

Adults surviving lung cancer two or more years: A systematic review

Dr. Deborah J Rhea ¹

Dr. Suzy Lockwood ¹

1. Texas Christian University - Centre for Evidence Practice and Research: A Collaborating Centre of the Joanna Briggs Institute

Corresponding Author: Dr. Deborah J Rhea,
Email: d.rhea@tcu.edu

Executive summary

Background

Lung cancer has had a low survival rate throughout the years. Some studies have shown that psychological variables such as hardiness and resiliency may play a role in the meaningfulness of survival among lung cancer patients.

Objective

The objective of this systematic review was to synthesize the best available evidence on the experiences of surviving lung cancer (including psychological/affective well-being dimensions such as resiliency, optimism, quality of life, and coping strategies) in adults over the age of 18, two or more years after diagnosis.

Inclusion Criteria

Types of participants

The review considered adults (18 years and older) who have survived lung cancer two or more years post diagnosis.

Types of Interventions/Phenomena of Interest

The review included studies that examined the experiences (including psychological/affective well-being dimensions such as resiliency, optimism, quality of life, and coping strategies) of surviving lung cancer two or more years post diagnosis.

Types of Outcomes

The review considered patients' experiences of surviving lung cancer post two years diagnosis, including the examination of specific psychological/affective well-being aspects such as resiliency, optimism, quality of life and coping strategies.

Types of studies

The review included quantitative descriptive studies and qualitative studies.

Search strategy

A search for published and unpublished studies in English language from January 1999 through December 2010 was undertaken in multiple databases including MEDLINE, CINAHL, ProQuest and Psyc INFO.

Methodological quality

Assessment of methodological quality of studies was undertaken using critical appraisal tools from the Joanna Briggs Institute.

Data collection

Data was extracted using the Joanna Briggs Institute Data Extraction forms.

Data synthesis

Results were presented in a narrative format as the synthesis of qualitative or quantitative data was not appropriate.

Results

13 studies were included in the review: one mixed methods study (including a qualitative research component) and 12 quantitative studies.

The qualitative component of the included mixed methods study identified five findings related to the meaningfulness of surviving lung cancer post two years. The central themes that emerged were existential issues, health and self-care, physical ability, adjustment, and support.

Quantitative studies identified that distressed groups had less meaningful experiences related to lung cancer survival than not distressed groups. The studies also found that emotional states and style of coping were related to the meaningfulness of lung cancer survival.

Conclusions

With less emotional distress, seeing the good in everything, adjusting life to fit the changes from lung cancer, and adding physical activity to the daily routine, the life of a lung cancer survivor can be more meaningful.

Implication for practice

Healthcare providers must assess lung cancer survivors for potential symptom clusters affecting key patient outcomes such as quality of life. Consider introducing interventions to promote light to moderate physical activity in older patients and moderate to vigorous physical activity in younger patients, and ceasing smoking. Teach active coping strategies.

Implications for research

There is a need for qualitative research studies exploring the experiences of lung cancer survivors. Further research is recommended on symptom clusters that might impact outcomes such as quality of life.

Keywords

adults, lung cancer, resiliency, quality of life, physical activity, coping strategies, depression, experiences, meaningfulness, systematic review

Background

Cancer is a leading cause of death worldwide.¹ Cancer as a diagnosis challenges an individual physically, socially, spiritually, and psychologically and just hearing the diagnosis itself can be devastating in all four health related areas.² Cancer of the lung accounts for the largest number of cancer deaths world wide among men and women (1.3 million/year);¹ while it accounts for approximately 30% of all cancer deaths in the United States.^{3,4} Lung cancer is relatively rare in persons under the age of 20; the median age for the diagnosis is 71 years of age.⁵ Survival rates for lung cancer have shown some improvement; however the 5-year survival rate overall for lung cancer remains at only 15.6%.^{5,6} Women generally do better than men with 17.2% of women surviving lung cancer compared to 13.6% of the men.⁴ Patients who present with any cancer that has already spread to distant sites rarely survive five years. While, stage and resectability are clear determinants of prognosis, most lung cancer patients will relapse and die within one year of diagnosis.³

Treatment for lung cancer, taking into account prognostic factors at time of diagnosis, involves a combination of chemotherapy, surgery, and radiation.⁴ Well-documented side effects of chemotherapy and radiation include, but are not limited to: myelosuppression, gastrointestinal disturbances and integument changes. New targeted therapies have provided only modest survival benefit and often invoke a papular rash that is difficult to manage.⁴ Video-assisted thoracic surgery has reduced hospital stays, and improved radiation delivery systems have minimized toxicities.⁷ The physical dimension of lung

cancer treatment has received the most attention specific to assessments, pulmonary functioning, and in particular the resultant impact on physical functioning.⁶ Although issues of genetic susceptibility, prevention and treatment toxicities for lung cancer patients need continued investigation, the question of whether psychological variables can predict or improve survival among patients with lung cancer remains unknown.

Receiving a diagnosis of any form of cancer can be psychologically devastating, however little is known about the long-term imprint of critical illness on the survivor. Self-reported multi-dimensional health—related quality of life data and research findings describing physical, psychological, social, and spiritual well being after the diagnosis of cancer have been increasingly published.⁶ Certain cancers have known lower survival rates and/or poorer prognosis, yet some people will beat the odds and out live the predicted term of survival. Gotay et al⁸ labelled cancer survivors that exceeded their life expectancies as “exceptional survivors”. Gotay et al⁸ studied cancer survivors that had lived five years past predicted survival for their given site and stage that had less than a 25% probability of living five years or more. Life orientation, optimism, coherence, and resiliency were the psychological predictors measured. They concluded that objective disease is not as important to cancer survivor’s well-being as their personal attributes.

Multiple terms (life orientation, optimism, coherence, resiliency, hope, hardiness) have been measured to try to capture the positive mindset that chronic disease patients who seem to recover easier, more effectively, with less pain, and ultimately survive at a higher rate might possess. One of the terms used most often in dialog is optimism. Optimism is defined as generalized (positive) expectations for important life outcomes.⁹ Optimism has consistently been shown to affect adjustment to quality of life (QOL) in chronic diseases such as cancer and is associated with better physical and psychological well-being.^{8,9,10} Optimists tend to have a faster rate of recovery from surgery, better cognitive and emotional function, and less pain and fatigue as compared to pessimists.¹¹ While optimism tends to play some part in the recovery of different types of chronic disease patients, it is important to note that optimism itself does not necessarily help individuals overcome the physical disease per se, but instead influence stress and ideally, select proper coping strategies.¹² While the existing findings on optimism have examined its influence on chronic disease in general including some forms of cancer, no studies have explored the nature of optimism’s influence on quality of life in lung cancer survival. A psychological phenomenon which has been explored in relation to lung cancer survival is helplessness/hopelessness.

A study conducted in Japan investigated psychological aspects and lung cancer survival. Nakaya et al¹³ found a significant, positive association between helplessness/hopelessness and lung cancer mortality. However, after assessing the clinical state variables, such as clinical tumor stage of the lung cancer, self-reported pain and dyspnea levels, and performance status (PS) as confounders, the relationship no longer remained significant.¹³ This study provides evidence that there is a potentially understudied relationship between psychological factors and long-term lung cancer survival. Faller et al¹⁴ assessed depressive coping and depression in lung cancer patients concluding that further examination of the relationship to survival was needed. As has been demonstrated in other cancer populations, little is known about the relationship between endocrine and/or immunological pathways and negative psychological factors on mortality risk in lung cancer survivors.⁸

Other terms which have come on the scene more recently are hardiness and resiliency. These concepts have been routinely applied in the areas of sport and competition, physical and mental abuse, and military operations, but there is limited evidence for the same in the oncology or nursing literature. Resilience has been described as a characteristic that person(s) have in response to negative effects of stress that allows them to adapt or meet the challenge(s) they encounter.¹⁵ Much of the work on resilience as a trait in adult subjects with cancer was published during the late 1980's to early 1990's. For some, a diagnosis of cancer is perceived as fatal while others view it as "just another illness to overcome". Jensen et al¹⁶ reported on the lived experience of "not giving in" of women with breast cancer.

The progressive improvement in survival for lung cancer patients and the wide acceptance of quality of life (QOL) as an important end point requires additional study. QOL is generally conceptualized as a multidimensional concept associated with physical, social, and psychological domains and, depending on the instrument, spiritual well being.⁶ The physical domain of QOL has received the most attention in assessments of lung cancer patients (i.e., diminished exercise and day to day tasks). Conversely, the psychological QOL has not been studied as much with lung cancer survivorship. Specific variables associated with psychological well-being studied in the past in other arenas of life (sport, military, abuse) would be resiliency and hardiness.^{17, 18, 19} Other cancer studies have provided extensive significant data to support that a positive QOL can lead to lower levels of distress or depression symptoms.^{8, 20} For example, Foley et al²⁰ showed persons with cancer who had reduced QOL had higher levels of pain and social isolation than those who "expected to survive" and incorporated personal growth into their survival experience.

Therefore, a systematic review of qualitative and quantitative studies that examine how people survive lung cancer past a two year period is needed. Developing an understanding of how individuals with lung cancer approach the phenomenon will help professionals assess and identify interventions for limiting the deleterious effects.

Deviations from the approved review protocol

The approved review protocol is available from the Joanna Briggs Institute (<http://www.joannabriggs.edu.au/Systematic%20Review%20Protocols>). Authors of the review acknowledge that there are deviations from the approved protocol. The inclusion criteria were modified during the review process to include also quantitative studies that examined psychological/affective well-being variables such as resiliency, optimism, quality of life, or coping strategies. The decision was determined by the absence of qualitative research studies matching the initial inclusion criteria. According to the revised inclusion criteria, text and opinion papers were not considered for inclusion in the review. Review articles were also excluded from the systematic review.

Objectives

The objective of this systematic review was to synthesize the best available evidence on the experiences of surviving lung cancer (including psychological/affective well-being dimensions such as resiliency, optimism, quality of life, or coping strategies) in adults over the age of 18, two or more years post diagnosis.

Inclusion Criteria

Types of participants

The review considered studies that included adult males or females (18 years and older) who have survived lung cancer two or more years after diagnosis. Review did not exclude individuals undergoing lung cancer treatment.

Types of Interventions/Phenomena of Interest

The review included studies that examined the experiences (including psychological/affective well-being dimensions such as resiliency, optimism, quality of life, and coping strategies) of surviving lung cancer two or more years post diagnosis.

Types of studies

The review considered quantitative descriptive studies and qualitative studies.

Types of Outcomes

The review considered all patients' experiences of surviving lung cancer post two years diagnosis, including the examination of specific psychological/affective well-being aspects such as resiliency, optimism, quality of life and coping strategies.

Exclusion criteria

This review excluded the following: patients within two years of lung cancer diagnosis, patients who had other types of cancer besides lung cancer, patients who were < 18 years, studies focused on physiological variables only, and review articles.

Search strategy

The search strategy was designed to search databases for published and unpublished studies in English language between January 1999 and December 2010. An initial limited search of MEDLINE and CINAHL was undertaken followed by analysis of the text words contained in the title and abstract, and of the keywords used to describe the article (Appendix I). Initial keywords included: Adult; Lung Cancer; Survivor; Quality of Life; Lived experience; Hardiness; Resilience.

A second search using all identified keywords was then undertaken across all included databases. Thirdly, reference lists of all identified reports and articles were searched for additional studies.

The databases searched included:

Academic Search Complete

CINAHL

Health reference Center-Academic

Health Source, Academic Edition

MEDLINE

OVID Nursing Journals Collection

ProQuest Nursing & Allied Health Source

Psychology & Behavioral Sciences

Psyc INFO

PubMed Central and Wiley Online Library

The search for unpublished studies included:

Dissertation Abstracts

ProQuest database for theses and dissertations

Sociological Abstracts

Conference Proceedings

Methods of the review

Critical Appraisal

Studies selected for retrieval were assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute (Appendix II). It was predetermined that any disagreements that arose between reviewers would be resolved through discussion with a third reviewer, if necessary. However, all disagreements between the two reviewers were satisfactorily resolved through discussion without having to bring in a third reviewer.

Data Collection

For each included study, data were extracted independently by the two reviewers using the standardized data extraction instruments from Joanna Briggs Institute and any disagreements were resolved through discussion (Appendix III).

Data synthesis

The results of this systematic review are presented in a narrative summary. It was not appropriate to synthesize the data.

Review Results

Description of studies

The search strategy identified 448 potentially relevant papers related to lung cancer. Full texts were retrieved for the 103 studies. Thirteen articles were included in the systematic review (See Figure 1 for the flowchart of study selection). The list of excluded studies is presented in Appendix IV. The details of included studies are presented in the table of included studies from Appendix V.

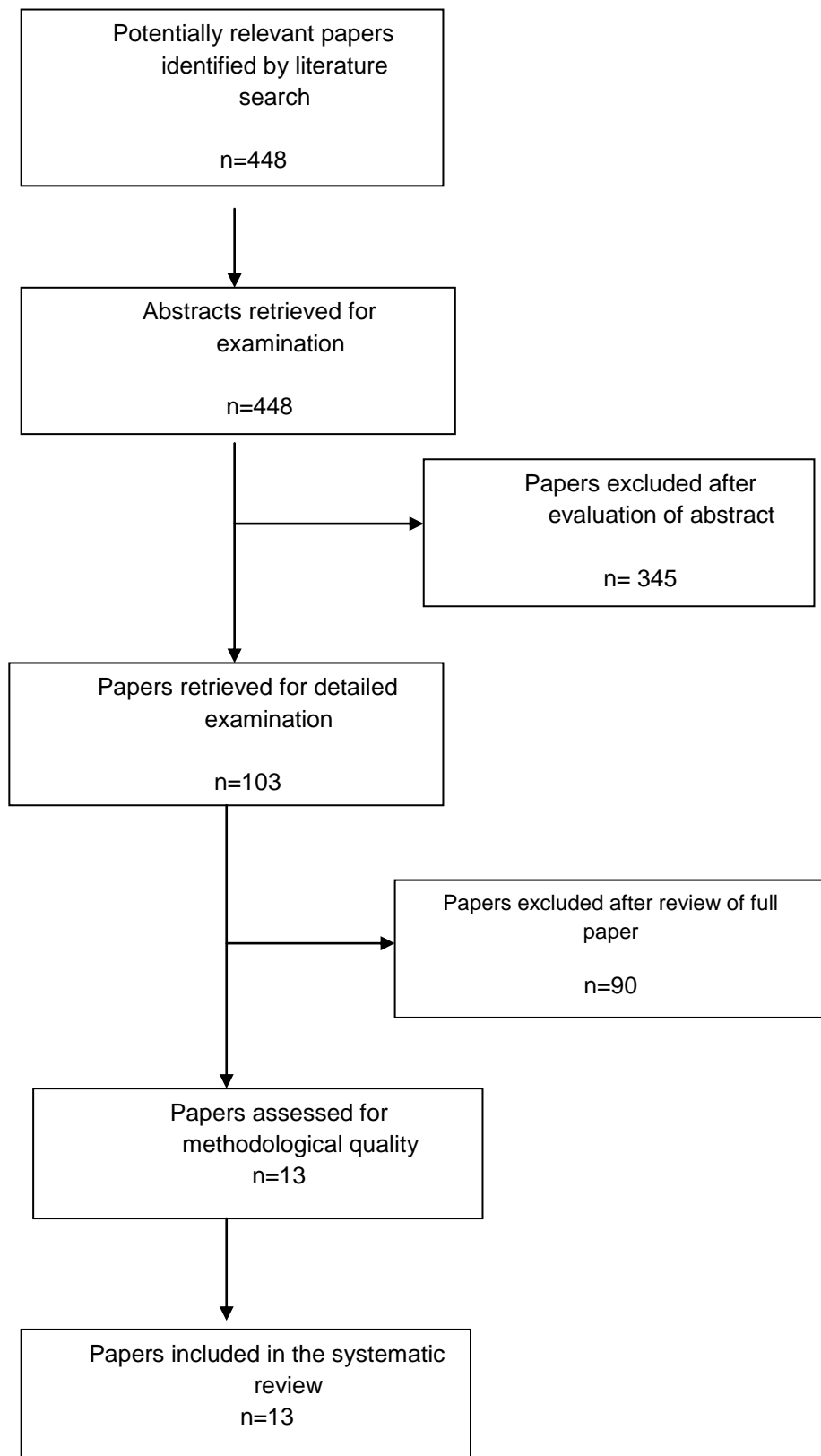


Figure 1. Flowchart of study selection

Qualitative Studies included in the Review

Only one qualitative study was included in this review. We considered for inclusion the qualitative component of mixed methods study²³ that incorporated qualitative and quantitative research. The qualitative part was a phenomenological design examining the meaningfulness of the lung cancer survivor's experience. Twenty nine survivors were included in the interview process and met the inclusion criteria for this review. Survivors were adults between the ages of 43 and 85 and had been disease free for at least 5 years.

Quantitative Studies included in the Review

A total of 13 studies were included in the quantitative component of this review. One study was a mixed methods study²³ with a qualitative component and a quantitative component. The qualitative component was included in the qualitative part of the review and the quantitative component of the mixed methods study was included in the quantitative part of the review.

The participants of the studies were adults over the age of 18 (ranging from 32-92 years) and had survived lung cancer for at least two years post diagnosis of the disease. In comparing demographic characteristics between studies, there was similarity in age, gender, and type of cancer (lung). All studies examined some combination of quality of life, coping styles, and emotional states as they relate to the survivor's meaningfulness in life two years or more post lung cancer diagnosis.

In both Coups studies³¹⁻³², researchers examined 175 survivors who had completed surgical treatment for early-stage non-small cell lung cancer 2 to 6 years previously. A sample of 514 potentially eligible individuals was identified from clinical and research databases at Memorial Sloan-Kettering Cancer Center. After further medical records review, 191 of the 514 were ineligible for study participation. Of the 323 potential participants, phone and mail input found another 48 were ineligible (deceased, current cancer). Of the remaining 275, 175 provided informed consent and participated in the study. Participants completed a one-time survey regarding quality of life and their engagement in physical activities currently, 6 months pre-diagnosis, and 6 months post-treatment. The goal was to identify if engaging in physical activity provided more meaning to their quality of life and cancer experience than not being active. Four measures were used including demographics, medical characteristics, QOL measures, and physical activity (Godin Leisure time exercise questionnaire).

In Faller studies^{21,22}, researchers examined 103 survivors. The goal was to determine the meaningfulness of coping and emotional distress on survival of lung cancer in these participants. The measures included demographics (age, gender), biomedical data (histological cell type, tumour stage, Karnofsky performance status), emotional distress (5 item scale), coping (Freiburg questionnaire of coping with illness), and depression (Depression Scale D-S).

In Fox study³⁰, the researchers used secondary data from an online lung cancer support group who had responded to a mailed survey with self-report of depression, fatigue, and pain (SF36), and quality of life (Fox simple QOL scale). A subset of 51 lung cancer patients was selected from the original data set consisting of a total of 142 patients with three common types of cancer (lung, colon, and ovarian). The

goal was to determine if depression, fatigue, and pain created less meaningfulness of surviving lung cancer.

In Garces study²⁷, 5,445 patients were enrolled in a study at Mayo Clinic with a participation rate of >95%. After exclusion criteria were examined, a total of 1,506 living patients were eligible for follow-up at 6 months and one year, then annually thereafter. Of that group, 1,028 responded to their first QOL questionnaire (82%) which made up the study population. At 6 months, 344 of the 1028 patients (33%) followed up with responses; 1 year, 308 of the 1028 patients (30%); 2 years, 254 of 1028 patients (25%); and 3 years, 122 of 1028 patients (12%). Data was collected at variable times from diagnosis to the QOL assessment. The goal of the study was to determine whether the patient's smoking history was more or less meaningful to their quality of life. The measures used were QOL (quality of life) and tobacco history (self-report; responses were never smoked, former smokers, current smokers, abstinent smoker, and relapsed smoker).

In Maliski study²³, 142 survivors of lung cancer who had been disease free for at least 5 years were the participants of this study. This was a survey targeted at individuals identified through tumor registries and surgical oncology practices in Southern California. The CES-D questionnaire was used to determine distressed or not distressed participants. Each group also answered SF-36 for QOL measures. The purpose of the study was to explore whether being distressed or not distressed changed the QOL in lung cancer survivors post two years of diagnosis. The premise was that distressed participants would have less meaningfulness or quality of life than the not distressed participants.

In Nakaya study¹³, 1178 patients were included and 403 patients were excluded. The study from Japan aimed to survey negative psychological aspects and cancer survival. The patients were diagnosed between 1999 and 2004. Each participant was given three psychological questionnaires (Eysenck Personality Questionnaire – Revised, Mental Adjustment to Cancer Scale, and Hospital Anxiety and Depression Scale). Individuals were excluded if they had concomitant cancer or duplicate cancer. Each of the scales measured psychological aspects of the patients for meaningfulness of living with a lung cancer diagnosis. The goal was to assess whether an association between negative psychological aspects and the risk of mortality existed among lung cancer patients. This relationship would illustrate if an individual had negative psychological experiences post diagnosis, then their life experience would be less meaningful and the mortality rate would increase.

Sarna published three articles related to lung cancer and the meaningfulness of surviving lung cancer.²⁴⁻²⁶

In the first Sarna and associates study²⁴, 142 five year minimum self-reported disease free lung cancer survivors completed quality of life, emotional distress, and depression scales. The purpose of the study was to describe the quality of life or meaningfulness among lung cancer survivors.

In the second Sarna and associates study²⁵, 353 women were screened for study participation. Of these 313 were eligible and 231 agreed to participate. 217 women actually completed the data for the outcome variables. These participants had to have been diagnosed with lung cancer within five years of this study (2 years average). The purpose was to explore the QOL (meaningfulness) of women who had been diagnosed with lung cancer and were now trying to find meaning in their lives post 2 years diagnosis. The

instruments used were QOL Scale – Patient version, the SF-36 (also for QOL), the Meaning of Illness to measure affective variables, and the CES-D to measure depression.

In the third Sarna and associates study²⁶, a onetime assessment of QOL and Meaning of Illness (MOI) from a sample of women with lung cancer (N=217) was taken after the three previous data collections had been completed^{24,25}. The same instruments were used to complete this study as were used in a previous Sarna study²⁵. The purpose of this study was to examine the physical and emotional QOL of the lung cancer survivors who had lived post 6 years of diagnosis.

In Svobodnik study²⁹, patients in the study were enrolled by the Epidemiology and Genetics of Lung Cancer Research Program at Mayo Clinic in Minnesota. All 650 patients actively monitored in this study had been diagnosed with lung cancer and were asked to participate in the study. At enrollment, each patient was informed about a 6 step follow-up process (6 months, 1 year, and annually thereafter for 4 years). Initially, 4537 patients were enrolled with a participation rate of 95%. After the first follow-up at 6 months, a total of 791 were found to still be eligible of which 650 responded to the questionnaire sent to the group of 791. The measure used for this study were the LCSS questionnaire to measure QOL. The purpose was to explore QOL in lung cancer survivors post two years of diagnosis.

In Win study³³, 110 patients from one lung cancer centre who had been diagnosed with lung cancer at least two years previously were included in the study. QOL was measured with the EORTC QLQ C30 survey. The purpose of this study was to examine the meaningfulness of survival with the QOL measure post two years diagnosis.

Methodological quality

Methodological quality of qualitative studies

The included qualitative study (the qualitative component of a mixed methods study)²³ was considered as high quality after critical appraisal using JBI-QARI appraisal criteria by two independent reviewers. There was full agreement between the reviewers to include this study in the final analysis. The interview questions asked were: How do lung cancer survivors describe their experiences? How do these descriptions relate to quality of life and their disease treatment? Do descriptions of lung cancer survivorship differ with the presence of depression? The interviews were transcribed verbatim. The analysis of the data proceeded from line by line coding to identification of major thematic areas. The results were reviewed and confirmed by experts in quality of life and lung cancer research. Rigor was ensured by periodic review and discussion of the analysis process by the authors, maintenance of a written log recording all aspects of the analysis process, and constant return to the original data. The only two areas that were not discussed in the article were a statement locating the researcher culturally or theoretically and the influence of the researcher on the research. Neither reviewer felt this was objectionable enough to eliminate it from the final analysis.

Methodological quality of quantitative studies

The 13 studies (the 12 quantitative studies and the quantitative component of the mixed methods study) were assessed as high quality using JBI-SUMARI appraisal criteria by two independent reviewers. There was a full agreement between the reviewers to include these 13 studies in the final analysis. All 13 studies demonstrated similarities in assessing outcomes objectively. Additionally, all 13 studies gave clearly defined inclusion criteria and carried out the study over a sufficient time period. Lastly, the outcomes were measured in a reliable way and studies used appropriate statistical analysis. The 13 articles were methodologically heterogeneous in nature.

Table 1. Results for the critical appraisal of the included quantitative studies

Citation	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Coups, E., et al. ³¹ 2009	Y	Y	Y	Y	Y	Y	Y	Y	Y
Coups, Park et al. ³² 2009	Y	Y	Y	Y	Y	Y	Y	Y	Y
Faller, H., et al. ²¹ 1999	N	Y	Y	Y	Y	Y	Y	Y	Y
Faller, H., et al. ²² 2002	N	Y	Y	Y	Y	Y	Y	Y	Y
Fox, S., et al. ³⁰ 2006	N	Y	N	Y	U	Y	Y	Y	Y
Garces, Y., et al. ²⁷ 2004	Y	Y	N	Y	Y	Y	N	Y	Y
Maliski, S., et al. ²³	Y	Y	Y	Y	Y	Y	Y	Y	Y

2003									
Nakaya, N., et al. ¹³ 2008	N	Y	Y	Y	Y	Y	Y	Y	Y
Sarna, L., et al. ²⁴ 2002	N	Y	Y	Y	Y	Y	Y	Y	Y
Sarna, L., et al. ²⁵ 2005	Y	Y	N	Y	U	Y	Y	Y	Y
Sarna, L., et al. ²⁶ 2010	N	Y	N	Y	Y	Y	Y	Y	Y
Svobodnik, A., et al. ²⁹ 2004	N	Y	Y	Y	Y	Y	Y	Y	Y
Win, T., et al. ³³ 2008	N	Y	Y	Y	Y	Y	Y	Y	Y
%	38.0	100.0	69.0	100.0	85.0	100.0	92.0	100.0	100.0

Y=yes; U=unclear; N=no

Results

The results are presented in a narrative summary.

Results from Qualitative studies

The lived experience of surviving lung cancer

Only one study (the qualitative component of a mixed methods study)²³ examined the meaningfulness of surviving lung cancer. The study used interviews. Participants (N=29) were asked to answer the CES-D questionnaire (Distressed Mood Scale) to divide them into two groups (distressed or not distressed). Once divided, each was interviewed (phenomenological interview) and asked to describe how their

experience changed their outlook or meaning on life. Part of the lung cancer aftermath involved balancing the negative and positive aspects of having survived the life threatening illness. Twenty of the 29 interviewed seemed to have achieved a balance that promoted a positive outlook on life (not distressed). As a result of the interviews, five themes emerged.

The first theme, considered the largest thematic category, related to existential issues concerning a changed life. The subcategories for these existential issues were appreciation for life, a changed outlook, loss of normality, and inner feelings about self. Appreciation for life was expressed through "living life to the fullest," "looking at every day as a gift," "increased focus on the little things in life" (p. 240). A changed outlook was expressed in a couple of different ways with the not distressed group of participants. Some expressed a changed outlook as "just enjoying life," "being more positive," or "living each day to its fullest" (p. 240). Others expressed their changed outlook was in not worrying so much about little things and being more satisfied. The negative distressed group stated that they now saw their outlook in a more positive way and one of the participants said he had a "better grasp on values/being more philosophical" (p. 240). The third subcategory, loss of normality, was described by two participants as what they felt they could not do anymore, e.g., physical activity, sex, and plans for retirement. They also expressed negative psychological issues such as loss of confidence, a fragile life, and less optimism. They both stated that "life after lung cancer is not a normal life" (p. 240). The last subcategory, inner feelings, was captured as the feeling of uselessness. One person said "he felt useless because he was just surviving and not contributing" (p. 240). Another person stated "she felt that her inner self was hurt and that she was depressed" (p. 240).

The second theme, related to health and self care was concerned with taking control of oneself. Several said they had "quit smoking" (p. 241). "Health and better self-care" were verbalized to be important by participants in both the negatively distressed and not distressed groups (p. 241). Taking control of health and better self-care was verbalized by cessation of smoking, staying away from other people who smoke, greater appreciation for health and its importance, eating better, exercising regularly, and not taking unnecessary chances. The one negative expression in this category, from the negatively distressed group, was one person stated "he had no control of his health" (p. 241). Except for the last statement, most felt as long as they "took better care of themselves, more control of their lives was possible" (p. 241).

The third theme, related to physical ability, was concerned with slowing down. Overall, the messages from this theme were more negative, focusing on loss of physical ability since the experience with lung cancer. Survivors told of "not being able to do what I used to do" or "not being able to do what I want" (p. 241). Specifically, not being able to exercise, feeling a shortness of breath, or adapting exercise patterns. The above negative focus was the expressions from the distressed group. The not distressed group had a different outlook about the lack of physical ability. They discussed decreased physical ability, but qualified it or overcame it. They expressed statements like "they had slowed down, but it was due to getting older," or "couldn't swim as fast after chemotherapy, but had built back up," or "one was proud of himself because he was still active even though he was weaker" (p. 241). Three of the participants mentioned pain, but did not indicate that it interfered with their lives. The last aspect related to lack of

physical ability had to do with comorbidities. The distressed group had more comorbidities than the not distressed group.

The fourth theme, related to adjustment, was concerned with integrating change into one's life. The not distressed group stated adjustment had to do with accepting and changing life to accommodate the decreased physical ability. They viewed the adjustments more positively. Individuals from the distressed group had more negative statements related to adjusting life. They would state things like "I cry a lot," or "I live with my condition because there is nothing I can do about it" (p. 242). The not distressed group was much more optimistic about how to change after the illness whereas the distressed group was much more gloom and doom about what life is like after the illness.

The final theme, related to support, was concerned with giving and receiving. This subcategory had only positive expressions. Many discussed how important family relationships were to their ability to improve. Others expressed that "giving to others through sharing their experiences with others" was important to their own improvement (p. 242). Gratitude and giving back were both very important to these participants and their ability to improve and live life more naturally.

Results from Quantitative studies

In the review, nine of the 13 studies²¹⁻²⁹ examined coping strategies, emotional states, and/or quality of life (QOL) to determine how meaningful these could be to lung cancer survival.

Faller et al²¹ conducted a study examining emotional states as predictors of how meaningful lung cancer survival could be over a 7-8 year period post diagnosis. The initial group of lung cancer patients was 103 and by year 8 there were only 11. The scales used to measure emotional states were Emotional Distress and D-S (Depression Intensity). Results showed that patients with high self-reported depressive coping and high emotional distress had shorter survival rates than those with low emotional distress. They were not able to measure any other type of coping with this study. The other finding was that coping might influence the course of the disease either in a direct manner through psychoneuroimmunological (PNI) mechanisms (e.g., active coping might increase and depressive coping might decrease natural killer cell activity) or in an indirect manner through compliance, such as when patients actively cope, they might receive higher amounts of chemotherapy or other treatments whereas those who depressively cope might discontinue such treatments earlier.

In 2002, Faller and colleagues²² conducted a study examining lung cancer patients. The objective was to determine whether style of coping was predictive of lung cancer survival. They used the Freiburg Questionnaire to measure active vs. depressive coping. The results of this study showed that style of coping does predict lung cancer survival – depressive coping predicts shorter survival time and active coping predicts longer survival time. The authors of this paper considered three other issues that could impact length of survival: the severity of the cancer (stage), the strength of the neuroendocrine-immune pathways, and compliance with medical treatment. This study was not able to interpret a cause and effect relationship with lung cancer survival, but was able to show that coping style does predict lung cancer survival.

Maliski et al²³ conducted a study for a comprehensive understanding of the meaningfulness of non-small cell lung cancer survivorship. The total number of participants was 142 survivors of at least 5

years disease free. The SF-36 was used to measure QOL, the CES-D scale was used to measure distressed mood, and an open ended questionnaire was used to interview 29 consecutive participants of the total 142 as they enrolled in the study. The distressed mood scale was used to identify the distressed group from the not distressed group (>16 was distressed; <16 not distressed). Results showed that the less distressed group took better care of themselves, verbalized more positive than negative expressions, and overall had a better outlook, while the more distressed group continued to smoke, overall had a lower QOL outlook, and expressed more negative thoughts.

Sarna and associates²⁴⁻²⁶ examined the meaningfulness of surviving lung cancer through variables such as emotional and physical characteristics of QOL, meaning of illness characteristics, and characteristics associated with greater risk of disruptions in QOL. The first study²⁴ (N=142) focused on describing the QOL experience among lung cancer survivors. The mental health subscale from the SF-36 was used to measure mental QOL score. Otherwise, the QOL-CS scale was used to measure physical, psychological, social, and spiritual well-being. The findings showed that 71% of the participants described themselves as hopeful and 50% viewed cancer as contributing to positive life change. Distressed mood was the single most important predictor of lower physical QOL. Sarna et al²⁵ advanced the results further in 2005 with 217 participants with follow up every 6 months through five years post diagnosis. They found that depressed mood, negative concept of illness, and younger age were predictive of poorer global, physical, psychological, and social QOL. Then in 2010, Sarna et al²⁶ examined 119 of the 217 participants from the 2005 study about physical and emotional QOL characteristics. Depressed mood was related to lower emotional QOL, emotional well-being was higher and returned to pre-operative levels regardless of physical impairment, and dyspnea was highly related to lower physical QOL.

Garces et al²⁷ mailed a questionnaire to patients (N=1028 responded) from Mayo Clinic between 1999 and 2002. A six step follow up was given at 6 months (N=344 out of 1028 responded), one year (N=308 out of 1028), two years (N= 254 out of 1028 responded), three years (N= 122 out of 1028 responded), four years and five years (N=81 both years). The number of participants diminished over each time point quite significantly. The following results were found: 7% of smokers had quit at follow-up; abstinence smokers at follow-up had better QOL (improved psychological well-being, depression, anxiety, energy, and current health perceptions compared to those who relapsed) suggesting tobacco intervention can lead to QOL improvement.

Nakaya et al²⁸ conducted a study examining negative psychological aspects with lung cancer survival among a group of Japanese patients (N=1178; M=64) with follow-up between 1998 and 2004 or until the participants died. The EPQ-R was used to measure neuroticism, MACS was used to measure coping, helplessness, and hopelessness, and HADS was used to measure depression/anxiety in lung cancer survivors. Results showed that higher scores on neuroticism were related to being unmarried and having higher pain/dyspnoea; higher scores of helpless/hopeless were associated with being older, having more advanced cancer, and less education; higher scores on depression were more likely to be related to more advanced cancer, poorer physical performance status (PS), and a higher severity of pain and dyspnoea.

Svobodnik et al²⁹ conducted a study examining quality of life (QOL) in 650 patients with lung cancer over a four year period. The measure used was LCSS to identify differences in quality of life (QOL). Findings showed that lower QOL was a result of appetite, coughing, and haemoptysis. Women had a higher QOL

than men related to coughing, dyspnoea, symptomatic distress, effect on activities, and overall QOL. Clinical stage also had an affect on QOL. Stages I & II had better QOL for appetite, fatigue, pain, symptomatic distress, effect on activities, and overall QOL than stages III & IV.

Much of the literature over the past decade has examined individual symptoms related to lung cancer. Two articles^{28,30} examined a theory of unpleasant symptoms, suggesting that symptoms cluster together, reinforce each other, and as a result, influence the meaningfulness of one's quality of life as a lung cancer survivor. Fox and colleagues³⁰ conducted a correlational study through secondary data which examined prevalence and intensity of depression, fatigue, and pain in lung cancer patients (N=51). These three symptoms are the most common among all cancer patients, including lung cancer patients. Participants ranged in age from 42-76 years (M = 56.9 years) and 98% were Caucasian. Participants were diagnosed, on average, 32 months prior to the study and were distributed evenly among early stage (31% with stage I- II), late stage (35% with stage III-IV), and unknown stage of lung cancer (33%). 94% of the sample had undergone some form of treatment prior to the study. The study included two QOL questionnaires: The Short Form 36 Health Status Survey (SF-36; 36 items) which measures seven dimensions of health: physical functioning, role limitations, bodily pain, social functioning, general mental health, vitality, and general health perceptions and the Fox Simple QOL Scale (FSQOLS; 25 items) which measures the cognitive and affective components of quality of life (QOL). The bodily pain subscale was used to measure pain, the mental health subscale was used to measure depressive symptoms, and the vitality subscale was used to measure fatigue. Results showed that 98% of the patients reported depression, 100% reported fatigue, and 65% reported pain. 94% of the sample reported having at least "a little bit" of all three symptoms. When examining the cluster, depression significantly related to fatigue, fatigue significantly related to pain, and depression and fatigue significantly related to QOL. Pain was not related to depression or QOL in this sample. The other relevant finding from this study is the cluster of depression and fatigue explained 29% of the variance in QOL of lung cancer survivors.

Nakaya et al²⁸ found a cluster effect with their study as well. They found a significant association between helplessness/hopelessness, depression, and risk of mortality confounded by clinical stage and clinical symptoms. They did not test how much of the variance was explained by the cluster, but did confirm the relationships.

In the review, three of the studies³¹⁻³³ examined physical activity and other physiological factors as they relate to the meaningfulness of one's QOL as a lung cancer survivor.

Coups et al^{31,32} conducted a study examining 175 patients with stage 1 lung cancer over a 6-year post diagnosis period. The first article³¹ examined the association between lung cancer survivors' physical activity level and QOL. The second article examined whether demographic and medical factors were associated with physical activity among lung cancer survivors and if self-efficacy would mediate associations of social support and perceived environmental factors with physical activity. The SF-36 was used to measure QOL and the Godin Leisure Time Exercise Questionnaire (GLTEQ) was used to measure physical activity patterns. The results in the first article showed that moderate to vigorous physical activity (MVPA) was lower during post treatment compared to pre diagnosis and current time. Lung cancer survivors who met physical activity guidelines had better QOL in multiple domains than less active individuals. Moderate and vigorous activity significantly decreased from pre to post treatment of

lung cancer. Light activity did not change as a result of pre, post, or six years after treatment. The Barriers to Self-Efficacy Scale (BSES) was used to measure self-esteem, the Exercise Decision Balance Questionnaire (EDBQ) was used to measure physical activity outcome expectations, Social Support of Exercise Scale (SSES) was used to measure perceived social support from family and friends, and GLTEQ was used to measure engagement in MVPA. The results in the second article³² showed individuals with more co-morbidities reported less leisurely walking; social support from friends was associated more with leisurely walking; and lower levels of MVPA were reported by lung cancer survivors with less positive physical activity outcome expectations and greater physical activity self-efficacy.

Win et al³³ conducted a study examining factors associated with the meaningfulness of overall survival in lung cancer patients (N=110). The factors considered were shuttle walking test, performance status, and global health status. QOL did not affect survival rate. Peak VO2 max and the shuttle distance test were associated with overall survival.

Discussion

It is apparent the four most salient factors impacting the meaningfulness of lung cancer survival are existential strategies (emotional), taking care of self, cognitive adjustment strategies, and support.

One of the key included articles was qualitative²³ and identified five themes corresponding to the meaningfulness of living as a lung cancer survivor. Each theme was presented throughout the 13 articles in one way or another. Validity for four of the themes is evident from the support of the other 12 articles. Two of the themes were very similar in context and created a much better fit as one factor with the other twelve articles reviewed. The third theme which is related to the body's inability to go at the same pace or do the same things as before lung cancer diagnosis and treatment was collapsed and joined with the fourth theme which is related to adjustment of life after diagnosis and treatment. Therefore, the findings from this review show support for a much tighter focus on four research factors related to a lung cancer survivor's meaningfulness of life post diagnosis.

This review has demonstrated existential issues (emotions) are very powerful with the strength of the meaningfulness of one's life in the ability to survive lung cancer. Maliski et al²³ initially defined existential issues as appreciating life (e.g., living life to the fullest; every day is a gift), changing one's outlook (e.g., enjoy life; be more positive), loss of normality (e.g., loss of confidence; fragile life; less optimistic), and inner feelings (e.g., feeling hurt; depressed feelings). The systematic review supports each of these issues, all related to emotion. When depressive coping such as depressive mood, helpless/hopeless disposition, and higher emotional stress is in motion, shorter survival time is predicted.^{21-26,28,30} Active coping (e.g., hopeful living, positive feelings, calmness) predicts longer survival time.^{22-26,28,30} Positive coping strategies may also influence the course of the disease and the meaningfulness of one's life. This means that psychoneuroimmunological (PNI) mechanisms can increase or decrease natural killer cell activity depending on positive or negative emotions/thoughts.²¹ This was the only study that discussed the possibility of PNI mechanisms interacting with the meaningfulness of lung cancer survival. Linking PNI mechanisms (combination of three body systems) to lung cancer healing should be examined further. A

final point raised from six of the articles was the relationship between emotional distress and smoking. Quality of life (QOL) was much improved when the patients quit smoking and significantly declined when the patients continued to smoke, suggesting that a tobacco intervention should be introduced and recommended from the oncologists in each case.²⁴⁻²⁷

Taking control of life is another important facet that was examined across several articles. Maliski et al²³ defined this theme as taking control of health and self-care. This was illustrated through examples like cessation of smoking, staying away from people who smoke, eating better, exercising regularly, and not taking unnecessary chances. Three other included articles^{31,32,33} supported this premise by showing that lung cancer survivors who met physical activity guidelines, had better peak VO₂ max and endurance, and ate more nutritionally sound foods were associated with better QOL and overall survival. The review articles also emphasized the decline in moderate to vigorous physical activity (MVPA) and proper nutritional habits from pre-diagnosis up to six years later. Patients who demonstrated MVPA and good nutrition in spite of lung cancer and weakness, improved their QOL and self-efficacy. Knowing that physical activity and nutrition are important to overall meaningfulness of survival, self-efficacy, and QOL, more attention needs to be placed on teaching nurses and family member's intervention strategies to intervene when appropriate.

Individuals view life from different perspectives and have specific mindsets that parallel their lives with success or failure. When patients are told they have lung cancer, negative thoughts embrace them and positive thinking can disappear with impact on the meaningfulness of their existence. Maliski et al²³ defines the next important meaningful facet of lung cancer survival, cognitive adjustment strategies, as the ability to integrate change into one's life through varying adjustments. Whether a patient realizes they have lost certain physical abilities (i.e., feeling shortness of breath, not being able to exercise, coordination is off, mental focus is lacking) or that life is not the same after the illness (e.g., I cry a lot; I live with my condition – nothing I can do about it), several articles supported a positive mindset by showing that a distressed and negative thought pattern or negative concept of the illness correlated strongly with poorer physical, global, psychological, and social QOL.²⁴⁻²⁶ However, patients who demonstrated less distressful thoughts verbalized more positive thoughts, saw cancer as contributing to positive life changes, and thought through productive coping strategies, had much better QOL, less pain, and longer survival rates. A positive mindset is crucial to a better, more meaningful life post lung cancer diagnosis.

Support of family, friends, and the clinical settings was introduced as a major category,²³ but was not heavily discussed in the included articles. Maliski et al defined support as giving and receiving. Patients discussed how important family relationships were to their ability to improve. Other patients expressed the importance of sharing their experiences with other cancer patients as helping them improve. Only one other article identified social support as a link to lung cancer survival. Coups et al³² showed that social support from friends and family was associated with patients exercising more and having better health. This was the weakest of the major categories but does not delimit the power of support in lung cancer survival. This topic needs to be addressed more in future endeavors.

The last piece of evidence addressed in a couple of the articles was the idea of clustering symptoms for a better understanding of the meaningfulness of surviving the disease.^{28,30} Lung cancer survivors

experience distressing symptoms that occur simultaneously. Symptoms that occur together may have a synergistic effect on each other and on key patient outcomes such as quality of life (QOL). Depression and fatigue were significantly related to each other and explained a significant amount of changes in QOL in the meaningfulness of lung cancer survivors.³⁰ Nakaya et al²⁸ found a cluster effect as well with helplessness/hopelessness, depression, and risk of mortality. This effect was identified with a cautionary statement because clinical variables such as clinical stage and the severity of the clinical symptoms did cancel out the risk for mortality once they were adjusted. Part of the problem could be the type of measure used to identify a variable. The measures used in many of the studies were different even though they were measuring the same psychological, social, and physical variables. It is important to continue examining symptom clusters in order to create the most meaningful health scenario for the patient. It is also important to minimize the number of measures used to identify the same variables (i.e., coping, depression, resiliency, distress, QOL).

Limitations of the Review

Only English language studies from January 1999 through December 2010 were included in the review. Only one qualitative study was identified. A limited number of quantitative studies were examined in this review.

Conclusions

A positive outlook appears to predict a longer, more meaningful survival for lung cancer patients. The prognosis for lung cancer is known to be unfavorable, but with a positive affect, less emotional distress, seeing the good in everything, adjusting life to fit the changes from lung cancer, eating nutritionally well, and adding MVPA to the daily routine, the life of a lung cancer survivor can be extended. The outcomes of affect can be confounded by the cancer stage as well as the treatment symptoms.

Implications for practice

Healthcare providers must assess lung cancer survivors for potential symptom clusters affecting key patient outcomes such as quality of life. Consider introducing interventions to promote light to moderate physical activity in older patients and moderate to vigorous physical activity in younger patients, and ceasing smoking. Teach active coping strategies. To support better quality of life, health promotion interventions are needed to support recovery related to smoking. Introduce interventions for improving nutritional needs and decreasing comorbidities.

Implication for research

As lung cancer research evolves, it is important to continually search for more consistent tools/measures and more successful interventions. In order to be more consistent with diagnoses and interventions, the research world is going to have to tighten up the measures used for different psychological factors such as depression, coping, and distress. The idea that symptoms cluster together, reinforce each other, and as a result, influence outcomes such as QOL, suggests that research should focus on different

combinations of symptoms (psychological and physiological) for a better understanding of cluster interventions. This should include examining, more thoroughly, potential emotional and psychological predictors (positive and negative coping strategies; resiliency; outlook on life; depression; quality of life) for a more meaningful and extended lung cancer survival. As a result of exploration, hopefully the most distressing set of symptoms will be targeted for interventions with lung cancer survivors. Lung cancer patients are one of the most vulnerable subgroups of cancer patients because of the short life span, for many, once diagnosed. Focusing on nurse and caregiver support, a change of mindset (be more positive), physical activity patterns, better nutrition, and adjustments to life are research areas with limited understanding and needed investigation. Once these areas are better clarified, earlier emotional and psychological interventions can be proposed.

Conflict of Interest

No conflict of interest.

Acknowledgements

None.

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Appendix I: Search Strategy

Search No.	Search terms and syntax
1	Adult and Lung Cancer
2	Adult and Lung Cancer and surviv*
3	Adult and Lung cancer and surviv* and quality of life
4	Adult and Lung Cancer and phenomenology
5	Adult and Lung cancer and surviv* and phenomenology
6	Adult and Lung cancer and phenomenology and quality of life
7	Adult and Lung Cancer and resiliency
8	Adult and Lung cancer and surviv* and resiliency
9	Adult and Lung cancer and resiliency and cancer experience
10	Adult and Lung cancer and resiliency and quality of life
11	Adult and Lung Cancer and hardiness
12	Adult and Lung cancer and surviv* and hardiness
13	Adult and Lung cancer and hardiness and cancer experience
14	Adult and Lung cancer and hardiness and quality of life

Appendix II: Critical appraisal instruments

QARI Appraisal instrument

JBI QARI Critical Appraisal Checklist for Interpretive & Critical Research

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Is there congruity between the stated philosophical perspective and the research methodology?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there congruity between the research methodology and the research question or objectives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Is there congruity between the research methodology and the methods used to collect data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is there congruity between the research methodology and the representation and analysis of data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is there congruity between the research methodology and the interpretation of results?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Is there a statement locating the researcher culturally or theoretically?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the influence of the researcher on the research, and vice-versa, addressed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Are participants, and their voices, adequately represented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info.

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Descriptive / Case Series

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Was study based on a random or pseudo-random sample?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the criteria for inclusion in the sample clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Were confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If comparisons are being made, was there sufficient descriptions of the groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info

Comments (Including reason for exclusion)

Appendix III: Data extraction instruments

QARI data extraction instrument

JBI QARI Data Extraction Form for Interpretive & Critical Research

Reviewer Date

Author Year

Journal Record Number

Study Description

Methodology _____

Method _____

Phenomena of interest _____

Setting _____

Geographical _____

Cultural _____

Participants _____

Data analysis _____

Authors Conclusions _____

Comments _____

Complete Yes No

Findings	Illustration from Publication (page number)	Evidence		
		Unequivocal	Credible	Unsupported

Extraction of findings complete

Yes

No

**JBI Data Extraction Form for
Experimental / Observational Studies**

Reviewer Date

Author Year

Journal Record Number

Study Method

RCT Quasi-RCT Longitudinal
Retrospective Observational Other

Participants

Setting _____

Population _____

Sample size

Group A _____ Group B _____

Interventions

Intervention A _____

Intervention B _____

Authors Conclusions:

Reviewers Conclusions:

Study results**Dichotomous data**

Outcome	Intervention () number / total number	Intervention () number / total number

Continuous data

Outcome	Intervention () number / total number	Intervention () number / total number

Appendix IV: Excluded Studies

Akechi T, Nakano T, Akizuki N, Nakanishi T, Yoshikawa E, Okamura H, et al. Clinical factors associated with suicidality in cancer patients. *Jpn J Clin Oncol*, 2002;32(12):506-511.

Reason for exclusion: Did not meet inclusion criteria – examined treatment not survival variables

Akechi T, Okamura H, Okuyama T, Furukawa TA, Kishiwaki Y, & Uchitomi Y. Psychosocial factors and survival after diagnosis of inoperable non-small cell lung cancer. *Psycho-Oncol*, 2009;18:23-29.

Reason for exclusion: Did not meet inclusion criteria – only looked at 2 months post diagnosis not 2 years post diagnosis

Altekruse SF, Kosary CL, Krapcho M, Neyman N, Aminou R, Waldron W, et al. SEER Cancer Statistics Review, National Cancer Institute. Bethesda, MD, 1975-2007, http://seer.cancer.gov/csr/1975_2007/, based on Nov. 2009 SEER data submission, posted to the SEER web site, 2010.

Reason for exclusion: Cancer statistics review; mismatch with the inclusion criteria.

Andrykowski MA, Lykins E, & Floyd A. Psychological health in cancer survivors. *Seminars in Oncol Nurs*, 2008;24(3):193-201.

Reason for exclusion: Did not meet inclusion criteria – does not identify lung cancer patients separate from other types of cancer

Arrieta O, Martinez-Barrera L, Trevino S, Guzman E, Castillo-Gonzalez P, Rios-Trejo MA, et al. Wood-smoke exposure as a response and survival predictor in Erlotinib-treated non-small cell lung cancer patients. *JThor Oncol*, 2008;3(8):887-893.

Reason for exclusion: Did not meet inclusion criteria – examined treatment not survival variables

Baker F, Denniston M, Smith T, & West MM. Adult cancer survivors: How are they faring? *Suppl Cancer*, 2005;104(11):2565-2576.

Reason for exclusion: Did not meet inclusion criteria – does not examine lung cancer patients specifically

Bertero C, Vanhanen M, & Appellin G. Receiving a diagnosis of inoperable lung cancer: Patients' perspectives of how it affects their life situation and quality of life. *Acta Oncol*, 2008;47:862-869.

Reason for exclusion: Did not meet inclusion criteria – the article focuses on physical treatment instead of quality of life surviving cancer

Bower JE, Meyerowitz BE, Desmond KA, Bernaards CA, Rowland JH, & Ganz PA. Perceptions of positive meaning and vulnerability following breast cancer: Predictors and outcomes among long-term breast cancer survivors. *Ann Behav Med*, 2005;29(3):236-245.

Reason for exclusion: Did not meet inclusion criteria – focuses on breast cancer instead of lung cancer

Briere J, & Elliott DM. Clinical utility of the impact of event scale: Psychometrics in the general population. *Psycho Assess*, 1998; 5(2):171-180.

Reason for exclusion: Did not meet inclusion criteria – too old (1999-2010 was criteria).

Brown DJF, McMillian DC, & Milroy R. The correlation between fatigue, physical function, the systemic inflammatory response, and psychological distress in patients with advanced lung cancer. *Cancer*, 2005;103(2):377-382.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Buccheri GF. Depressive reactions to lung cancer are common and often followed by a poor outcome. *Eur Respir J*, 1998:173-178.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Buccheri, GF, Ferrigno D, Tamburini M, & Brunelli C. The patient's perception of his own quality of life might have an adjunctive prognostic significance in lung cancer. *Lung Cancer*, 1995;12:45-58.

Reason for exclusion: Did not meet inclusion criteria – too old (1999-2010 is criteria).

Carlsen K, Jensen AB, Jacobsen E, Krasnik M, Johansen C. Psychosocial aspects of lung cancer. *Lung Cancer*, 2005; 47: 293-300.

Reason for exclusion: Review article; mismatch with the inclusion criteria – didn't measure two years post diagnosis.

Carlson LE, & Bultz BD. Mind-body interventions in oncology. *Cur Treat Opt Oncol*, 2008;9:127-134.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis and not specified as lung cancer patients

Carver CS, Pozo C, Harris SD, Noriega V, Scheier MF, Robinson DS, et al. How coping mediates the effect of optimism on distress: A study of women with early stage breast cancer. *J Pers Soc Psych*, 1993;65(2):375-390.

Reason for exclusion: Did not meet inclusion criteria – focuses on breast cancer instead of lung cancer

Chi CGHL. The role of hope in patients with cancer. *Oncol Nurs Forum*, 2007;34(2):415-424.

Reason for exclusion: Did not meet inclusion criteria – did not examine lung cancer patients post two years diagnosis

Cooley ME, Short TH, & Moriarty HJ. Patterns of symptom distress in adults receiving treatment for lung cancer. *J Palliative Care*, 2002;18(3):150-159.

Reason for exclusion: Did not meet inclusion criteria – the article focuses on physical treatment instead of quality of life surviving cancer

Cunningham AJ, Phillips C, Lockwood GA, Hedley DW, & Edmonds CV. Association of involvement in psychological self-regulation with longer survival in patients with metastatic cancer: An exploratory study. *Mind-Body Med*, 2000;16(4):1470-3556.

Reason for exclusion: Did not meet inclusion criteria – no specified lung cancer patients

Dharma-Wardene M, Au HJ, Handson J, Dupere D, Hewitt J, & Feeny D. Baseline FACT-G score is a predictor of survival for advanced lung cancer. *Qual Life Res*, 2004;13:1209-1216.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Dirksen SR. Search for meaning in long-term cancer survivors. *J Adv Nurs*, 1995;21:628-633.

Reason for exclusion: Did not meet inclusion criteria – too old (1999-2010 was criteria)

Efficace F, Bottomley A, Smit EF, Lianes P, Legrand C, Debruyne C. et al. Is a patient's self-reported health-related quality of life a prognostic factor for survival in non-small-cell lung cancer patients? A multivariate analysis of prognostic factors of EORTC study 08975. *Annals of Oncol*, 2006;17:1698-1704.

Reason for exclusion: Did not meet inclusion criteria – only examined patients during treatment – recently diagnosed

Evangelista LS, Sarna L, Brecht ML, Padilla G, & Chen J. Health perceptions and risk behaviors of lung cancer survivors. *Heart & Lung*, 2003;32(2):131-139.

Reason for exclusion: Did not meet inclusion criteria – examined treatment of patients with cancer not quality of life of surviving lung cancer

Faller H, & Schmidt M. Prognostic value of depressive coping and depression in survival of lung cancer patients. *Psycho-Oncol*, 2004;13:359-363.

Reason for exclusion: Did not meet inclusion criteria – newly diagnosed patients, no one post two years

Fawzy FI. Psychosocial interventions for patients with cancer: What works and what doesn't. *Euro J Cancer*, 1999;35(11):1559-1564.

Reason for exclusion: Did not meet inclusion criteria – does not identify lung cancer patients separate from other types of cancer

Fernandes OJCB, Almgren SO, Thaning L, Filbey D, Helsing M, Karlsson M, et al. Prognostic factors for the survival of surgically treated patients for non-small cell lung cancer. *Acta Oncol*, 2003;42(4)338-341.

Reason for exclusion: Did not meet inclusion criteria – examined treatment of patients with cancer

Ferrell B, Cullinane CA, Ervin K, Melancon C, Uman GC, & Juarez G. Perspectives on the impact of ovarian cancer: Women's views of quality of life. *Oncol Nurs Forum*, 2005; 32(6):1143-1149.

Reason for exclusion: Did not meet inclusion criteria – focuses on ovarian cancer instead of lung cancer

Fielding R, Wong WS. Quality of life as a predictor of cancer survival among Chinese liver and lung cancer patients. *Euro J Cancer*, 2007; 43 (11): 1723-90.

Reason for exclusion: Did not meet inclusion criteria – no specified lung cancer patients post two years diagnosis

Fleer J, Hoekstra HJ, Sleijfer DT, Tuinman MA, & Hoekstra-Weebers JEHM. The role of meaning in the prediction of psychosocial well-being of testicular cancer survivors. *Qual Life Res*, 2006;15:705-717.

Reason for exclusion: Did not meet inclusion criteria – only looks at testicular cancer – no lung cancer patients

Foley KL, Farmer DF, Petronis VM, Smith RG, McGraw S, Smith K, et al. A qualitative exploration of cancer experience among long-term survivors: Comparisons by cancer type, ethnicity, gender, and age. *Psycho-Oncology*, 2006;15:248-258.

Reason for exclusion: Did not meet inclusion criteria – does not identify lung cancer patients separate from other types of cancer

Garrido P, Gonzalez-Larriba JL, Insa A, Provencio M, Torres A, Isla D, et al. Long-term survival associated with complete resection after induction chemotherapy in stage IIIA (N2) and IIIB (T4N0-1) non-small-cell lung cancer patients: The Spanish lung cancer group trial 9901. *J Clinical Oncol*, 2007;25(30):4736-4742.

Reason for exclusion: Did not meet inclusion criteria – examined medical treatment of patients with cancer not surviving lung cancer post two years diagnosis

Gibson LMR, & Parker V. Inner resources and predictors of psycho well-being in middle-income African breast cancer survivors. *Cancer Control*, 2003;10(5).

Reason for exclusion: Did not meet inclusion criteria – focuses on breast cancer instead of lung cancer

Giese-Davis J, Wilhelm FH, Conrad A, Abercrombie HC, Sephton S, Yutsis M, et al. Depression and stress reactivity in metastatic breast cancer. *Psychosom Med*, 2006;68:675-683.

Reason for exclusion: Did not meet inclusion criteria – focuses on breast cancer instead of lung cancer

Gotay CC, Isaacs P, & Pagano I. Quality of life in patients who survive a dire prognosis compared to control cancer survivors. *Psycho-Oncol*, 2004;13:882-892.

Reason for exclusion: Did not meet inclusion criteria – does not identify lung cancer patients separate from other types of cancer

Grafton E, Gillespie B, Henderson S. Resilience: The power within. *Oncol Nurs Forum*, 2010; 37(6): 698-705.

Reason for exclusion: Review article; mismatch with the inclusion criteria

Gridelli C, Perrone F, Nelli F, Ramponi S, DeMarinis F. Quality of life in lung cancer patients. *Annals Oncol*. 2001; 12 (Supl.3): S21-S25.

Reason for exclusion: Review article; mismatch with the inclusion criteria

Groome PA, Schulze KM, Keller S, & Mackillop WJ. Demographic differences between cancer survivors and those who die quickly of their disease. *Clinical Oncol*, 2008;20:647-656.

Reason for exclusion: Did not meet inclusion criteria – examined different types of cancer and examined post one year not two year diagnosis

Hjerl K, Anderson EW, Keiding N, Mouridsen HT, Mortensen PB, & Jorgensen T. Depression as a Prognostic Factor for Breast Cancer Mortality. *Psychosomatics*, 2003;44(1):24-30.

Reason for exclusion: Did not meet inclusion criteria – focuses on breast cancer instead of lung cancer

Hopwood P, & Stephens RJ. Depression in patients with lung cancer: Prevalence and risk factors derived from quality-of-life data. *J Clinical Oncol*, 2000;18(4):893-903.

Reason for exclusion: Did not meet inclusion criteria – not clear on how many years the patients had been examined post diagnosis

Howard G, Anderson RT, Russell G, Howard VJ, & Burke GL. Race, socioeconomic status, and cause-specific mortality. *Ann Epidemiol*, 2000;10:214-223.

Reason for exclusion: Did not meet inclusion criteria – did not include lung cancer patients

Hui AC, Vinod SK, Jalaludin BB, Yuile P, Delaney GP, & Barton MB. Socio-economic status and patterns of care in lung cancer. *Public Health*, 2005;29:373-377.

Reason for exclusion: Did not meet inclusion criteria – examined medical treatment of patients with cancer not surviving lung cancer post two years diagnosis

Jacelon CS. The trait and process of resilience. *J Adv Nurs*, 1997;25:123-129.

Reason for exclusion: Did not meet inclusion criteria – lung cancer was not a variable and too old (1999 – 2010 was criteria)

Jensen KP, Back-Pettersson S, & Segesten K. The meaning of “not giving in”: Lived experiences among women with breast cancer. *Cancer Nurs*, 2000;23(1):6-11.

Reason for exclusion: Did not meet inclusion criteria – focuses on breast cancer instead of lung cancer

Kaplan BW. Mind over body: The effects of depression on physical disease and how it can predict outcome. *Oncol Nurse Advisor*, 2010:42-43.

Reason for exclusion: This isn't a research article

Karanikas V, Khalil S, Kerenidi T, Gourcoulianis KI, Germeis AE. Anti-surviving antibody responses in lung cancer. *Cancer Letters*, 2009;282:159-166.

Reason for exclusion: Did not meet inclusion criteria – examined treatment of patients with cancer

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Reason for exclusion: Did not meet inclusion criteria – does not identify lung cancer patients separate from other types of cancer

Kim DJ, Lee JG, Lee CY, Park I, & Chung KY. Long-term survival following pneumonectomy for non-small cell lung cancer: Clinical implications for follow-up care. *Chest*, 2007;132:178-184.

Reason for exclusion: Did not meet inclusion criteria – examined treatment of patients with cancer

Kroenke K, Theobald D, Wu J, Norton K, Morrison G, Carpenter J, et al. Effect of telecare management on pain and depression in patients with cancer. *JAMA*, 2010;304(2):163-171.

Reason for exclusion: Did not meet inclusion criteria – examined treatment of patients with cancer

Kurtz ME, Kurtz JC, Stommel M, Given CW, & Given B. Predictors of depressive symptomatology of geriatric patients with lung cancer—a longitudinal analysis. *Psycho-Oncol*, 2002;11:12-22.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Langendijk JA, Aaronson NK, de Jong JMA, ten Velde GPM, Muller MJ, Lamers RJ et al. Prospective study on quality of life before and after radical radiotherapy in non-small-cell lung cancer. *J Clinical Oncol*, 2001;19(8):2123-2133.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

MacManus MP, Wada M, Matthews JP, & Ball DL. Characteristics of 49 patients who survived for 5 years following radical radiation therapy for non-small cell lung cancer: The potential for cure. *Int J Radiation Oncol Biol Phys*, 2000;46(1):63-69.

Reason for exclusion: Did not meet inclusion criteria – examined treatment not survival variables

Maddi S. Hardiness: An operationalization of existential courage. *J Hum Psych*, 2004; 44: 279-298.

Reason for exclusion: Did not meet inclusion criteria – did not examine lung cancer specifically nor did it look at a sample of lung cancer survivors

Martins SJ, Ho N, Cavamura SO, Harada CM, Yamamoto CA, & Takagaki TY. Lung cancer symptoms and pulse oximetry in the prognostic assessment of patients with lung cancer. *BMC Cancer*, 2005;5(72).

Reason for exclusion: Did not meet inclusion criteria – examined medical treatment of patients with cancer and only new patients not post two years diagnosis

McCarthy MM, Thompson A, Rivers S, Jahanzeb. The benefits of support group participation to lung cancer survivors – An evaluation. *Clinical Lung Cancer*, 1999; 1(2): 110-117.

Reason for exclusion: Did not meet inclusion criteria - survey and focus group examining the value to lung cancer survivors of participating in support groups organized specifically for them

Milne HM, Guilfoyle A, Gordon S, Wallman KE, & Courneya KS. Personal accounts of exercise and quality of life from the perspective of breast cancer survivors. *Qual Life Res*, 2007;16:1473-1481.

Reason for exclusion: Did not meet inclusion criteria – focuses on breast cancer instead of lung cancer

Montazeri A, Milroy R, Hole D, McEwen J, & Grillis CR. Quality of life in lung cancer patients as important prognostic factor. *Lung Cancer*, 2001;31:233-240.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Montazeri A, Milroy R, Hole D, McEwen J, & Grillis CR. Anxiety and depression in patients with lung cancer before and after diagnosis: Findings from population in Glasgow, Scotland. *J Epidemiol Community Health*, 1998; 52:203-204.

Reason for exclusion: Did not meet inclusion criteria – too old (1999-2010 is criteria)

Naughton MJ, Herndon JE, Shumaker SA, Miller AA, Kornblith AB, Chao D, et al. The health-related quality of life and survival of small-cell lung cancer patients: Results of a companion study to CALGB 9033. *Qual Life Res*, 2002;11:235-248.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Oswaldo F, Stig-Olof A, Thaning L, Filbey D, Helsing M, Karlsson M, et al. Prognostic factors for the survival of surgically treated patients for non-small cell lung cancer. *Acta Oncol*, 2003; 42: 338-341.

Reason for exclusion: Did not meet inclusion criteria – the article focuses on treatment instead of surviving cancer.

Papathanassoglou EDE, & Patiraki EI. Transformations of self: A phenomenological investigation into the lived experiences of survivors of critical illness. *Nursing in Critical Care*, 2003;8(1):13-21.

Reason for exclusion: Did not meet inclusion criteria – lung cancer was not a variable

Paralkar VR, Li T, & Langer CJ. Population characteristics and prognostic factors in metastatic non-small-cell lung cancer: A Fox Chase Cancer Center retrospective. *Clinical Lung Cancer*, 2008;9(2):116-121.

Reason for exclusion: Did not meet inclusion criteria – the article focuses on treatment instead of surviving cancer.

Pearman T. Psychosocial factors in lung cancer: Quality of life, economic impact, and survivorship implications. *J Psychosoc Oncol*, 2008;26(1):69-79.

Reason for exclusion: Did not meet inclusion criteria – the article focuses on treatment instead of surviving cancer.

Petticrew M, Bell R, & Hunter D. Influence of psychological coping on survival and recurrence in people with cancer: Systematic review. *BMJ*, 2002;325:1066-1069.

Reason for exclusion: Did not meet inclusion criteria – focuses on a review of different types of cancer not quality of life of lung cancer patient

Qi Y, Schild SE, Mandrekar SJ, Tan AD, Krook JE, Rowland KM, et al. Pretreatment quality of life is an independent prognostic factor for overall survival in patients with advanced stage non-small cell lung cancer. *J Thoracic Oncol*, 2009;4(9):1075-1082.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Rawl SM, Given BA, Given CW, Champion VL, Kozachik SL, Barton D, et al. Intervention to improve psychological functioning for newly diagnosed patients with cancer. *RAWL*, 2002;29(6):967-975.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Schnoll RA, Knowles JC, Harlow L. Correlates of adjustment among cancer survivors. *J Psychosoc Oncol*, 2002; 20(1): 37-59.

Reason for exclusion: Did not meet inclusion criteria – no specified lung cancer patients

Schroevers MJ, Ranchor AV, & Sanderman R. The role of age at the onset of cancer in relation to survivors' long-term adjustment: A controlled comparison over an eight-year period. *Psycho-Oncology*, 2004;13:740-752.

Reason for exclusion: Did not meet inclusion criteria – does not specify lung cancer patients

Scott HR, McMillian DC, Forrest LM, Brown DJF, McArdle CS, & Milroy R. The systemic inflammatory response, weight loss, performance status and survival in patients with inoperable non-small cell lung cancer. *Br J Cancer*, 2002;87:264-267.

Reason for exclusion: Did not meet inclusion criteria – examined treatment not survival variables

Shen BJ, McCreary CP, Myers HF. Independent and mediated contributions of personality, coping, social support, and depressive symptoms to physical functioning outcome among patients in cardiac rehabilitation. *J Behav Med*, 2004; 27:39-62.

Reason for exclusion: Did not meet inclusion criteria – does not specify lung cancer patients

Skuladottir H, & Olsen JH. Can reproductive pattern explain better survival of women with lung cancer? *Acta Oncol*, 2006;45:47-53.

Reason for exclusion: Did not meet inclusion criteria – examined treatment of patients with cancer

Spiro SG, Rudd RM, Souhami RL, Brown J, Fairlamb DJ, Gower NH, et al. Chemotherapy versus supportive care in advanced non-small cell lung cancer: Improved survival without detriment to quality of life. *Thorax*, 2004;59:828-836.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis

Stavraky KM, Donner AP, Kincade JE, & Stewart MA. The effect of psychosocial factors on lung cancer mortality at one year. *J Clin Epidemiol*, 1988;41(1):75-82.

Reason for exclusion: Did not meet inclusion criteria – didn't measure two years post diagnosis and too old (1999-2010 was criteria)

Stiegelis HE, Hagedoorn M, Sanderman R, van der Zee KI, Puunk BP, & van den Bergh, ACM. Cognitive adaptation: A comparison of cancer patients and healthy references. *Br J Health Psych*, 2003;8:303-318.

Reason for exclusion: Did not meet inclusion criteria – no specified lung cancer patients

Sugimura H, Yang P. Long-term survivorship in lung cancer: A review. *CHEST*, 2006; 129(4): 1087-1097.

Reason for exclusion: Review article; mismatch with the inclusion criteria.

Sugiura H, Yamada K, Sugiura T, Hida T, Mitsudomi T. Predictors of survival in patients with bone metastasis of lung cancer. *Clin Orthop Relat Res*, 2008;466:729-736.

Reason for exclusion: Did not meet inclusion criteria – examined treatment not psychological variables related to surviving lung cancer

Temeck BK, Flehinger BJ, & Martini N. A retrospective analysis of 10-year survivors from Carcinoma of the lung. *Cancer*, 1984;53:1405-1408.

Reason for exclusion: Did not meet inclusion criteria – too old (outside of 1999-2010).

Thome B, Esbensen BA, Kykes AK, & Hallberg IR. The meaning of having to live with cancer in old age. *Euro J Cancer Care*, 2004;13:399-408.

Reason for exclusion: Did not meet inclusion criteria – does not examine patients two years post diagnosis and only one patient was diagnosed with lung cancer

Tian J, Chen ZC, & Hang, LF. The effects of psychological status of the patients with digestive system cancers on prognosis of disease. *Cancer Nurs*, 2009; 32:230-235.

Reason for exclusion:

Tobin GA, & Begley C. Receiving bad news: A phenomenological exploration of the lived experience of receiving a cancer diagnosis. *Cancer Nurs*, 2008;31(5):31-39.

Reason for exclusion: Did not meet inclusion criteria – does not examine patients two years post diagnosis

Toh CK, Wong EH, Lim WT, Leong SS, Fong KW, Wee J, et al. The impact of smoking status on the behavior and survival outcome of patients with advanced non-small cell lung cancer: A retrospective analysis. *CHEST*, 2004;126(6):1750-1756.

Reason for exclusion: Did not meet inclusion criteria – examined treatment not psychological variables related to surviving lung cancer

Uchitomi Y, Mikami I, Nagai K, Nishiwaki Y, Akechi T, & Okamura H. Depression and psychological distress in patients during the year after curative resection of non-small-cell lung cancer. *J Clinical Oncol*, 2003;21:67-77.

Reason for exclusion: Did not meet inclusion criteria – does not examine patients two years post diagnosis

Uchitomi Y, Mikami I, Kugaya A, Nakano T, Okuyama T, Akechi T, et al. Physician support and patient psychological responses after surgery for nonsmall cell lung Carcinoma. *Cancer*, 2001;92(7):1926-1935.

Reason for exclusion: Did not meet inclusion criteria – does not examine patients two years post diagnosis

van der Molen, B. Relating information-needs to the cancer experience. 1. Jenny's story: A cancer narrative. *Euro J Cancer Care*, 2000;9:41-47.

Reason for exclusion: Did not meet inclusion criteria – no lung cancer patients were identified

van der Molen, B. Relating information needs to the cancer experience. 2. Themes from six cancer narratives. *Euro J Cancer Care*, 2000;9:48-54.

Reason for exclusion: Did not meet inclusion criteria – no lung cancer patients were identified

Visser MRM, & Smets EMA. Fatigue, depression and quality of life in cancer patients: How are they related? *Support Care Cancer*, 1998;6:101-108.

Reason for exclusion: Did not meet inclusion criteria – no specified lung cancer patients post two years diagnosis

Wang T, Nelson RA, Bogardus A, & Grannis FW. Five-year lung cancer survival. *Cancer*, 2010;116:1518-1525.

Reason for exclusion: Did not meet inclusion criteria – examined treatment not psychological variables related to surviving lung cancer

Wang XS, Shi Q, Lu C, Basch EM, Johnson VE, Mendoza TR, et al. Prognostic value of symptom burden for overall survival in patients receiving chemotherapy for advanced nonsmall cell lung cancer. *Cancer*, 2010;116:137-145.

Reason for exclusion: Did not meet inclusion criteria – examined treatment not psychological variables related to surviving lung cancer

Wong WS, Fielding R. Quality of life and pain in Chinese lung cancer patients: Is optimism a moderator or mediator? *Qual Life Res*, 2007; 16: 53-63.

Reason for exclusion: Did not meet inclusion criteria – no specified lung cancer patients post two years diagnosis

Woodgate RL. Conceptual understanding of resilience in the adolescent with cancer: Part I. *J Pediatric Oncol Nurs*, 1999;16(1):35-43.

Reason for exclusion: Review paper; mismatch with inclusion criteria.

Yedidia MJ, MacGregor B. Confronting the prospect of dying: Reports of terminally ill patients. *J Pain Symptom Mgt*, 2001;22(4):807-819.

Reason for exclusion: Did not meet inclusion criteria – examines dying not surviving

Zabora J, Brintzenhofesoc K, Curbow B, Hooker C, & Piantadosi S. The prevalence of psychological distress by cancer site. *Psycho-Oncol*, 2001; 10:19-28.

Reason for exclusion: Did not meet inclusion criteria – no specified lung cancer patients post two years diagnosis

Appendix V: Included Studies

Reference	Purpose & Design	Measures	Physiological & Psychological Results	Implications
Coups et al. ³¹ 2009	<ul style="list-style-type: none"> • Association between lung cancer survivors' physical activity and QOL • Stage 1 lung cancer • 1-6 yrs post • N =175; • Study design: Descriptive study • Data collection methods:148 telephone interviews; 27 paper surveys 	<ul style="list-style-type: none"> • SF-36 v2: QOL with 8 dimensions: physical functioning, role limitations due to physical problems, bodily pain, general health perceptions, vitality, social functioning, mental health, & role limitations due to emotional problems. • Baseline dyspnea index: dyspnea • Brief fatigue inventory: fatigue • HADS: anxiety/depression • GLTEQ: sedentary or number of minutes participating in physical activity. 	<ul style="list-style-type: none"> • MVPA was lower during post treatment compared to pre diagnosis & current time • Light activity did not differ across 3 time points • Almost 2/3 of participants did not engage in sufficient physical activity levels to meet national standards across all three time points • Lung cancer survivors who currently met physical activity guidelines had better QOL in multiple domains than less active individuals • Moderate activity significant decreased pre to post, significant increased post to cured • Strenuous activity followed same patterns as moderate 	<ul style="list-style-type: none"> • Need to develop & test physical activity interventions designated specifically for survivors of early stage lung cancer • Take into consideration light to moderate activity in older patients; frequent co-morbid conditions common with physical & QOL impairments

<p>Coups, Park et al.³² 2009</p>	<ul style="list-style-type: none"> • To examine whether demographic and medical factors were associated with physical activity among lung cancer survivors. • To determine if self-efficacy would mediate associations of social support and perceived environmental factors with physical activity • Study design: Descriptive study • Data collection methods: interviews, medical record review • N= 175 	<p>BSES: physical activity self-efficacy (perceived ability -13 items)</p> <p>EDBQ: physical activity outcome expectations & negative outcomes of physical activity</p> <p>SSES: perceived social support from family & friends</p> <p>GLTEQ: engagement in moderate & strenuous intensity physical activities.</p> <p>Medical record & self-report: stage, demographics, pulmonary function, time since resection, extent of resection, length of stay, post resection complications, current smoking/prior, height, weight, co-morbidities</p>	<p>Individuals with poorer preoperative pulmonary function reported less engagement in physical activity.</p> <p>Activity was lower for individuals treated with chemotherapy or radiotherapy as well as surgery</p> <p>Individuals with more co-morbidities reported less leisurely walking</p> <p>Social support from friends was associated with leisurely walking</p> <p>Lower levels of moderate/strenuous physical activity were reported by lung cancer survivors with less positive physical activity outcome expectations and greater physical activity self-efficacy</p>	<ul style="list-style-type: none"> • Early stage Non-small cell lung cancer (NSCLC) survivors with lower levels of education may need interventions to promote physical activity • Perceived behavioral control is associated with cancer survivors engagement in MVPA (intentions & behavior)
<p>Faller et al.²¹</p>	<ul style="list-style-type: none"> • To determine whether coping and emotional state are predictors of 	<p>Freiburg Questionnaire: Active coping, Depressive coping</p>	<p>Karnofsky performance status was correlated with active coping</p>	<ul style="list-style-type: none"> • Coping strategies predict survival

<p>1999</p>	<p>survival among lung cancer patients.</p> <ul style="list-style-type: none"> • Study design: Descriptive study • Data collection methods: interviews • N=103; after diagnosis 7-8 yrs later n= 11 	<p>(self-report & interviewer rating)</p> <p>Emotional Distress:5 items (5 point scale)</p> <p>D-S:Depression intensity</p> <p>Biomedical variables: Tumor stage, Cell type, Karnofsky performance status</p>	<p>and inversely with depression</p> <p>No effect of age & tumor stage on psychological variables</p> <p>Patients with high self-reported depressive coping had shorter survival</p> <p>Emotional distressed patients had shorter times of survival</p>	<ul style="list-style-type: none"> • Coping may influence the course of disease (Psychoneuroimmunological mechanisms decrease natural killer cell activity)
<p>Faller et al.²² 2002</p>	<ul style="list-style-type: none"> • To determine whether style of coping was predictive of survival in lung cancer. • Study design: Descriptive study • Data collection methods: Interviews, medical record review • N= 103 	<p>Freiburg Questionnaire:</p> <p>Active coping, Depressive coping (self-report & interviewer rating)</p> <p>Survival time: diagnosis to death</p> <p>Medical record: Tumor stage</p> <p>Cell type, Treatment, demographics</p>	<p>Depressive coping predicts shorter survival time</p> <p>Physicians ratings of severity =predictive of shorter survival</p> <p>Self-report/interviewer ratings of depressive coping correlated</p> <p>Cell type was not predictive</p> <p>Depressive coping predicts short</p>	<ul style="list-style-type: none"> • Style of coping predicts survival • Due to its observational design precludes any causal interpretation

		Physician report: Karnofsky performance scale, physicians rating of cancer severity 5-pt Likert scale	survival times, active coping predicts longer survival time Coping & survival maybe mediated by neuroendocrine-immune pathways & compliance with medical treatment	
Fox et al. ³⁰ 2006	<ul style="list-style-type: none"> Explore prevalence & intensity of depression, fatigue, & pain in survivors of lung cancer; examine relationship of symptom cluster with QOL Study design: Descriptive study Data collection methods: Mailed surveys to online support groups N=142; subset lung=51 	<ul style="list-style-type: none"> SF-36: General QOL (physical functioning, role limitations, bodily pain, social functioning, general mental health, vitality, general health perceptions) Fox simple QOL scale: cognitive & affective components of QOL 	<ul style="list-style-type: none"> 98% reported depression 100% fatigue 65% pain Depression significantly related to fatigue Fatigue sig related to pain Depression/fatigue sig correlated with QOL 	<ul style="list-style-type: none"> Need to conduct with use of larger groups & more variables within symptom clusters Clusters need to be compared across illness continuum for acute phase vs survivors
Garces et al. ²⁷ 2004	<ul style="list-style-type: none"> To describe the relationship between cigarette smoking & QOL among lung cancer survivors. Study design: Descriptive study Data collection methods: 	LCSS: Specific lung cancer symptoms (appetite, fatigue, cough, SOB, hemoptysis, pain), General lung cancer symptoms (how affects normal activities/overall QOL/alcohol intake)	7% smokers had quit at follow-up 30% continued to smoke Continued smoking related to lung cancer survivor experiencing a	<ul style="list-style-type: none"> QUIT SMOKING Survival-related outcomes related to smoking will be assessed as future aim

	<p>Mailed questionnaires, medical record review</p> <ul style="list-style-type: none"> • 6-step follow-up (6 months, 1yr,2 yr,3yr,4yr,5yr) • N= 1506 	<p>Tobacco History: Smoking history (never, current, former, persistent, relapsed former, abstinent), Self-reported packs per day</p> <p>Medical record: Cell type, stage, type of treatment, demographics</p>	<p>relative deficit in QOL</p> <p>Abstinent smokers at follow-up had better QOL suggesting tobacco intervention lead to QOL improvement</p>	
<p>Maliski, et al.²³ 2003</p>	<ul style="list-style-type: none"> • The experience of surviving lung cancer from long-term survivors of lung cancer • Study design: mixed methods study with a qualitative component (phenomenological research) and a quantitative component (quantitative descriptive study) • Data collection methods: Interviews = 29 patients; questionnaires 	<p>Quantitative measures:</p> <ul style="list-style-type: none"> • CES-D: distressed mood • SF 36: quality of life <p>Qualitative phenomenological interview</p>	<ul style="list-style-type: none"> • >16 distressed group; <16 not distressed group • Less distressed took better care of themselves • Higher proportion of participants continued to smoke in distressed group • Qualitative Themes: <ol style="list-style-type: none"> 1. A changed life (appreciation for life – low distressed group; loss of normality; negative expressions; inner feelings) 2. Health & self-care (taking control) 3. Physical ability (slowing down) 4. Adjustment (integrating 	<ul style="list-style-type: none"> • Distressed group expressed more negative than not distressed group • Need to know if patients already were depressed or became depressed after hearing news • May be link between smoking & depression

			change) 5. Support (giving & receiving)	
Nakaya et al. ¹³ 2008	<ul style="list-style-type: none"> • Associations between negative psychological aspects & cancer survival in Japanese participants. • Study design: Descriptive study • Data collection methods: Questionnaires, medical record review • N=1178; excluded 403 • Follow-up 1998-2004 or until died 	<ul style="list-style-type: none"> • EPQ-R: neuroticism • MACS: coping; helplessness, hopelessness • HADS: depression/anxiety 	<p>Higher scores:</p> <ul style="list-style-type: none"> • Neuroticism – unmarried & higher severity pain & dyspnea • Helpless/hopeless – older; more advanced cancer; less education; higher severity of pain/dyspnea • Significant association with risk of mortality • Association between helpless/hopeless, depression, & risk of mortality confounded by clinical stage, clinical symptoms • More advanced clinical stage & a poorer PS significant association with higher prevalence of depression • Poor psych states in cancer patients were merely a consequence of illness but not a determinant of poor prognosis 	

<p>Sarna et al.²⁴ 2002</p>	<ul style="list-style-type: none"> To describe the QOL among survivors of non-small cell lung cancer (NSCLC). Study design: Descriptive study Data collection methods: Interviews and medical record review N= 142 	<p>SF-36: Mental QOL score</p> <p>QOL-CS: physical, psychological, social & Spiritual well-being</p> <p>Tobacco History: Smoking status</p> <p>Lung Health Survey: Pulmonary function test/cotinine dipstick</p> <p>Urine Sample: Biochemical validation of smoking</p> <p>Lung Health Study Assessment of Co-morbid conditions: tobacco history & current smoking status</p> <p>CES-D: Distressed mood</p> <p>Medical record & self-report: demographics, height, weight, BMI,</p> <p>stage/cell type, extent of surgery, Other treatments</p>	<p>71% described self as hopeful</p> <p>50% viewed cancer as contributing to positive life change</p> <p>Women had better spiritual QOL scores</p> <p>Distressed mood group had poorer physical QOL</p> <p>27% reported fatigue, 24% aches/pains</p> <p>30% reported anxiety, 21% changes in self-concept, 20% change in appearance</p> <p>34% reported family members experienced serious distress with illness (social well-being)</p> <p>Non-white reported higher levels of overall QOL & better mental health; white participants rated higher physical function</p>	<ul style="list-style-type: none"> Distressed mood (30%) single most important predictor of lower QOL NSCLC survivors are diverse group with different levels of QOL & different needs for rehabilitation Depression among patients with advanced lung cancer is strongly associated with functional impairment & symptom distress Further study needed to assess QOL consequences of continued smoking after diagnosis not only on survival but also on incidence of comorbid conditions/QOL
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<p>Sarna et al.²⁵ 2005</p>	<ul style="list-style-type: none"> To describe the experience of women with NSCLC & examine relationships of demographics & meaning of illness characteristics Study design: Descriptive study Data collection methods: In-person interviews N=217 > 6 months & < 5 yrs since diagnosis Follow-up: across 6 month collection period 	<ul style="list-style-type: none"> QOL-P : cancer specific QOL for patients SF 36: General QOL MOI: positive & negative perceptions BYFSS: tobacco history & current smoking status Fagerstrom Test for Nicotine Dependence CES-D: depression NSCLC histology, stage at diagnosis; time since diagnosis, type/extent of disease; presence & type of treatment status Charlson Comorbidity Index (31% COPD) 	<ul style="list-style-type: none"> Serious pain & fatigue, but substantially more disruption in psych & social well-being Viewed illness as challenge Depressed mood, negative concept of illness, & younger age were predictive of poorer global, physical, psych, & social QOL number of comorbid conditions was related to physical QOL (most common chronic obstructive PD) 	<ul style="list-style-type: none"> Women with lung cancer experience a range of disruptions in QOL More than a third associate lung cancer with a negative meaning Younger age, depressed mood, & number of comorbid diseases are risk factors for negative QOL Younger women need to be assessed for QOL, MOI, & health status
<p>Sarna et al.²⁶ 2010</p>	<ul style="list-style-type: none"> To describe physical and emotional QOL of disease-free female non-small cell lung cancer survivors and to determine characteristics associated with greater risk for disruptions. Study design: Descriptive 	<p>RAND SF-36: PCSs physical QOL, MCSs emotional QOL(8 domains- physical functioning, role limitations from physical health problems, bodily pain, energy/fatigue, general health perceptions, social functioning, emotion well-being)</p> <p>Charlson Co-morbidity Index: co-morbid conditions & BMI,</p>	<p>Dyspnea highly correlated with lower physical QOL</p> <p>Comorbid conditions were common & influenced ratings</p> <p>Depressed mood related to lower</p>	<ul style="list-style-type: none"> Only looked at women NSCLC Need to look at how nurses can support lung cancer survivors Health status, specifically

	<p>study</p> <ul style="list-style-type: none"> • Data collection methods: Questionnaires, medical records • N= 119 	<p>self-report</p> <p>CES-D: Depressed mood</p> <p>Tobacco History: smoking history, urine strip, biochemical verification, self-report</p> <p>Dyspnea Index: measure breathlessness according to level of activity, self-report</p> <p>MOI: Attributions of illness</p> <p>Positive(challenging or value),</p> <p>Negative (enemy, loss, punishment, weakness), Other (relief, strategy)</p> <p>Medical record: Extent of surgery, time of diagnosis, age, race. living arrangements, education level, employment, marital status</p>	<p>emotional QOL</p> <p>Heart disease & COPD associated with negative MCS ratings</p> <p>Emotional well-being was higher and returned to pre-operative levels regardless of physical impairment</p>	<p>depressed mood, smoking, and dyspnea key factors related to poorer physical and emotional QOL</p> <ul style="list-style-type: none"> • To support QOL health promotion interventions needed to support recovery of lung cancer survivors related to smoking and obesity
<p>Svobodnik et al.²⁹ 2004</p>	<ul style="list-style-type: none"> • To report the results of quality of life • Study design: Descriptive study • Data collection methods: Self-administered questionnaires, medical 	<ul style="list-style-type: none"> • LCSS: Quality of life • Medical records: Demographics • Mayo Tumor Registry: tumor type & stage 	<ul style="list-style-type: none"> • Lower QOL for appetite, coughing, & hemoptysis in older patients • Better QOL in women than men for coughing, dyspnea, symptomatic distress, effect on activities, & overall QOL 	<ul style="list-style-type: none"> • Look for potential predictors for survival

	<p>record review</p> <ul style="list-style-type: none"> • 650 patients with lung cancer • 6 months to 4 years post diagnosis • Follow-up 6 months, 1 yr, annually for 4 yrs 		<ul style="list-style-type: none"> • Patients with stage I & II NSCLC had better QOL for appetite, fatigue, pain, symptomatic distress, effect on activities, & overall QOL than NSCLC stages III & IV • More than 5% weight loss – significant lower QOL for appetite, fatigue, dyspnea, pain, symptomatic distress, effect on activities, & overall QOL • SCLC patients had lower QOL for hemoptysis, effect on activities, & overall QOL than NSCLC patients 	
<p>Win et al.³³ 2008</p>	<ul style="list-style-type: none"> • To determine factors associated with overall survival in potentially curable lung cancer patients • Study design: Descriptive study • Data collection methods: Descriptive and medical record review • N= 110 	<p>STEEP: shuttle walking test, cardiopulmonary exercise tests</p> <p>ECOG-WHO: performance status</p> <p>EORTC QLQ C30: global health status</p> <p>Lung Function Test: forced expiratory volume, forced vital capacity</p> <p>Nutritional status: BMI, loss of appetite, weight loss, serum</p>	<p>Peak VO2 max, shuttle test distance, and predicted postoperative transfer factor were associated with overall survival.</p> <p>Lower albumin was associated with poorer survival</p> <p>Heart disease was not associated with poorer outcome; however</p>	<ul style="list-style-type: none"> • Strongest independent prognostic value = shuttle test & diabetes • QOL did not affect survival rate • Decrease survival due to tumor stage

		<p>albumin</p> <p>Medical record: Tumor stage, cell type, co-morbidities, smoking history, surgery</p> <p>Survival time: followed for 2 years</p>	<p>diabetes's was</p>	<ul style="list-style-type: none"> • Diabetes & nutritional state are associated with poorer survival
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KEY

BSES: Barriers to Self-Efficacy Scale

BYFSS: Behavioral risk factor survey

CES-D: Center for Epidemiologic Survey Depression Scale

D-S: Depression Scale

ECOG-WHO: Eastern Cooperative Oncology Group WHO scale

EDBQ: Exercise Decision Balance Questionnaire

EPQ-R: Eysenck Personality Questionnaire Revised

EORTC: European Organization for Research and Treatment of Cancer

FACT-L: The Functional Assessment of Cancer Therapy-Lung

GLTEQ: Godin Leisure Time Exercise Questionnaire

HADS: Hospital Anxiety/Depression Scale

HALEX(1): Health and Activities Limitations Index

LCSS: Lung cancer symptom scale

MACS: Mental Adjustment to Cancer Scale

MOI: meaning of illness

MOS SF36:

POMS: Profile of Moods Scale

QOL-CS: 41-item QOL (Cancer Patient Version) revised Cancer Survivors

SF-36: RAND Short Form- 36

SSES: Social Support of Exercise Scale

STEEP: Standardized Exponential Exercise Protocol