis (26/56 studies – 46.4%); sampling frame (19/56 studies – 33.9%) and the degree to which non-respondents were adequately reported (11/56 studies – 19.6%).

Cohort/longitudinal studies were most likely to meet criteria relating to: representativeness of sample/exposed cohort (7/7 -100%); selection of exposed and control cohorts (7/7 -100%); assessment of validated outcomes (6/7 studies – 85.6%); ascertainment of validated predictors (6/7 studies – 85.7%). They were least likely to meet criteria relating to: sampling frame (3/7- 42.9%); reporting of non-respondents (3/7- 42.9%); adequacy of follow-up (28.6%) and having an a priori hypothesis (1/7 – 14.3%).

Table 2 presents the overall quality assessment score for each overarching theme. The quality of studies underpinning each of the seven overarching themes was very similar, although there was some degree of variation. Studies underpinning the overarching themes 'patient condition' (mean = 6.65 +/- 1.78) and 'contextual factors' (mean = 6.63 +/- 2.22) were underpinned by the highest quality studies overall, followed by 'carer internal processes (mean = 6.23 +/- 1.84), 'support' (mean = 6.17 +/1 72), 'relationships' (mean = 6.00 +/- 2.20) and ' finances' (mean = 5.83 +/- 2.48), and with 'impact of caring responsibilities' (mean = 5.57 +/ - 2.10) having the lowest quality studies overall.

5) Discussion

5.1 General discussion of findings

The literature in this review is very diverse, and it is difficult to give a simple summary of findings. However, some patterns emerged. Regarding the patient condition, when patients' psychological symptoms are worse, this seems fairly consistently related to worse carer mental health, while better patient quality of life seems related to better carer mental health. A concern here may be if patient scores were provided by carers by proxy, as scoring may then be influenced by carers' own mental health, making correlations more likely to be an artefact of study design. Findings for other patient condition variables are mixed and less clear.

The impact of caring responsibilities (in terms of impact on carer lives, task difficulty and general burden) showed clear associations with worse mental health. However, these factors have predominantly been measured using carer burden measures, and whilst we were careful to exclude measures that essentially measured psychological impact, there is a possibility that some remaining measures still retained a subjective, emotional element that made them more likely to correlate with mental health as an artefact of the measurement tools. However, further studies that did not rely on burden measures also indicated that greater impact on carers' lives is associated with worse mental health.

Family dynamics, the quality of the carer-patient relationship and finance have not been extensively studied, but findings suggest they show sufficient relationship to carer mental health to warrant further investigation.

Where carers' psychological processes are concerned, self-efficacy and, possibly, preparedness appear related to better mental health. However, having provided care to a loved one in the past may be detrimental rather than positive. Research on coping strategies show limited or mixed associations with mental health and may need more consistency and direction to become useful.

Having unmet needs appears related to worse mental health, while satisfaction with care may relate to better mental health, but more research is required to better understand where and how informal and formal support may have an impact.

In terms of contextual factors, older age seems generally to be associated with better carer mental health, and being female with worse health, but it is difficult to draw conclusions from findings on other contextual factors.

Compared with the comprehensive review of the quantitative carer literature by Stajduhar et al[20], this review confirms and expands on the previous findings. It identified similar factors in terms of the patient condition, impact on carers' lives, carer internal psychological processes, and context, which indicates consistency in the patterns found. Additionally, the current review captured emerging research on relational variables, available support and features of interaction with healthcare providers which the earlier review noted were missing from the literature. We also identified literature on the association between financial difficulties and carer mental health which was absent from the earlier review.

5.2 Quality of the evidence

Study designs

A major problem with the observational quantitative literature in informing predictors of carers' mental health, is the predominance of cross sectional studies (56 studies) and the dearth of longitudinal studies (7). This considerably limited our ability to be certain about the causal direction of the relationships found. Some factors are clearly likely to be precursors to carers' state of mental health, such as elements of the patient condition, age and sex, although we are left to hypothesise as to why they may affect mental health. However, many other variables may plausibly be the effect of, rather than a contributing cause of, carers' mental health. For instance, the carer with poor mental health may feel caregiving tasks are more onerous, have a lower sense of self efficacy and preparedness, and perceive quality of support to be worse, rather than the other way around. Further, many variables may work in both directions, for instance patient and carer anxiety are likely influence each other. It is therefore often a matter of judgement whether we believe that factors are precursors and/or contributors to carers' mental health, although mostly it appears plausible that they should be.

A further challenge in assessing causal relationships is that on occasion it can be unclear exactly what a variable measures or what it means, e.g. patient diagnosis or type of service (if we know nothing further about the features of the patients or service in a given study context), or 'carer burden' (which is conceptualised somewhat differently within the measures used). It was also not possible to provide any definitive evidence about the strength of the relationships identified, due to the small number of studies identified for each bivariate relationship, which were often based on small sample sizes and may therefore inflate the effect sizes. While some of the factors may be more important in protecting or worsening carers' mental health than others, it is difficult to conclude from the findings in this review which these are.

Gaps within the evidence

It is important to recognise that some of the factors identified within this review were more intensively investigated than others. Although there is evidence that both carer finances and the quality of relationships are related to carer mental health, the evidence base is limited in comparison with patient condition, impact of caring responsibilities, carer internal processes, support or contextual factors.

Similarly, the number of investigations with significant results within each factor also varied. While the highest number of significant investigations were reported for the patient condition (50/95), the lowest number of significant investigations were identified for relationships (14/16) and carer finances (5/8). This is not surprising given the overall body of evidence underpinning each of these factors. What may be of more interest is the proportion of significant interactions identified within the relationship theme, which was the highest across all factors.

The vast bulk of studies within this review investigated depression as an outcome (115 factors across 34 studies), with carer distress investigated the least (32 factors across 12 studies). This may be due in part because distress was limited within our review to measurement scales identified specifically as measuring psychological distress (e.g. General Health Questionnaire-12, Psychological Distress Thermometer) and therefore did not capture broader outcomes like anger, frustration and grief (which are included within the qualitative synthesis). Despite this, it is important to recognise that the evidence base in this review is considerably more weighted towards outcomes related to depression, anxiety and quality of life.

We can only report on what the observational quantitative research has focused on. This is not the same as saying other factors are unimportant. Further, the review reported primarily on bivariate relationships between factors and mental health outcomes, so there may have been confounding factors which exaggerated or masked the real relationship between the factor/s identified and carer mental health.

Lack of models

Overall, the lack of good models to guide enquiry poses a challenge to synthesis and clear conclusions. Both this review and that of Stajduhar et al[20] found little use of models or frameworks within the carer research literature.

There was sometimes an impression that variables were investigated simply because they were available or for which validated measurement tools existed, rather than because there was a clear theoretical rationale for their inclusion. This is particularly the case for clinical data (e.g. condition, treatment) and contextual data (e.g. age, sex) that are often routinely recorded for other purposes. Without clear models or frameworks to provide direction and systematic enquiry, research can become piecemeal and sprawling. Accordingly, we found that this research proved difficult to summarise because of the very wide range of factors, carer groups and contexts considered, and little of the evidence lent itself to the meta-analysis.

5.3 Limitations to the review

Our review focused on caregiving in a home care setting. It may therefore not fully capture what gives rise to worse carer mental health in other settings, e.g. the intensive care unit. However, the home is where most of the care in the patients' final year takes place, where a majority of patients prefer to remain for as long as possible, even to death, and where carers have the greatest responsibility and undertake the widest range of tasks. Making sure carers are supported in this setting is likely to have the greatest impact on patient care, as well as carers themselves.

Our review is mainly representative of the developed world, and is limited to studies published in English and Scandinavian. Although a range of countries are represented, these are all OECD countries. There is therefore a lack of research from cultures and perspectives beyond the developed world. Further, within the countries represented in the review, there is little research encompassing perspectives of ethnic minorities. We also focused on adult carers during caregiving, and the review may not reflect relevant factors for younger carers and outcomes in bereavement. The literature itself typically focuses on carers of people with cancer and may not fully represent carers of people with other conditions, e.g. longer term conditions where duration of care and service provision may be different.

The search was limited to 2009-2019, did not cover dissertations or grey literature, nor scan bibliographies or contact key authors directly. Important studies may therefore have been missed. However, comparison with overview reviews of the carer literature 1998-2008[20 91] indicates that the factors identified remain fairly consistent across studies and over time.

Our review did not apply GRADE to provide an overall assessment of the certainty of evidence and strength of the findings as was proposed in the protocol. GRADE is better suited to interventional trials rather than observational research. Furthermore, the diversity in measurement of factors, imprecision and different summary statistics used by studies hampered attempts at transforming the data. Therefore, to assess validity and importance of research findings, rather the project invested time and resources on PPI through carer Review Advisory Panel and stakeholder consultations. This confirmed that the seven identified themes were perceived as important and as meaningful causal factors (see section 5.4 below).

While psychological wellbeing was defined as the primary outcome for quality of life, this was not consistently reported across studies assessing quality of life as an outcome measure. Given we used general quality of life as a proxy measure where psychological wellbeing was not available, it is important to consider that quality of life in this review reflects a combination of both overall quality of life and psychological wellbeing measures.

5.4 Relevance of findings: PPI from carer RAP and stakeholder consultation

Carer Review Advisory Panel (RAP) members felt the quantitative factors investigated had relevance to them, although they suggested amendments in the presentation of some factors. For instance, the coping literature often refers to ‘maladaptive’ versus more adaptive coping. However, what is termed ‘maladaptive’ may be the most constructive way for a carer to cope at a given time. Members therefore suggested that coping strategies should be presented simply as having positive or negative impact on carer mental health and with less value-laden labels attached. The RAP also highlighted the incongruence between how important the members considered sufficient finances to be in protecting carer mental health with the dearth of research studies found addressing this factor. Furthermore, the carer RAP highlighted the absence of evidence relating to carer self-identification[92] as a gap in the observational review evidence. In addition to the themes emerging from the qualitative synthesis and carer RAP work, the observational quantitative synthesis also identified contextual factors that may relate to carer mental health. The RAP agreed these were an important additional consideration, which warrant further focus.

Feedback from our wider stakeholder consultation with additional carers, a patient, practitioners, commissioners and policy makers confirmed that findings within all the resulting themes were considered relevant and informative in understanding the carer experience and what may help in supporting carers. More detailed involvement of the carer RAP and wider stakeholder consultation, along with the lessons learnt, is reported elsewhere [link to be provided].

5.5 Implications and future research

Improved models, designs and definitions

In order to move the field of carer mental health research meaningfully forward, the development of clear and comprehensive explanatory models and frameworks are needed, to guide enquiry and develop testable theories to investigate the relationships between caregiving factors as primary stressors, mediators and moderators in relation to carer psychological morbidity. Future research requires more hypothesis-driven longitudinal and larger study designs incorporating quantitative causal analyses to provide a more comprehensive understanding of the range and interaction of factors affecting the mental health of end-of-life caregivers.

In addition, improvements in how factors within studies are defined/described and the reporting of a priori hypotheses of why factors have been investigated is required. This will prove useful in obtaining a more detailed understanding of the factors investigated and how they relate to carer mental health.

Knowledge gaps

Given the paucity of research studies focused on relationships, finances and different cultural perspectives, further studies exploring the impact of these factors on carer mental health are needed, in order to further understand how these factors contribute to carer psychological morbidity within a broader context, e.g using political theory.

Comprehensive strategy for carer support

The fact that a range of factors are implicated in carer mental health, means that we are likely to need a comprehensive, coordinated strategy to improve the mental health of UK end-of-life carers that encompasses several factors, rather than focusing on one or two .The range of factors captured in this synthesis can help inform such a comprehensive strategy. They may inform decisions about legislation, allocation and distribution of funding, and the fiscal incentives to control quantity and quality of services among policy makers and commissioners e.g. to improve work and benefits legislation, boost respite provision, or mandate provision for carers within services. Overall findings may guide services in design of operational procedures to enable more effective carer and patient support through earlier, targeted carer intervention to prevent later crises, in particular through knowledge of carer protective and risk factors for psychological morbidity. For example, it may help identify those carers at higher risk and to work with protective factors that build carer resilience and strength to help those at risk within existing resources. Review findings may also help carers identify options for self-help to boost protective factors, and support carer organisations in terms of where to focus their resources and advocacy.

In general we need to recognise carers as a vital resource and provide better cross-society initiatives to support carers and prevent adverse health outcomes from caregiving.

5.6 Dissemination

Project findings have been reported to carer Review Advisory Panel members and stakeholder groups throughout the project through meetings, workshops and focus groups. All components of the project will be written up as NIHR HS&DR peer reviewed publications. The project has been presented at the European Association for Palliative Care Congress 2021. In response to stakeholder recommendations, project findings are disseminated via posters and leaflets, podcasts, webinars and a website. Awareness of the findings will be raised via Twitter and through stakeholder networks of NIHR ARC Greater Manchester and co-applicants. The current report, reports for additional project components, and all project materials will be available through the project website https://www.arc-gm.nihr.ac.uk/carer-project-.

5.7 Conclusions

It is clear that factors associated with carers' mental health during end-of-life caregiving are wide ranging and we cannot focus on one single factor to reduce psychological morbidity among family carers who care for patients at the end-of-life, whether it be: patient condition, impact of caring responsibilities, relationships, finances, carer internal processes, support or contextual factors. We therefore need a comprehensive rather than narrow approach to improving carers' mental health.

The literature on this topic is very diverse and difficult to summarise, and the field would benefit from a clearer direction of enquiry guided by explanatory models and frameworks. The impact of quality of relationships and finance warrant further investigation.

Factors need to be better defined and it needs to be better established, through quantitative causal analyses, why they should relate to mental health. More longitudinal research is required to help understand likely causal direction of associations.

Working throughout the research project alongside a carer RAP was important as RAP members were able to act as a lens to validate, present and interpret research findings from the quantitative observational review.

Synthesis of the existing evidence on factors associated with carers' mental health during end-of-life caregiving provides a comprehensive understanding of factors affecting psychological morbidity of end-of-life carers. It is anticipated that the findings from this review will inform the development of future initiatives and interventions to improve the mental health of end-of-life carers and lead to better targeting of carers at risk of poor mental health.

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Author contributions
Gunn Grande, Christine Rowland, Alison Wearden, Jackie Flynn, Penny Bee, Morag Farquhar and Maria Panagioti developed the project protocol. Tracey Shield designed the search strategy with support from Kerin Bayliss, Gunn Grande, Christine Rowland, Jackie Flynn, Penny Bee, Alexander Hodkinson, Maria Panagioti, Morag Farquhar and Alison Wearden. Tracey Shield and Kerin Bayliss searched and selected the literature with support from Gunn Grande. Tracey Shield analysed and synthesised the observational review data with support from Gunn Grande. Alexander Hodkinson, Maria Panagioti and Danielle Harris supported the quantitative analysis. Tracey Shield and Gunn Grande drafted the manuscript. All authors (Gunn Grande, Tracey Shield, Kerin Bayliss, Christine Rowland, Jackie Flynn, Penny Bee, Alexander Hodkinson, Maria Panagioti, Morag Farquhar, Danielle Harris, and Alison Wearden) had access to all study data, contributed to the analysis plan, discussed the interpretation of findings, provided critical revision of the manuscript and take responsibility for data integrity and analysis.

Ethics statement / approval(s)

This is a report of an evidence synthesis of existing literature, and no research data were collected for the project. Consultation with the University of Manchester Research Practice Governance Office established that the project did not require ethics approval.

Information governance

There were no personal data involved in the production of this report.

Data sharing

All data for this report and the project as a whole are accessible via our website https://www.arc-gm.nihr.ac.uk/carer-project-. As this is an evidence synthesis project, data are mainly contained within the referenced literature, tables and appendices of our reports. For more information please contact the corresponding author.

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Appendices and supplements

- Appendix 1. Search strategy
- Appendix 2. Newcastle Ottawa Scale (NOS) adapted Quality Assessment criteria
- Supplement 1. Quantitative Observational Research Evidence: In-depth list of factors affecting caregiver mental health overall
- Supplement 2. Quantitative Observational Research Evidence: In-depth list of factors affecting different types of mental health outcome

Project documentation
Linked articles/related specialty collections
[To complete once everything is in place]

Appendix 1. Search strategy

Caregiver

MESH terms related to caregiver:

MEDLINE [Ovid Online]:
- *Caregivers*

EMBASE [Ovid]:
- *Caregiver*
- *Caregiver burden*
- *Caregiver Burnout*
- *Caregiver Strain Index*
- *Caregiver Support*

PsychINFO [Ovid Online]:
- *Caregivers*
- *Caregiver burden*

CINAHL Plus [EBSCO]
- *Caregiver Burden*
- *Caregiver Attitudes*
- *Caregiver Support*

Social Sciences Citation Index [Institute for Scientific Information; Clarivate Analytics]
TOPIC
- *Informal caregivers*
- *Family caregivers*

Cochrane Central Register of Controlled Trials (CENTRAL)
- *Caregivers*

Database of Abstracts of Reviews of Effects (DARE) [University of York Centre for Reviews and Dissemination]
- *Caregivers*

Cochrane Qualitative Reviews
- *Caregivers*

- Use MESH term for carer where database allows. For example, Caregiver in MEDLINE. Avoid home nursing as a MESH term as this will incorporate health care workers.

- Search for additional string carer terms as both a key word and within ti,ab.

- *family care giv*; family caregiv**
- *informal caregiv*; informal care giv**
- *family care* or informal care**

- Combine : (MESH term) OR (additional string carer terms)

Rationale :
- Incorporates use of MESH term.
- Looks to capture additional relevant literature on carers not indexed under the database MESH term. Using MEDLINE as the test database, a number of different terms for carer were searched to determine the most relevant terms for capturing additional literature not included within the MESH term 'Caregiver'. Using *'family caregiver'* as a key word and '*informal caregiver'* in a title and abstract search were shown to include 2 additional relevant references while *'family carer(s)' and 'informal carer(s)'* are terms often used in the literature to represent carers.
- By combining appropriate MESH terms for carer along with additional string search terms, the risk of missing papers not captured by the MESH terms is reduced.

Palliative Care **MESH terms related to palliative care:** **MEDLINE** [Ovid Online]: • *Palliative Care* • *Hospice and Palliative Care Nursing* • *Terminal Care* • *Terminally Ill* • *Hospice Care* • *Hospice* **EMBASE** [Ovid]: • *Cancer palliative therapy* • *Palliative nursing* • *Palliative therapy* • *Terminal Care* • *Terminally Ill Patient* • *Terminal Disease* • *Hospice* • *Hospice Care* • *Hospice Nursing* **PsychINFO** [Ovid Online]: • *Palliative Care* • *Terminally Ill Patients* • *Hospice* **CINAHL Plus** [EBSCO] • *Palliative Care* • *Hospice and Palliative Nursing* • *Terminal Care* • *Hospice Care* **Social Sciences Citation Index** [Institute for Scientific Information; Clarivate Analytics] TOPIC: • *Palliative Care* • *Palliative Care Nursing /Hospice and Palliative Care Nursing* • *Terminal Care*	• Use MESH terms where database allows for : ▪ *Palliative Care* ▪ *Palliative Care Nursing /Hospice and Palliative Care Nursing* ▪ *Terminal Care* ▪ *Terminally Ill* ▪ *Hospice Care* ▪ *Hospice* • Search for End of Life as both key word and within ti,ab. : *end-of-life; end of life* • Combine : (All MESH terms) OR (additional end of life terms) • Where database does not index papers under the specific MESH terms above, use the most relevant alternative MESH term given. If there is no relevant MESH term given, search the term as both a key word search and as a search within title and abstract. Depending on numbers of papers, expand terms – e.g. use 'palliative' instead of 'palliative care' to increase numbers. **Rationale:** • Incorporates search terms used by Flemming et al (2019) and MEDLINE MESH search terms used in Candy et al (2011) systematic reviews*. • Looks to capture additional relevant literature on palliative care not indexed under palliative care as a MESH term. • Each included MESH term has been tested using MEDLINE as a test database to confirm the retrieval of additional relevant papers which would not have been captured by Palliative Care MESH term only, • 'end-of-life' and 'end of life' have previously been tested using MEDLINE as a test database to confirm the retrieval of additional relevant papers which would not have been captured by ***any*** of the MESH terms above. * Candy, B; Jones, L; Drake, R; Leurent, B; King, M; (2011); Interventions for supporting informal caregivers of patients in the terminal phase of a disease. The Cochrane database of systematic

- *Terminally Ill* - *Hospice Care* - *Hospice* **Cochrane Central Register of Controlled Trials (CENTRAL)** - *Palliative Care* - *Hospice and Palliative Care Nursing* - *Terminally Ill* - *Terminal Care* - *Hospice Care* - *Hospices* **Database of Abstracts of Reviews of Effects (DARE)** [University of York Centre for Reviews and Dissemination] - *Palliative care* - *Hospice and palliative care nursing* - *Terminally Ill* - *Terminal Care* - *Hospice Care* - *Hospices* **Cochrane Qualitative Reviews** - *Palliative Care* - *Hospice and Palliative Care Nursing* - *Hospices* - *Hospice Care* - *Terminal Care* - *Terminally Ill* AND - *'Qualitative Research'* as MESH or *'Qualitative'* in Title, abstract or keyword search	reviews Issue 6. Art No.: CD007617. ISSN 1469-493X DOI: https://doi.org/10.1002/14651858.CD007617.pub2 Flemming K, Atkin K, Ward C and Watt I. Adult family carers' perceptions of their educational needs when providing end-of-life care: a systematic review of qualitative research [version 1; peer review: 3 approved with reservations] AMRC Open Research 2019, 1:2 (https://doi.org/10.12688/amrcopenres.12855.1)
<u>Databases</u>	Medline, CINAHL Plus; PsychINFO; Social Sciences Citation Index; EMBASE; Cochrane Central Register of Controlled Trials (CENTRAL); Database of Abstracts of Reviews of Effects (DARE); Cochrane Qualitative Reviews.
Year	2009-2019

Appendix 2. Newcastle Ottawa Scale (NOS) adapted Quality Assessment criteria

Depending on the type of study, studies were assessed using either the cohort (CO)/ longitudinal study criteria or cross sectional (CR) criteria listed below. The origin of each criterion, which relates to the version of NOS the criteria was adapted from, is also included for each criterion.

Scoring system: A maximum score of 1 was available for each criterion, with the exception of comparability criterion, where a maximum score of 2 was possible. Where a starred condition (*) within the criterion was met, the criterion was awarded one point, with the exception of comparability criterion, where 1 point was available for each starred (*) condition. This resulted in a maximum score for quality assessment of cohort or longitudinal studies = 12 and a maximum score for quality assessment of cross-sectional studies = 10

Cohort (CO) or longitudinal study	**Cross sectional (CR) study**	**Origin**
SELECTION	**SELECTION**	
Representativeness of the sample/ exposed cohort: a) Truly representative of carers of patients at end of life * (all subjects or random sampling) b) Somewhat representative of carers of patients at end of life.* (non-random sampling) c) Selected group of users (e.g. convenience sampling; not sampling of all carers fitting criteria). d) No description of the sampling strategy.	Representativeness of the sample: a) Truly representative of carers of patients at end of life * (all subjects or random sampling) b) Somewhat representative of carers of patients at end of life.* (non-random sampling) c) Selected group of users (e.g. convenience sampling; not sampling of all carers fitting criteria). d) No description of the sampling strategy.	CR/ CO
Selection of exposed and control cohort 1. drawn from the same community * 2. drawn from different sources 3. not clear	Selection of the sample a) drawn from the same community * b) drawn from different sources (e.g. mixture of hospital and home/outpatient) – where distribution is likely to be unrelated to the predictor/s* c) drawn from different sources (e.g. mixture of hospital and home/outpatient) – where distribution is likely to be related with the predictor/s d) not clear	CO
Non-respondents: a) Comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory. *	Non-respondents: a) Comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory. *	CR

b) The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory. c) No description of the response rate or the characteristics of the responders and the non-responders.	b) The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory. c) No description of the response rate or the characteristics of the responders and the non-responders.	
Sampling frame a) The analytical (final) frame is ≥ 50% of the initial sampling frame* b) The analytical (final) frame is < 50% of the initial sampling frame c) The initial sampling frame is not reported	Sampling frame a) The analytical (final) frame is ≥ 50% of the initial sampling frame* b) The analytical (final) frame is < 50% of the initial sampling frame c) The initial sampling frame is not reported	
Ascertainment of the predictor(s) ('exposure'/'risk factor'): a) Validated measurement tool (CR); secure record (e.g. surgical records), structured interview (CO). * b) Non-validated measurement tool, but the tool is available or described (CR); written self report (CO). c) No description (of the measurement tool). (CR/ CO)	Ascertainment of the predictors ('exposure'/'risk factor'): a) Validated measurement tool (CR); secure record (e.g. surgical records), structured interview (CO). * b) Non-validated measurement tool, but the tool is available or described (CR); written self report (CO). c) No description (of the measurement tool). (CR/ CO)	CR/ CO
Demonstration that predictors preceded outcome and/or that baseline measurement of outcome variable was taken into account a) yes * b) no		CO
COMPARABILITY	**COMPARABILITY**	
Evidence of attempting to control for other/ confounding factors in the analysis of relationship between predictor and outcome a) The study controls for the most important factor (select one). * b) The study control for any additional factor. *	Evidence of attempting to control for other/ confounding factors in the analysis of relationship between predictor and outcome a) The study controls for the most important factor (select one). * b) The study control for any additional factor. *	CR
OUTCOME		
Was there an a priori hypothesis/hypotheses or was the study exploratory? (a) A priori hypothesis * (b) Exploratory	Was there an a priori hypothesis or was the study purely exploratory? (a) A priori hypothesis * (b) Exploratory	
Assessment of the outcome(s):	Assessment of the outcome(s):	CR/ CO

a. Independent assessment* b. Clinical interview * c. Record linkage * d. Validated measurement tool* e. Self report. *f.* No description.	a) Independent assessment* b) Clinical interview* c) Record linkage. * d) Validated measurement tool* e) Self report. f) No description.	
<u>Adequacy of follow up of cohorts</u> a) complete follow up - all subjects accounted for * b) subjects lost to follow up unlikely to introduce bias - small number lost - > ____ % (select an adequate %) follow up, or description provided of those lost) * c) retrospective cohort so not applicable * c) follow up rate < ____% (select an adequate %) and no description of those lost. d) no statement		CO
<u>Statistical test:</u> a) The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value). * b) The statistical test is not appropriate, not described or incomplete.	<u>Statistical test:</u> a) The statistical test used to analyse the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value). * b) The statistical test is not appropriate, not described or incomplete.	CR

Supplement 1. Quantitative Observational Research Evidence: In-depth list of factors affecting caregiver mental health overall

1: Patient condition

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘patient condition’	**Better mental health**	**Worse mental health**	**No change**
Patient condition			
Other conditions			
Patients with heart failure (patients with heart failure were compared with patients with lung cancer)			3
Patient with chronic obstructive pulmonary disease (COPD) (patients with COPD were compared with patients with chronic heart failure and patients with chronic renal failure]		1	
Cancer			
Primary brain cancer (patients with primary brain cancer were compared with patients other cancers)		1	
Type of cancer (lung, colon, liver, brain, prostate, stomach, pancreatic)			2
Patients with rare cancers (patients with rare cancer compared with patients with common cancers)		1	1
Patient cancer diagnosis (types of cancer were studied: prostate, lung, breast, colorectal, pancreatic)			1
Patients with lung cancer (patients with lung cancer were compared with patients with breast, urogenital and other cancers)		2	
Tumour histology in patients with high-grade glioma			1

To note:
The numbers in each column do not relate to the total number of research studies that investigated each factor. Rather, the numbers in each column relate to the total number of times the relationship was investigated between the individual factor and a single mental health outcome (anxiety, depression, distress or psychological wellbeing/Quality of Life) and where the individual factor was identified as having a positive impact, negative impact or no change on the mental health outcome investigated. This way of reporting the numbers is intended to bring together all investigations of individual factors within a theme and therefore purposely does not take into account where one research study looks at several outcomes for the same factor.
(For details on the total number of research studies that looked at the individual factor for each different type of mental health outcome (anxiety, depression, distress, psychological wellbeing/Quality of Life), please refer to the Level 4 information: ‘Observational research – In-depth factors for different outcomes’)

1: Patient condition (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to 'patient condition'	**Better mental health**	**Worse mental health**	**No change**
Patient diagnosis			
Shorter time since diagnosis (months) in palliative cancer patients		1	
Patient disease burden			
Physical functioning			
Greater functional impairment			
Patient lower functional capacity		1	
(measured using Barthel Index)			
Patient functional capacity			1
(measured using using Palliative performance scale and Activities of Daily Living Index)			
Patient activities of daily living impairment			2
Patient ECOG 3*		1	
*An ECOG score of 3 refers to a person who is capable of only limited self-care and is confined to bed or a chair for more than 50% of waking hours			
Patient functional status			1
(measured by the amount of assistance for ADL's using Katz Index)			
Functional impairment of patient		1	
Patient functional status			3
(measured by Patient Kamofsky Performance Status Scale)			
Patient comorbidity*			1
*patient has two or more medical conditions at the same time			
Patient needing night time care			1
Cognitive functioning *(a person's ability to process thoughts and remember things)*			
Greater cognitive impairment*			3
*cognitive impairment is a temporary or permanent loss of mental functions, causing forgetfulness, lack of concentration, learning difficulties, and other reductions in effective thinking			
Patient disease severity			
Patient disease severity			2

1: Patient condition (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to 'patient condition'	**Better mental health**	**Worse mental health**	**No change**
Patient Quality of Life (QoL)			
Patient overall QOL	6	1**	3
**study reports a positive relationship between QoL and depression but does not state if a higher score on the QoL measure relates to a lower QOL			
Patient psychological QOL (psychological wellbeing)	1		
Patient stage of disease			
Time		1	1
12 months to 1 month prior to death of patient with ovarian cancer			
Time taken for a patient with Amyotrophic Lateral Sclerosis (ALS*) to show a measurable decline** in functioning		1	
*ALS is a similar condition to multiple sclerosis **(a decline of 5 points on the Amyotrophic Lateral Sclerosis (ALS) Functional Rating Scale (ALSFRS) – this was not longer than 15 months from baseline measures			
Change over time (7, 12, 18 and 24 weeks after Quality of Life was first measured in caregivers of patients with lung cancer)		1	1
Caregivers perceived stage of the patient's cancer (PSOC)* at 4 different time points prior to the patient dying			2
* caregivers were asked the following question: 'How advanced is the patient's disease at present?'			

1: Patient condition (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘patient condition’	**Better mental health**	**Worse mental health**	**No change**
Patient symptoms			
Patient overall symptoms			
Patient symptom burden		1	
Patient symptoms			1
Caregiver finds the patient’s difficult/troubling emotional, psychological and physical symptoms stressful		1	
Patient physical symptoms			
Greater symptom burden related to appetite			1
Greater symptom burden related to drowsiness		1	
Greater symptom burden related to dyspnoea			1
*dyspnoea is shortness of breath/breathing difficulty			
Greater symptom burden related to fatigue		1	
Greater symptom burden related to nausea			1
Greater symptom burden related to pain		1	
Patients increased problems with communication measured using Brain Cancer Module (BN20), which assesses patient’s neurological functioning as perceived by caregiver		1	

1: Patient condition (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘patient condition’	**Better mental health**	**Worse mental health**	**No change**
Patient symptoms *(continued)*			
Patient psychological symptoms			
Patient anxiety		7	
Patient depression		9	3
Greater symptom burden related to anxiety		1	
Greater symptom burden related to depression		1	
Greater symptom burden related to reduced sense of wellbeing			1
Patient exhibits psychological or psychiatric symptoms		1	
Patient symptom global distress* **measures the distress a patient with cancer experiences in response to the severity and frequency of symptoms*		1	

1: Patient condition (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘patient condition’	**Better mental health**	**Worse mental health**	**No change**
Patient treatment			
Patient admitted to hospital or long term care within previous 7 days		1	
Patient awaiting new line of treatment			1
Patient receiving no cancer therapy		1	
Medical care provided			1
No past surgery		1	1
Past chemotherapy			2
Patient frequently visited emergency outpatient clinic			1
Patient follow up method (oncologist*-led follow-up compared with multidisciplinary group follow-up)			1
*oncologist is a doctor who specializes in diagnosing and treating people who have cancer			
Patient receiving Specialized Palliative Care (SPC)			1
*According to National Institute of Clinical Excellence (NICE), **Specialist palliative care** encompasses hospice care (including inpatient hospice, day hospice, hospice at home) as well as a range of other specialist advice, support and care such as that provided by hospital palliative care teams.			

2: Impact of caring responsibilities

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to 'Impact of caring responsibilities'	**Better mental health**	**Worse mental health**	**No change**
Caregiver workload			
Caring for patient			
Caregiver burden measures:			
Bakas Caregiving Outcomes Scale (BCOS) score – changes have worsened.*		5	
*BCOS measures carers' perception of changes in their lives as a result of providing care and covers social functioning, physical health and subjective wellbeing.			
Oberst Caregiving Burden Score - D (OCBS-D) score - tasks of greater difficulty* *OCBS-D measures difficulty of caregiving tasks		2	
Oberst Caregiving Burden Score -T (OCBS-T) score -more time spent on caregiving tasks* *OCBS-T measures time spent on caregiving tasks		2	
Perceived burden (measured by Caregiver Strain Index)		1	
Zarit Burden Inventory 12 (ZBI-12) (measures subjective burden)		3	
Burden Scale for Family Caregivers (BSFC) (measures burden of care)		3	

2: Impact of caring responsibilities (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘Impact of caring responsibilities’	**Better mental health**	**Worse mental health**	**No change**
Caregiver workload *continued*			
Caring for patient			
Caregiver assists with activities of daily living (ADL*) *ADLs are the essential tasks that each person needs to perform, on a regular basis, to sustain basic survival and well-being.		1	
Caregiver assists with medical tasks		1	
Number of days spent on caregiving tasks		1	
Physical strain		1	
Demands* on caregiver *caregiving demands include acknowledged tasks such as activities of daily living; preparing and administering medication; maintaining nutritional care; transporting; giving emotional support; conducting family business; and, less recognized, acting as a source of data about the patient to professional healthcare providers.		1	
Impact on caregiver’s schedule – (measured by Carer Reaction Assessment (CRA)		1	
Number of hours per week providing care			1

2: Impact of caring responsibilities (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘Impact of caring responsibilities’	**Better mental health**	**Worse mental health**	**No change**
Caregiver workload *(continued)*			
Length of caring			
Duration of care			
Duration of care			1
Period of home care (months)			1
Number of months of caregiving			1
Other demands on time			
Other demands on time		1	
Support for others			
Additional caring responsibilities			
Caring for others			1
Children of minor age			2
Caregiver with childcare responsibilities		1	
Caregiver lifestyle adjustments			
Caregiver has made greater lifestyle adjustments to accommodate the caregiver role		1	
Caregiver sleeping hours			
Caregiver sleeping hours			1
Caregiver sleep problems			
Caregiver has sleep problems*		1	
*family caregivers were asked how often in the prior 2 weeks they had experienced having ‘trouble falling or staying asleep or sleeping too much'			

3: Relationships

Factor (Overall theme)	Impact on mental health		
Individual factor/s contributing to 'Relationships'	Better mental health	Worse mental health	No change
Family dynamics			
Coherence *(ability of family members to successfully cope with family stressors)*			
Family sense of coherence* perceived by caregiver is high (measured by Family Sense of Coherence Scale)	2		
*family sense of coherence relates to the ability of family members to successfully cope with family stressors			
Cohesion *(the level of commitment and support in the family)*			
Family cohesion* perceived by caregiver is low (measured by family environment scale)		1	
*family cohesion relates to the degree of commitment, help and support family members provide one another			
Family cohesion* perceived by patient is low (measured by family environment scale)		1	
*family cohesion relates to the degree of commitment, help and support family members provide one another			
Supportiveness of family relationships	1		
Communication			
Family expressiveness* perceived by caregiver is low (measured by family environment scale)		1	
*family expressiveness is the extent to which family members are encouraged to express feelings directly			
Family expressiveness* perceived by patient is low (measured by family environment scale)		1	
*family expressiveness is the extent to which family members are encouraged to express feelings directly			
Conflict			
Family conflict* perceived by caregiver is high (measured by family environment scale)		1	
*family conflict relates to the amount of openly expressed anger and conflict among family members			
Family conflict* perceived by patient is high (measured by family environment scale)		1	
*family conflict relates to the amount of openly expressed anger and conflict among family members			

3: Relationships (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘Relationships’	**Better mental health**	**Worse mental health**	**No change**
Quality of patient-caregiver relationship			
Caregiver attachment style *(how the caregiver relates to people)*			
Caregiver has an insecure-anxious attachment style*		1	
*attachment style relates to the different ways of interacting and behaving in relationships			
Caregiver has an insecure-avoidant attachment style*			1
*attachment style relates to the different ways of interacting and behaving in relationships			
Cohesion *(the level of commitment and support in the relationship)*			
Caregiver gets on with the patient			1
Communication			
Caregiver communication with patient about both their illness and approaching death is high	1		
Conflict			
Caregiver dissatisfaction with caregiver-patient partnership		1	
Number of unresolved family conflicts perceived by family member		1	
Number of unresolved family conflicts perceived by patient		1	

4: Finances

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘Finances’	**Better mental health**	**Worse mental health**	**No change**
Caregiver finances			
Sufficient family budget	1		
Caregiver income (US dollars)			1
Annual income during care (US dollars)			1
Financial difficulties due to patients’ disease		1	
Financial strain related to providing informal care		1	
Caregiver mode of transport			
Means of transport (private car)		1	1
Impact on work			
Change in work situation (includes: less hours worked, quit job, on leave, changed job, lost job)		1	

5: Carer internal processes

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘Carer Internal proceses’	**Better mental health**	**Worse mental health**	**No change**
Acceptance of patient condition			
Difficult for caregiver to emotionally accept that the patient's condition was rapidly worsening		1	
Coping patterns			
Positive impact			
Optimistic	1		
Secular* caregivers	1		
*non-religious			
Negative impact			
Suppression of competing activities* (measured using COPE Inventory)		1	
* coping style which is based on solving problems, such as concentrating efforts on doing something about a problem or thinking about what steps to take for solving a problem			
Seeking for emotional social support (measured using COPE Inventory)		1	
Disengagement through substance use* (measured using COPE Inventory)		1	
Dysfunctional* coping strategies (measured using Brief COPE)		1	
*coping style which is based on not accepting a problem or not wanting to think about it, such as avoiding dealing with the problem or not accepting that the situation has happened			
Venting of emotions (measured using COPE Inventory)		1	

5: Carer internal processes (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to 'Carer Internal proceses'	**Better mental health**	**Worse mental health**	**No change**
Coping patterns *(continued)*			
No impact			
Emotion-focused* coping strategies (measured using Brief COPE)			1
* coping strategies which aim to reduce or eliminate negative feelings such as accepting the reality or trying to see the situation positively			
Problem focused coping strategies (measured using Brief COPE)			1
* coping strategies which aim to solve problems, such as concentrating efforts on doing something about a problem or thinking about what steps to take for solving a problem			
Active coping*(measured using COPE Inventory)			1
* coping style which is based on solving problems, such as concentrating efforts on doing something about a problem or thinking about what steps to take for solving a problem			
Humour* (measured using COPE Inventory)			1
Fighting spirit coping style* (measured using Mini-Mental Adjustment to Coping Scale)			2
Seeking for information support (measured using COPE Inventory)			1
Religious coping (measured using COPE Inventory)			1
Denial (measured using COPE Inventory)			1
Cognitive avoidance coping style* (measured using Mini -Mental Adjustment to Coping Scale)			2
* cognitive avoidance relates to avoiding feeling or thinking about events or experiences such as unpleasant or distressing thoughts or memories			
Mental disengagement* (measured using COPE Inventory)			1
* coping style in which a person turns to other activities (including daydreaming, sleep, work or other substitute activities like watching TV) when they experience a stressful event			

5: Carer internal processes (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘Carer Internal proceses’	**Better mental health**	**Worse mental health**	**No change**
Control over the care situation			
Control over the care situation (measured using the Carer Experience Scale)			1
Caregiver feels helpless or guilty because they could do nothing for the patient		1	
Self-efficacy			
Self efficacy*	1		
Caregiver has greater confidence in caring for themselves (as a measure of their self-efficacy*)	1		
Caregiver has greater confidence in managing caregiving demands (as a measure of their self-efficacy*)	1		
*confidence in one’s ability to carry out a task			
Self-esteem			
Esteem		1**	
** author's confirmed higher scores on caregiver esteem were unexpectedly related to higher scores on depression".			
Positive aspects of caregiving			
Fulfilment from caring			1
Happy to care			1
Pre-loss grief			
Pre-loss grief		1	
Preparedness for caregiving			
Preparedness for caregiving	2		1
Previous experience of informal caregiving			
Provided care to a loved one in the past		2	
Time for respite			
Activities outside caring			1
Enough time for self	1		

6: Support

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to 'Support'	**Better mental health**	**Worse mental health**	**No change**
Accessible information			
Accessible information for carers	1		
Accessible information for patients	1		
Caregiver support			
Formal support			
Previously received formal support:			
Caregiver previously accessed support services			1
Currently receiving formal support:			
Caregiver receiving support services	1		
Caregiver accessing professional psychological help		1	2
Institutional support - assistance from organisations and the government			1
Caregiver receiving formal help			1
Interested in receiving support:			
Caregiver interested in accessing future support services		1	
Caregiver requesting home care for patient	1		
Type of formal support service used and frequency			1
Home-visit physicians and nurses provide no help in symptom management		1	

6: Support (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘Support’	**Better mental health**	**Worse mental health**	**No change**
Caregiver support *continued*			
Informal support			
Currently receiving informal support			
Social support : from family and friends	2		
Instrumental support : presence of a sub caregiver	1		
Caregiver receiving informal help			1
Availability of someone who could stay with patient			1
Caregiver working in pairs			2
Perceived support			
Caregiver perceived support			2
Satisfaction with support			
Caregiver support satisfaction	1		

6: Support (continued)

Factor (Overall theme)	Impact on mental health		
Individual factor/s contributing to ‘Support’	Better mental health	Worse mental health	No change
Communication with care professionals			
Faster dialogue pace**		1	1
Language complexity**			2
Length of interaction (in minutes)**			2
Team taking turns to speak**			2
** in care planning sessions between informal caregivers and hospice team members			
Health professionals understanding of patient needs			
Because symptoms are not severe in daytime, physicians or nurses do not understand their severity			1
Quality of Care			
Caregiver satisfaction with care	1		
Caregiver satisfaction with home care	1		
Patient satisfaction with home care	1		
Instrumental support services received considered necessary by caregiver			1
Carer reports of quality of care: more problems in patient emotional and spiritual support	1		
Carer reports of quality of care: more problems with patient unmet needs		1	
Unmet needs in caregiver			
Number of important unmet needs by health professionals		1	
Total number of unmet needs (psychological, social and physical needs)		3	

7: Contextual factors

Factor (Overall theme)	Impact on mental health		
Individual factor/s contributing to ‘Support’	**Better mental health**	**Worse mental health**	**No change**
Caregiver age			
Caregiver age - increasing age	6		8
Carer age >=75	1		
Caregiver education			
Number of years of education completed			1
Caregiver educational level			3
Caregiver education			5
Caregiver employment status			
Unemployed			
Unemployed		1	
Employed			
Caregiver employment			6
Employed – on leave		1	
Retired			
Retired	2		
Caregiver ethnicity			
Non-European ethnicity			1
White	1		1
Caregiver gender			
Female caregiver		6	13
Wife caregiver		1	
Husband caregiver			1

7: Contextual factors (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to ‘Support’	**Better mental health**	**Worse mental health**	**No change**
Caregiver health status			
Poor physical health			
Caregiver comorbidity*			1
* comorbidity is the presence of two or more medical conditions at the same time			
Physical health condition of carer - poor		1	
Caregiver disability or chronic illness			1
Caregiver chronic disease			1
Overall health			
Overall health status			1
Caregiver marital status			
Caregiver marital status			4
Caregiver socio-economic status			
Higher socioeconomic status (SES)	1		
*SES is a combined measure of a person's work experience and of an individual's or family’s economic and social position in relation to others, based on income, education, and occupation			
Composition of household			
Composition of household members who live with caregiver			1
Length of patient-caregiver relationship			
Date of marriage			1

7: Contextual factors (continued)

Factor (Overall theme)	**Impact on mental health**		
Individual factor/s contributing to 'Support'	**Better mental health**	**Worse mental health**	**No change**
Patient age			
Patient age	1		2
Patient educational level			
Patient educational level			2
Patient gender			
Patient gender			2
Male patient		2	
Patient lives with caregiver			
Patient lives with caregiver		2	2
Relationship to patient			
Spouse/partner			
Spouse	1		
Spouse or partner			4
Relationship to patient			3
Child			
Daughter			1
Child	1		
Other relationship			
Not a spouse/partner of the patient		1	1
Caregiver other than wife, husband or daughter	1		
Nature of relationship			2
Rural location			
Living in a rural area			3

Supplement 2. Quantitative Observational Research Evidence: In-depth list of factors affecting different types of mental health outcome

*Factors relating to Caregiver **Quality of Life (QoL)***

1: Patient condition

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'patient condition'	**Better QoL**	**Worse QoL**	**No change**
Patient condition			
Other conditions			
Patients with heart failure *Malik et al 2013*			1
(patients with heart failure were compared with patients with lung cancer)			
Cancer			
Primary brain cancer *Aoun et al 2015*		1	
(patients with primary brain cancer were compared with patients other cancers)			
Type of cancer *Ito & Tadaka 2017*			1 (1)
(lung, colon, liver, brain, prostate, stomach, pancreatic)			
Patients with rare cancers *Loggers & Prigerson 2014*		1 (1)	
(patients with rare cancer were compared with patients with common cancers)			
Tumour histology in patients with high-grade glioma *Boele et al 2012*			1

*Factors relating to Caregiver **Quality of Life (QoL)***

1: Patient condition (continued)

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'patient condition'	**Better QoL**	**Worse QoL**	**No change**
Patient disease burden			
Physical functioning			
Greater functional impairment:			
Patient ECOG 3* _Duimering et al 2019_		1 (1)	
*An ECOG score of 3 refers to a person who is capable of only limited self-care and is confined to bed or a chair for more than 50% of waking hours			
Patient functional status _Ito & Tadaka 2017_			1 (1)
(measured by amount of assistance for Activities of Daily Living using Katz Index)			
Functional impairment of patient _Ownsworth et al 2010_		1	
Patient functional status _Wasner et al 2013_			1 (1)
(measured by Patient Kamofsky Performance Status Scale)			
Patient comorbidity* _Wadhwa et al 2013_			1
*patient has two or more medical conditions at the same time			
Patient needing night time care _Ito & Tadaka 2017_			1 (1)
Cognitive functioning			
Greater cognitive impairment * _Wasner et al 2013_			1 (1)
(measured by Mini-Mental State Evaluation (MMSE)) _*cognitive impairment is a temporary or permanent loss of mental functions, causing forgetfulness, lack of concentration, learning difficulties, and other reductions in effective thinking_			

*Factors relating to Caregiver **Quality of Life (QoL)***

1: Patient condition (continued)

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to ‘patient condition’	**Better QoL**	**Worse QoL**	**No change**
Patient Quality of Life (QoL)			
Patient overall QOL *Janda et al 2017* *McIlfatrick et al 2018* *Wadhwa et al 2013* *Wasner et al 2013*	3 (1)		1 (1)
Patient psychological QOL (psychological wellbeing) *Boele et al 2012*	1		
Patient stage of disease			
Time *Butow et al 2014*			1
(period 12 months to 1 month prior to death of patient with ovarian cancer)			
Time taken for a patient with Amyotrophic Lateral Sclerosis (ALS*) to show a measurable decline** in functioning *Stutzki et al 2014*		1 (1)	
*ALS is a similar condition to multiple sclerosis **a decline of 5 points on the Amyotrophic Lateral Sclerosis Functional Rating Scale (ALSFRS) – this was not longer than 15 months from baseline measures			
Change over time *Grant et al 2013*		1	
(7, 12, 18 and 24 weeks after QoL was first measured in caregivers of patients with lung cancer)			

Factors relating to Caregiver ***Quality of Life (QoL)***

1: Patient condition (continued)

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'patient condition'	**Better QoL**	**Worse QoL**	**No change**
Patient symptoms			
Patient overall symptoms:			
Patient symptoms *Ito & Tadaka 2017*			1 (1)
Patient physical symptoms:			
Greater symptom burden related to appetite *Wadhwa et al 2013*			1
Greater symptom burden related to drowsiness *Wadhwa et al 2013*		1	
Greater symptom burden related to dyspnea *Wadhwa et al 2013*			1
**dyspnoea is shortness of breath/breathing difficulty*			
Greater symptom burden related to fatigue *Wadhwa et al 2013*		1	
Greater symptom burden related to nausea *Wadhwa et al 2013*			1
Greater symptom burden related to pain *Wadhwa et al 2013*		1	
Patients increased problems with communication *Boele et al 2012*		1	
(measured using Brain Cancer Module (BN20), which assesses patient's neurological functioning as perceived by caregiver)			
Patient psychological symptoms:			
Patient anxiety *McIlfatrick et al 2018*		1	
Patient depression *Huang & McMillan 2019* *McIlfatrick et al 2018*		1	1
Greater symptom burden related to anxiety *Wadhwa et al 2013*		1	
Greater symptom burden related to depression *Wadhwa et al 2013*		1	
Greater symptom burden related to reduced sense of wellbeing *Wadhwa et al 2013*			1

Factors relating to Caregiver ***Quality of Life (QoL)***

1: Patient condition (continued)

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to ‘patient condition’	**Better QoL**	**Worse QoL**	**No change**
Patient treatment			
Patient admitted to hospital or long term care within previous 7 days *Duimering et al 2019*		1 (1)	
Patient awaiting new line of treatment *Wadhwa et al 2013*			1
Patient receiving no cancer therapy *Wadhwa et al 2013*		1	
Medical care provided *Ito & Tadaka 2017*			1 (1)

2: Impact of caring responsibilities

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'impact of caring responsibilities'	**Better QoL**	**Worse QoL**	**No change**
Caregiver workload			
Caring for the patient			
Caregiver burden measures:			
Zarit Burden Inventory 12 (ZBI-12) - measures subjective burden *Malik et al 2013*		1 (1)	
Burden Scale for Family Caregivers (BSFC) - measures burden of care *Wasner et al 2013*		1	
Caregiver assists with activities of daily living (ADL*) *Duimering et al 2019*		1 (1)	
**ADLs are the essential tasks that each person needs to perform, on a regular basis, to sustain basic survival and well-being.*			
Caregiver assists with medical tasks *Duimering et al 2019*		1 (1)	
Number of days spent on caregiving tasks *Wadhwa et al 2013*		1	
Physical strain *Hoefman et al 2015*		1	
Support for others			
Additional caring responsibilities:			
Caring for others *Wadhwa et al 2013*			1
Other demands on time			
Other demands on time *Hoefman et al 2015*		1	
Length of caring			
Duration of care			
Duration of care *Flechl et al 2013*			1 (1)
Period of home care (months) *Ito & Tadaka 2017*			1 (1)
Caregiver sleeping hours			
Caregiver sleeping hours *Ito & Tadaka 2017*			1 (1)

Factors relating to Caregiver ***Quality of Life (QoL)***

3: Relationships

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to ‘Relationships’	**Better QoL**	**Worse QoL**	**No change**
Family dynamics			
Cohesion *(the level of commitment and support in the family)*			
Supportiveness of family relationships *Nissen et al 2016*	1		
acceptanceCohesion *(the level of commitment and support in the relationship)*			
Caregiver gets on with the patient *Hoefman et al 2015*			1

4: Finances

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to ‘Finances’	**Better QoL**	**Worse QoL**	**No change**
Financial situation			
Caregiver income (US dollars) *Wadhwa et al 2013*			1
Financial difficulties due to patients’ disease *Flechl et al 2013*		1 (1)	
Financial strain related to providing informal care *Hoefman et al 2015*		1	
Sufficient family budget *Ito & Tadaka 2017*	1 (1)		
Impact on work			
Change in work situation *Ito & Tadaka 2017*		1	
includes: less hours worked, quit job, on leave, changed job, lost job			

Factors relating to Caregiver ***Quality of Life (QoL)***

5: Carer internal processes

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to ‘Carer internal processes’	**Better QoL**	**Worse QoL**	**No change**
Control over the care situation			
Control over the care situation *Hoefman et al 2015*			1
Self-efficacy			
Self efficacy* *Ito & Tadaka 2017*	1 (1)		
*confidence in one’s ability to carry out a task			
Positive aspects of caregiving			
Fulfilment from caring *Hoefman et al 2015*			1
Happy to care *Hoefman et al 2015*			1
Preparedness for caregiving			
Preparedness for caregiving *McIlfatrick et al 2018*	1 (1)		
Time for respite			
Activities outside caring *Hoefman et al 2015*			1
Enough time for self *Hoefman et al 2015*	1		

Factors relating to Caregiver ***Quality of Life (QoL)***

6: Support

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'Caregiver support'	**Better QoL**	**Worse QoL**	**No change**
Accessible information			
Accessible information for carers *Ito & Tadaka 2017*	1 (1)		
Accessible information for patients *Ito & Tadaka 2017*	1 (1)		
Caregiver support			
Formal support			
Previously received formal support:			
caregiver previously accessed support services *Duimering et al 2019*			1 (1)
Currently receiving formal support:			
caregiver receiving support services *Ito & Tadaka 2017*	1 (1)		
caregiver accessing professional psychological help *Janda et al 2017*			1 (1)
institutional support - assistance from organisations and the government *Hoefman et al 2015*			1
caregiver receiving formal help *Wadhwa et al 2013*			1
Interested in receiving support:			
caregiver interested in accessing future support services *Duimering et al 2019*		1 (1)	
caregiver requesting home care for patient *Ito & Tadaka 2017*	1 (1)		
Type of formal support service used and frequency *Ito & Tadaka 2017*			1 (1)

*Factors relating to Caregiver **Quality of Life (QoL)***

6: Support (continued)

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'Caregiver support'	**Better QoL**	**Worse QoL**	**No change**
Informal support			
Currently receiving informal support:			
social support : from family and friends *Hoefman et al 2015*	1		
instrumental support : presence of a sub caregiver *Ito & Tadaka 2017*	1 (1)		
caregiver receiving informal help *Wadhwa et al 2013*			1
Communication with care professionals			
Faster dialogue pace** *Wittenberg-Lyles et al (2013)*		1 (1)	
Language complexity** *Wittenberg-Lyles et al (2013)*			1 (1)
Length of interaction (in minutes)** *Wittenberg-Lyles et al (2013)*			1 (1)
Team taking turns to speak** *Wittenberg-Lyles et al (2013)*			1 (1)
** in care planning sessions between informal caregivers and hospice team members			
Quality of Care			
Caregiver satisfaction with care *Hannon et al 2013*	1 (1)		
Caregiver satisfaction with home care *Ito & Tadaka 2017*	1 (1)		
Patient satisfaction with care *Hannon et al 2013*	1 (1)		
Instrumental support services received considered necessary by caregiver *Ito & Tadaka 2017*			1 (1)

*Factors relating to Caregiver **Quality of Life (QoL)***

7: Contextual factors

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'Contextual factors'	**Better QoL**	**Worse QoL**	**No change**
Caregiver age			
Caregiver age – increasing age *Flechl et al 2013* *Ito & Tadaka 2017* *Janda et al 2017* *Wadhwa et al 2013*	2 (1)		2 (2)
Carer age >=75 *McIlfatrick et al 2018*	1 (1)		
Caregiver education			
Caregiver education *Janda et al 2017* *Wadhwa et al 2013*			2 (1)
Caregiver employment status			
Unemployed			
Unemployed *Wadhwa et al 2013*		1	
Employed			
Employed *Ito & Tadaka 2017*			1
Employed – on leave *Duimering et al 2019*		1 (1)	
Retired			
Retired *Duimering et al 2019* *Wadhwa et al 2013*	2 (1)		
Caregiver ethnicity			
Non-European			
Non-European ethnicity *Wadhwa et al 2013*			1
Caregiver gender			
Female caregiver *Butow et al 2014* *Duimering et al 2019* *Ito & Tadaka 2017* *Janda et al 2017* *Wadhwa et al 2013*		1	4 (3)

7: Contextual factors (continued)

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'Contextual factors'	**Better QoL**	**Worse QoL**	**No change**
Caregiver health status			
Poor physical health			
Caregiver disability or chronic illness *Wadhwa et al 2013*			1
Caregiver chronic disease *Ito & Tadaka 2017*			1 (1)
Caregiver socio-economic status			
Higher socioeconomic status (SES)* *Duimering et al 2019*	1 (1)		
*SES is a combined measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.			
Composition of household			
Composition of household members who live with caregiver *Ito & Tadaka 2017*			1 (1)
Patient age			
Patient age *Flechl et al 2013* *Ito & Tadaka 2017* *Wadhwa et al 2013*	1 (1)		2 (2)
Patient gender			
Patient gender *Ito & Tadaka 2017* *Wadhwa et al 2013*			2 (2)
Patient lives with caregiver			
Patient lives with caregiver *Duimering et al 2019* *Wadhwa et al 2013*		1 (1)	1

7: Contextual factors (continued)

Factor (Overall theme)	**Impact on Quality of Life (QoL)**		
Individual factor/s contributing to 'Contextual factors'	**Better QoL**	**Worse QoL**	**No change**
Relationship to patient			
Spouse/partner			
Spouse *Wadhwa et al 2013*	1		
Spouse or partner *Janda et al 2017*			1 (1)
Relationship to patient *Butow et al 2014* *Ito & Tadaka 2017*			2 (1)
Child			
Child *Duimering et al 2019*	1 (1)		
Rural location			
Living in a rural area *Duimering et al 2019* *Butow et al 2014*			2 (1)

*Factors relating to Caregiver **Depression***

1: Patient condition

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Patient condition’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Patient condition			
Other conditions			
Patients with heart failure *Malik et al 2013*			1
(patients with heart failure were compared with patients with lung cancer)			
Cancer			
Patient cancer diagnosis *Rivera et al 2010*			1
(types of cancer were studied: prostate, lung, breast, colorectal, pancreatic)			
Patients with lung cancer *Govina et al 2019*		1	
(patients with lung cancer were compared with patients with breast, urogenital and other cancers)			
Patient diagnosis			
Shorter time since diagnosis (months) in palliative cancer patients *Fasse et al 2015*		1	
Patient disease burden			
Physical functioning			
Greater functional impairment:			
patient functional status (measured using Palliative performance scale and Activities of Daily Living Index) *Rivera et al 2010*			1
patient activities of daily living impairment *Burton et al 2012*			1
patient Karnofsky Performance Status Scale *Wasner et al 2013*			1
Cognitive functioning			
Cognitive impairment *Wasner et al 2013*			1
Patient disease severity			
Patient disease severity *Burton et al 2012*			1

*Factors relating to Caregiver **Depression***

1: Patient condition (continued)

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Patient condition’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Patient stage of disease			
Caregivers perceived stage of the patient’s cancer (PSOC)* at 4 different time points prior to patient dying *Burridge et al 2009*			1
* caregivers were asked the following question: ‘How advanced is the patient’s disease at present?’			
Patient symptoms			
Patient overall symptoms			
Caregiver finds the patient’s difficult/troubling emotional, psychological and physical symptoms stressful *Wilkes et al 2018*		1	
Patient psychological symptoms			
Patient anxiety *Jacobs et al 2017* *McIlfatrick et al 2018*		2	
Patient depression *Gotze et al 2014* *Huang & McMillan 2019* *Jacobs et al 2017* *Janda et al 2017* *McIlfatrick et al 2018* *Rivera et al 2010* *Siminoff et al 2010*		6	1
Patient exhibits psychological or psychiatric symptoms *Kobayakawa et al 2017*		1	
Patient symptom global distress* *Rivera et al 2010*		1	
*measures the distress a patient with cancer experiences in response to the severity and frequency of symptoms			

*Factors relating to Caregiver **Depression***

1: Patient condition (continued)

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to 'Patient condition'	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Patient quality of life (QoL)			
Patient overall quality of life *McIlfatrick et al 2018* *Rivera et al 2010* *Wasner et al 2013*	1	1**	1
**study reports a positive relationship between QoL and depression but does not state if a higher score on the QoL measure relates to a lower QOL			
Patient treatment			
No past surgery *Govina et al 2019*			1
Past chemotherapy *Govina et al 2019*			1
Patient frequently visited emergency outpatient clinic *Kobayakawa et al 2017*			1

*Factors relating to Caregiver **Depression***

2: Impact of caring responsibilities

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Impact of caring responsibilities’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Caregiver workload			
Caring for the patient			
Caregiver burden measures:			
Bakas Caregiving Outcomes Scale (BCOS) score – changes have worsened.* *Buscemi et al 2010* *Govina et al 2019*		2	
*BCOS measures carers' perception of changes in their lives as a result of providing care and covers social functioning, physical health and subjective wellbeing.			
Oberst Caregiving Burden Score - D (OCBS-D) score - tasks of greater difficulty.* *Govina et al 2019*		1	
*OCBS-D measures difficulty of caregiving tasks			
Oberst Caregiving Burden Score -T (OCBS-T) score -more time spent on caregiving tasks* *Govina et al 2019*		1	
*OCBS-T measures time spent on caregiving tasks			
Burden Scale for Family Caregivers (BSFC) - measures burden of care *Wasner et al 2013*		1	
Zarit Burden Inventory 12 (ZBI-12) - measures subjective burden *Malik et al 2013*		1	
Demands* on caregiver *Thielemann & Conner 2009*		1	
*caregiving demands include acknowledged tasks such as activities of daily living; preparing and administering medication; maintaining nutritional care; transporting; giving emotional support; conducting family business; and, less recognized, acting as a source of data about the patient to professional healthcare providers.			
Impact on caregiver’s schedule *Hudson et al 2011*		1	
(measured by Carer Reaction Assessment (CRA)			
Number of hours per week providing care *Thielemann & Conner 2009*			1

2: Impact of caring responsibilities (continued)

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to 'Impact of caring responsibilities'	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Caregiver workload			
Support for others:			
Additional caring responsibilities:			
Children of minor age *Govina et al 2019*			1
Length of caring			
Number of months of caregiving *Thielemann & Conner 2009*			1

*Factors relating to Caregiver **Depression***

3: Relationships

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Relationships’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Family dynamics			
***Coherence** (ability of family members to successfully cope with family stressors)*			
Family sense of coherence* perceived by caregiver is high *Mollerberg et al 2019*	1		
(measured by Family Sense of Coherence Scale) *family sense of coherence relates to the ability of family members to successfully cope with family stressors			
***Cohesion** (the level of commitment and support in the family)*			
Family cohesion* perceived by caregiver is low *Siminoff et al 2010*		1	
(measured by family environment scale) *family cohesion relates to the degree of commitment, help and support family members provide one another			
Family cohesion* perceived by patient is low *Siminoff et al 2010*		1	
(measured by family environment scale) *family cohesion relates to the degree of commitment, help and support family members provide one another			
Communication			
Family expressiveness* perceived by caregiver is low *Siminoff et al 2010*		1	
(measured by family environment scale) *family expressiveness is the extent to which family members are encouraged to express feelings directly			
Family expressiveness* perceived by patient is low *Siminoff et al 2010*		1	
(measured by family environment scale) *family expressiveness is the extent to which family members are encouraged to express feelings directly			

3: Relationships (continued)

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to 'Relationships'	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Family dynamics			
Conflict			
Family conflict* perceived by caregiver is high *Siminoff et al 2010*		1	
(measured by family environment scale) *family conflict relates to the amount of openly expressed anger and conflict among family members			
Family conflict* perceived by patient is high *Siminoff et al 2010*		1	
(measured by family environment scale) *family conflict relates to the amount of openly expressed anger and conflict among family members			
Quality of patient-caregiver relationship			
Caregiver attachment style			
Caregiver has an insecure-anxious attachment style* *Fasse et al 2015*		1	
*attachment style relates to the different ways of interacting and behaving in relationships			
Caregiver has an insecure-avoidant attachment style *Fasse et al 2015*			1
*attachment style relates to the different ways of interacting and behaving in relationships			
Communication			
Caregiver communication with patient about both their illness and approaching death is high *Bachner & Carmel 2009a*	1		
Conflict			
Number of unresolved family conflicts perceived by family member *Exline et al 2012*		1	
Number of unresolved family conflicts perceived by patient *Exline et al 2012*		1	

*Factors relating to Caregiver **Depression***

4: Finances

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Finances’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Financial situation			
Annual income during care (US dollars) *Kobayakawa et al 2017*			1
Caregiver mode of transport			
Means of transport (private car) Govina et al 2019			1

Factors relating to Caregiver ***Depression***

5: Carer internal processes

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to 'Carer internal processes'	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Acceptance of patient condition			
Difficult for caregiver to emotionally accept that the patient's condition was rapidly worsening *Kobayakawa et al 2017*		1	
Caregiver coping patterns			
Positive impact			
Optimistic *Hudson et al 2011*	1		
Secular* caregivers. *non-religious *Bachner et al 2011*	1		
Negative impact			
Suppression of competing activities* *Fasse et al 2015*		1	
(measured using COPE Inventory) * coping style which is based on solving problems, such as concentrating efforts on doing something about a problem or thinking about what steps to take for solving a problem			
Seeking for emotional social support *Fasse et al 2015*		1	
(measured using COPE Inventory)			
Disengagement through substance use *Fasse et al 2015*		1	
(measured using COPE Inventory)			
Venting of emotions *Fasse et al 2015*		1	
(measured using COPE Inventory)			

*Factors relating to Caregiver **Depression***

5: Carer internal processes(continued)

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to 'Carer internal processes'	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Caregiver coping patterns			
No impact			
Active coping* *Fasse et al 2015*			1
(measured using COPE Inventory) * coping style which is based on solving problems, such as concentrating efforts on doing something about a problem or thinking about what steps to take for solving a problem			
Humour *Fasse et al 2015*			1
(measured using COPE Inventory)			
Fighting spirit coping style *Burton et al 2012*			1
(measured using Mini -Mental Adjustment to Coping Scale)			
Seeking for information support *Fasse et al 2015*			1
(measured using COPE Inventory)			
Religious coping *Fasse et al 2015*			1
(measured using COPE Inventory)			
Denial *Fasse et al 2015*			1
(measured using COPE Inventory)			

Factors relating to Caregiver ***Depression***

5: Carer internal processes (continued)

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Carer internal processes’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Caregiver coping patterns (continued)			
No impact *(continued)*			
Cognitive avoidance* coping style *Burton et al 2012*			1
(measured using Mini -Mental Adjustment to Coping Scale) *cognitive avoidance relates to avoiding feeling or thinking about events or experiences such as unpleasant or distressing thoughts or memories			
Mental disengagement* *Fasse et al 2015*			1
(measured using COPE Inventory) * coping style in which a person turns to other activities (including daydreaming, sleep, work or other substitute activities like watching TV) when they experience a stressful event			
Control over the care situation			
Caregiver feels helpless or guilty because they could do nothing for the patient *Kobayakawa et al 2017*		1	
Self-esteem			
Esteem *Hudson et al 2011*		1**	
** author's confirmed higher scores on caregiver esteem were unexpectedly related to higher scores on depression".			
Pre-loss grief			
Pre-loss grief *Nielsen et al 2017*		1	
Preparedness for caregiving			
Preparedness for caregiving *Henriksson & Arestedt 2013*			1
Previous experience of informal caregiving			
Provided care to a loved one in the past *Govina et al 2019*		1	

Factors relating to Caregiver ***Depression***

6: Support

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Support’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Caregiver support			
Formal support			
Caregiver accessed professional psychological help *Janda et al 2017*			1
Home-visit physicians and nurses provide no help in symptom management *Kobayakawa et al 2017*		1	
Informal support			
Availability of someone who could stay with patient *Kobayakawa et al 2017*			1
Caregiver working in pairs *Wittenberg-Lyles et al 2014*			1
Social support (from family and friends) *Thielemann & Conner 2009*	1		
Perceived support			
Caregiver perceived support *Burton et al 2012*			1
Satisfaction with social support			
Caregiver support satisfaction (physical, emotional, informational) *Rivera et al 2010*	1		
Health professionals understanding of patient needs			
Because symptoms are not severe in daytime, physicians or nurses do not understand their severity *Kobayakawa et al 2017*			1
Unmet needs in caregiver			
Total number of unmet needs (psychological, social and physical needs) *Buscemi et al 2010*		1	

*Factors relating to Caregiver **Depression***

7: Contextual factors

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Contextual factors’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Caregiver age			
Caregiver age – increasing age *Burton et al 2012* *Govina et al 2019* *Janda et al 2017* *Rivera et al 2010* *Thielemann & Conner 2009*	1		4
Caregiver education			
Number of years of education completed *Thielemann & Conner 2009*			1
Caregiver educational level *Govina et al 2019* *Janda et al 2017* *Kobayakawa et al 2017*			3
Caregiver employment status			
Employed			
Caregiver employment *Burton et al 2012* *Govina et al 2019*			2
Caregiver ethnicity			
White			
Caregiver ethnicity (white) *Rivera et al 2010* *Thielemann & Conner 2009*	1		1
Caregiver gender			
Female caregiver *Burton et al 2012* *Fasse et al 2015* *Govina et al 2019* *Janda et al 2017* *Kobayakawa et al 2017* *Rivera et al 2010* *Thielemann & Conner 2009*		2	5
Wife caregiver *Rivera et al 2010*		1	
Husband caregiver *Rivera et al 2010*			1
Caregiver health status			
Poor physical health			
Physical health condition of carer – poor *Kobayakawa et al 2017*		1	

*Factors relating to Caregiver **Depression***

7: Contextual factors (continued)

Factor (Overall theme)	**Impact on Depression**		
Individual factor contributing to ‘Contextual factors’	**Better mental health (lower depression)**	**Worse mental health (higher depression)**	**No change**
Caregiver health status *continued*			
Overall health			
Overall health status *Rivera et al 2010*			1
Caregiver marital status			
Caregiver marital status *Burton et al 2012* *Govina et al 2019*			2
Length of patient-caregiver relationship			
Date of marriage *Thielemann & Conner 2009*			1
Patient educational level			
Patient educational level *Govina et al 2019*			1
Patient gender			
Male patient *Govina et al 2019*		1	
Patient lives with caregiver			
Patient lives with caregiver *Govina et al 2019*			1
Relationship to patient			
Spouse/partner			
Spouse/partner *Janda et al 2017* *Kobayakawa et al 2017*			2
Child			
Daughter *Rivera et al 2010*			1
Other relationship			
Caregiver other than wife, husband or daughter *Rivera et al 2010*	1		
Nature of relationship *Govina et al 2019*			1

Factors relating to Caregiver ***Anxiety***

1: Patient condition

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to 'Patient condition'	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Patient condition			
Other conditions			
Patients with heart failure *Malik et al 2013*			1
(patients with heart failure were compared with patients with lung cancer)			
Cancer			
Patients with lung cancer *Govina et al 2019*		1	
(patients with lung cancer were compared with patients with breast, urogenital and other cancers)			
Patient disease burden			
Physical functioning			
Greater functional impairment:			
patient lower functional capacity (measured using Barthel Index) *Perez-Ordonez et al 2016*		1	
patient activities of daily living impairment *Burton et al 2012*			1
patient Karnofsky Performance Status Scale *Wasner et al 2013*			1
Cognitive functioning			
Greater cognitive impairment *Wasner et al 2013*			1
Patient disease severity			
Patient disease severity *Burton et al 2012*			1
Patient quality of life (QoL)			
Patient overall quality of life *McIlfatrick 2017* *Wasner et al 2013*	1		1

Factors relating to Caregiver ***Anxiety***

1: Patient condition (continued)

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to 'Patient condition'	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Patient stage of disease			
Caregivers perceived stage of patient's cancer *Burridge et al 2009*			1
(PSOC)*at 4 different time points prior to patient dying * caregivers were asked the following question: 'How advanced is the patient's disease at present?'			
Patient symptoms			
Patient psychological symptoms			
Patient anxiety *Gotze et al 2014* *Jacobs et al 2017* *Janda et al 2017* *McIlfatrick et al 2018*		4	
Patient depression *Jacobs et al 2017* *McIlfatrick 2017*		2	
Patient treatment			
No past surgery *Govina et al 2019*		1	
Past chemotherapy *Govina et al 2019*			1

Factors relating to Caregiver ***Anxiety***

2: Impact of caring responsibilities

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to 'Impact of caring responsibilities'	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Caregiver workload			
Caring for the patient			
Caregiver burden measures:			
Bakas Caregiving Outcomes Scale (BCOS) score – changes have worsened* *Buscemi et al 2010* *Govina et al 2019*		2	
*BCOS measures carers' perception of changes in their lives as a result of providing care and covers social functioning, physical health and subjective wellbeing.			
*Oberst Caregiving Burden Score - D (OCBS-*D*) score - tasks of greater difficulty *Govina et al 2019*		1	
*OCBS-D measures difficulty of caregiving tasks			
Oberst Caregiving Burden Score -T (OCBS-T) score -* more time spent on caregiving tasks *Govina et al 2019*		1	
*OCBS-D measures difficulty of caregiving tasks			
Perceived burden *(measured by Caregiver Strain Index)* *Perez-Ordonez et al 2016*		1	
Burden Scale for Family Caregivers (BSFC) - *measures burden of care* *Wasner et al 2013*		1	
Zarit Burden Inventory 12 (ZBI-12) – *measures subjective burden* *Malik et al 2013*		1	
Support for others			
Additional caring responsibilities			
- *children of minor age* *Govina et al 2019*			*1*
Caregiver sleep problems			
Caregiver has sleep problems* *Washington et al 2018a*		1	
*family caregivers were asked how often in the prior 2 weeks they had experienced having 'trouble falling or staying asleep or sleeping too much'			

Factors relating to Caregiver ***Anxiety***

3: Relationships

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to ‘Relationships’	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Family dynamics			
Coherence *(ability of family members to successfully cope with family stressors)*			
Family sense of coherence* *Mollerberg et al 2019*	1		
* family sense of coherence relates to the ability of family members to successfully cope with family stressors			

4: Finances

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to ‘Finances’	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Caregiver mode of transport			
Means of transport (private car) *Govina et al 2019*		1	

<u>*Factors relating to Caregiver* ***Anxiety***</u>

5: Carer internal processes

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to ‘Carer internal processes’	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Caregiver coping patterns			
Negative impact			
Dysfunctional* coping strategies *Perez-Ordonez et al 2016*		1	
(measured using Brief COPE) *coping style which is based on not accepting a problem or not wanting to think about it, such as avoiding dealing with the problem or not accepting that the situation has happened			
No impact			
Emotion-focused* coping strategies *Perez-Ordonez et al 2016*			1
(measured using Brief COPE) *coping strategies which aim to reduce or eliminate negative feelings such as accepting the reality or trying to see the situation positively			
Problem focused* coping strategies *Perez-Ordonez et al 2016*			1
(measured using Brief COPE) *coping strategies which aim to solve problems, such as concentrating efforts on doing something about a problem or thinking about what steps to take for solving a problem			
Fighting spirit coping style *Burton et al 2012*			1
(measured using Mini -Mental Adjustment to Coping Scale)			
Cognitive avoidance* coping style* *Burton et al 2012*			1
(measured using Mini -Mental Adjustment to Coping Scale) *cognitive avoidance relates to avoiding feeling or thinking about events or experiences such as unpleasant or distressing thoughts or memories			

Factors relating to Caregiver ***Anxiety***

5: Carer internal processes (continued)

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to 'Carer internal processes'	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Self-efficacy			
Caregiver has greater confidence in caring for themselves *Hampton & Newcomb 2018*	1		
(measured using the Caregiver Inventory as a measure of their self-efficacy*) *confidence in one's ability to carry out a task			
Caregiver has greater confidence in managing caregiving demands *Hampton & Newcomb 2018*	1		
(measured using the Caregiver Inventory as a measure of their self-efficacy*) *confidence in one's ability to carry out a task			
Preparedness for caregiving			
Preparedness for caregiving *Henriksson & Arestedt 2013*	1		
Previous experience of informal caregiving			
Provided care to loved one in past *Govina et al 2019*		1	

Factors relating to Caregiver ***Anxiety***

6: Support

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to ‘Support’	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Caregiver support			
Formal support			
Caregiver accessed professional psychological help *Janda et al 2017*		1	
Informal support			
Caregiver working in pairs *Wittenberg-Lyles et al 2013*			1
Perceived support			
Caregiver perceived support *Burton et al 2012*			1
Communication with care professionals			
Faster dialogue pace** *Wittenberg-Lyles et al 2013*			1
Language complexity** *Wittenberg-Lyles et al 2013*			1
Length of interaction (in minutes)** *Wittenberg-Lyles et al 2013*			1
Team taking turns to speak** *Wittenberg-Lyles et al 2013*			1
*** in care planning sessions between informal caregivers and hospice team members*			
Unmet needs in caregiver			
Total number of unmet needs *Buscemi et al 2010*		1	
(psychological, social and physical needs)			

Factors relating to Caregiver ***Anxiety***

7: Contextual factors

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to ‘Contextual factors’	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Caregiver age			
Caregiver age - increasing age *Burton et al 2012* *Govina et al 2019* *Janda et al 2017*	2		1
Caregiver education			
Caregiver education *Govina et al 2019* *Janda et al 2017*			2
Caregiver employment status			
Employed			
Caregiver employment *Burton et al 2012* *Govina et al 2019*			2
Caregiver gender			
Female caregiver *Burton et al 2012* *Govina et al 2019* *Janda et al 2017* *Wasner et al 2013*		2	2
Caregiver marital status			
Caregiver marital status *Burton et al 2012* *Govina et al 2019*			2

Factors relating to Caregiver ***Anxiety***

7: Contextual factors (continued)

Factor (Overall theme)	**Impact on Anxiety**		
Individual factor contributing to 'Contextual factors'	**Better mental health (lower anxiety)**	**Worse mental health (higher anxiety)**	**No change**
Patient educational level			
Patient educational level *Govina et al 2019*			1
Patient gender			
Male patient *Govina et al 2019*		1	
Patient lives with caregiver			
Patient lives with caregiver *Govina et al 2019*		1	
Relationship to patient			
Spouse/partner			
Spouse/partner *Janda et al 2017*			1
Other relationship			
Nature of relationship *Govina et al 2019*			1

*Factors relating to Caregiver **Distress***

1: Patient condition

Factor (Overall theme)	**Impact on Distress**		
Individual factor contributing to 'Patient condition'	**Better mental health (lower distress)**	**Worse mental health (higher distress)**	**No change**
Patient condition			
Other conditions			
Patient with chronic obstructive pulmonary disease (COPD) *Janssen et al 2012*		1	
(patients with COPD were compared with patients with chronic heart failure and patients with chronic renal failure)			
Cancer			
Patient with rare cancers *Loggers & Prigerson 2014*			1
(patients with rare cancers were compared with patients with common cancers)			
Type of cancer *Kershaw et al 2015*			1
(4 types of cancer were studied: prostate, lung, breast, colorectal)			
Patient disease burden			
Physical functioning			
Patient does not have a comorbid condition *Kershaw et al 2015*			1
Patient Quality of Life			
Patient QOL *O'Hara et al 2010*	1		
Patient stage of disease			
Change over time			1
(7, 12, 18 and 24 weeks after distress was first measured in caregivers of patients with lung cancer) *Grant et al 2013*			
Time		1	
(period 12 months to 1 month prior to death of patient with ovarian cancer) *Butow et al 2014*			

Factors relating to Caregiver ***Distress***

1: Patient condition (continued)

Factor (Overall theme)	**Impact on Distress**		
Individual factor contributing to ‘Patient condition’	**Better mental health (lower distress)**	**Worse mental health (higher distress)**	**No change**
Patient symptoms			
Patient overall symptoms			
Patient symptom burden *O’Hara et al 2010*		1	
Patient psychological symptoms			
Patient depression *O’Hara et al 2010*			1
Patient treatment			
Patient follow up method *Catt et al 2012*			1
(oncologist*-led follow-up compared with multidisciplinary group follow-up) *oncologist is a doctor who specializes in diagnosing and treating people who have cancer			
Patient receiving Specialized Palliative Care (SPC) *Seekatz et al 2017*			1
*According to National Institute of Clinical Excellence (NICE), Specialist palliative care encompasses hospice care (including inpatient hospice, day hospice, hospice at home) as well as a range of other specialist advice, support and care such as that provided by hospital palliative care teams.			

Factors relating to Caregiver ***Distress***

2: Impact of caring responsibilities

Factor (Overall theme)	**Impact on Distress**		
Individual factor contributing to ‘Impact of caring responsibilities’	**Better mental health (lower distress)**	**Worse mental health (higher distress)**	**No change**
Caregiver workload			
Caring for the patient			
Caregiver burden measures:			
Bakas Caregiving Outcomes Scale (BCOS) score – changes have worsened.* *Buscemi et al 2010*		1	
*BCOS measures carers' perception of changes in their lives as a result of providing care and covers social functioning, physical health and subjective wellbeing.			
Support for others			
Additional caring responsibilities:		1	
- *caregiver with childcare responsibilities* *Catt et al 2012*		1	
Caregiver lifestyle adjustments			
Caregiver has made greater lifestyle adjustments to accommodate the caregiver role *Catt et al 2012*		1	

3: Relationships

Factor (Overall theme)	**Impact on Distress**		
Individual factor contributing to ‘Relationships’	**Better mental health (lower distress)**	**Worse mental health (higher distress)**	**No change**
Quality of patient-caregiver relationship			
Conflict			
Caregiver dissatisfaction with caregiver-patient partnership *Gotze et al 2014*		1	

4: Finances

No factors identified

Factors relating to Caregiver ***Distress***

5: Carer internal processes

No factors identified

6: Support

Factor (Overall theme)	**Impact on Distress**		
Individual factor contributing to ‘Support’	**Better mental health (lower distress)**	**Worse mental health (higher distress)**	**No change**
Quality of care			
Carer reports of quality of care: more problems in patient emotional and spiritual support *O’Hara et al 2010*	1		
Carer reports of quality of care: more problems with patient unmet needs *O’Hara et al 2010*		1	
Unmet needs in caregiver			
Number of important unmet needs by health professionals *Areia et al 2019*		1	
Total number of unmet needs *Buscemi et al 2010*		1	
(psychological, social and physical needs)			

*Factors relating to Caregiver **Distress***

7: Contextual factors

Factor (Overall theme)	**Impact on Distress**		
Individual factor contributing to 'Contextual factors'	**Better mental health (lower distress)**	**Worse mental health (higher distress)**	**No change**
Caregiver age			
Caregiver age - increasing age *Catt et al 2012* *Kershaw et al 2015*	1		1
Caregiver education			
Caregiver education *Catt et al 2012*			1
Caregiver employment status			
Employed			
Caregiver employment *Catt et al 2012*			1
Caregiver gender			
Female caregiver *Catt et al 2012* *Butow et al 2014* *Kershaw et al 2015*		1	2
Caregiver health status			
Caregiver comorbidity* *Kershaw et al 2015*			1
*comorbidity is the presence of two or more medical conditions at the same time			
Relationship to patient			
Spouse/partner			
Relationship to patient *Butow et al 2014*			1
Other relationship			
Not a spouse/partner of the patient *Catt et al 2012* *Kershaw et al 2015*		1	1
Rural location			
Living in a rural area *Butow et al 2014*			1