**Title:** Does shared decision-making in cancer treatment improve quality of life? A systematic literature review

**Authors:**

Michael Saheb Kashaf (MSc) (corresponding author)

Johns Hopkins University School of Medicine

733 North Broadway

Baltimore, MD 21205

sahebkashaf@gmail.com

+1 (617) 640-9823

Elizabeth McGill (MSc)

Department of Health Services Research and Policy

London School of Hygiene & Tropical Medicine

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**Abstract**

**Background:** The growing consensus espousing the use of shared decision-making in cancer treatment has coincided with the rise of healthcare evaluation paradigms that emphasize quality of life as a central outcome measure.

**Purpose:** This review systematically examines the association between treatment shared decision-making and quality of life outcomes in cancer.

**Data Sources:** A range of bibliographic databases and grey literature sources.

**Study Selection:** The search retrieved 16,726 records which were screened in sequence, by title, abstract and full-text to identify relevant studies. The review included 17 studies with a range of study designs and populations.

**Data Extraction:** Data were extracted on included studies’ methods, participants, setting, study or intervention description, outcomes, main findings, secondary findings and limitations.

**Data Synthesis:** Appraised study methodological quality was used, in conjunction with a narrative approach, to synthesize the evidence. The review found weak, but suggestive, evidence for a positive association between perceived patient involvement in decision-making - a central dimension of shared decision-making - and quality of life outcomes in cancer. The review did not find evidence for an inverse association between shared decision-making and quality of life.

**Limitations:** The poor methodological quality and heterogeneity of the extant literature constrains the derived conclusions. In addition, the literature commonly treated various subscales of quality of life instruments as separate outcomes, increasing the probability of spurious findings.

**Conclusions:** There is weak evidence that aspects of shared decision-making approaches are positively associated with quality of life outcomes and very little evidence of a deleterious effect. The extant literature largely assesses patient involvement, only capturing one aspect of the shared decision-making construct, and is of relatively poor quality, necessitating robust studies examining the association.

**Introduction**

The patient-physician interaction is in part defined by informational inequality. This disconnect is particularly salient in treatment decision-making. While physicians usually hold more clinical information, patients know more about the ways in which their personal lives, values and preferences are likely to interact with treatment. Moreover, in formulating treatment plans, medical systems must confront the competing demands posed by efficacy, efficiency, and patient autonomy.

Shared decision-making (SDM) is one approach to clinical decision-making. The paradigm calls for a partnership between patients and clinicians. Decision-making is effected as a process wherein the clinical knowledge of clinicians is intermeshed with the values and preferences held by patients. (1-3) SDM has been broadly espoused as ideal. The Institute of Medicine in the United States has proclaimed SDM a goal of patient-centered care (4) and the optimal approach to clinical decision-making. The emphasis on SDM among healthcare policy-makers has led to a shift toward this paradigm, particularly in Western countries.(5-7) In recent decades, there also has been growing recognition that the primary objective of health care is the maintenance and improvement of quality of life (QOL), a paradigm referred to as the ‘Outcomes Model’ of healthcare.(8)

***Shared decision-making in cancer***

The treatment of cancers is a crucial field for the study of clinical decision-making. Indeed, neoplasms are often lethal; the stakes for treatment are high and this elevates the importance of decision-making regarding treatment. In addition, treatment often presents several options with equivalent or uncertain effectiveness. This rules out clinical decision-making purely on the basis of avowedly objective biomedical knowledge and permits patient preferences to more strongly influence decision-making. (9) Finally, even in cases where one treatment option is known to offer better survival outcomes, there may be marked trade-offs between outcomes such as survival and QOL.(10)

Chemotherapy is associated with fatigue, hair loss and nausea and is known to negatively impact QOL. (11) Moreover, there are psychological side effects associated with drug toxicities related to treatment.(12, 13) Radiation therapy is also associated with severe negative consequences for QOL.(14) Overall, the QOL of cancer patients has been shown to decrease during treatment and for the first few months after the initiation of treatment.(15, 16)

A number of theoretical pathways have been suggested to link SDM approaches with QOL outcomes in cancer. The General Health Polity Model hypothesizes that empowered patients use their self-knowledge to select options that maximize their well-being. (17) A second theory, rooted in the biopsychosocial perspective, points to the known positive health impact of perceived control and the finding that blaming others is associated with poor coping and worse QOL outcomes.(18, 19) By extension, it is hypothesized that involved patients perceive greater control and therefore experience better QOL outcomes. Third, theories rooted in behavioral perspectives suggest that SDM will result in better patient and clinician engagement with treatment and thereby produce better QOL outcomes. (20) These theoretical mechanisms are illustrated in Figure 1.

SDM has also been hypothesized to result in negative QOL outcomes. From a biopsychosocial perspective, SDM may negatively affect QOL if engaging in decision-making results in elevated patient anxiety.(18, 19) Cancer patients also may be overburdened by the complexity of clinical information and the responsibility of sharing the decision-making process.(21) Furthermore, if treatment proves unsuccessful, participation may create feelings of self-blame and regret that may further impair QOL.(22, 23) The uncertainty necessitates an evidence synthesis to formally assess the impact of SDM on QOL in cancer. As such, this review aims to review the literature exploring the association between SDM with regards to treatment and QOL outcomes in cancer, and to identify the variables that moderate this association.

[Insert **Figure 1** Mechanisms hypothesized to mediate the association between SDM and QOL]

**Methods**

***Searching***

In June and July 2014, 13 bibliographic databases and grey literature sources were searched using search terms for ‘shared decision making,’ ‘quality of life’ and ‘cancer’. The databases searched included: Cochrane Database of Systematic Reviews, Embase + Embase Classic, MEDLINE, PsycINFO, Web of Science, CINAHL Plus, PsycEXTRA, Open Grey, New York Academy of Medicine Grey Literature Report, RAND Corporation, National Institute for Health and Care Excellence, Institute of Medicine, and Google. The searches were not limited by date, but were confined to papers published in English. The searches were re-run in November 2014 for any recently-published relevant literature. In addition, the journals *Quality of Life Research* and *Medical Decision Making* were hand searched, from February 1992-November 2014, and February 1981-November 2014, respectively. Finally, all references from included studies were screened for additional relevant studies. The full search strategy is presented in the appendix.

Studies assessing SDM and QOL were included in this review. Studies referenced these constructs directly or through the synonyms identified in the appendix.

*Inclusion criteria*

All retrieved studies were evaluated according to title and abstract for adherence to the following, pre-specified eligibility criteria. Those passing this initial screening were subsequently screened in full-text.

*Participants:* was the study population comprised of adults (≥18 years) with a first-time diagnosis of cancer? The age restriction was meant to minimize the potentially distorting effect of parental co-option of decision-making. Restriction to first-time diagnosis of cancer was meant to eliminate the effect of experiences gained during the previous episode of diagnosis.

*Setting:* did the study concern decision-making within the context of cancer treatment? Studies conducted in all recruitment and care settings were included in the analysis.

*Explanatory variable:* did the study measure patient participation in cancer treatment decision-making? A formal definition of SDM based on the model proposed by Charles et al. was utilized. (9) This definition calls for four minimally necessary criteria: 1) involvement of at least two parties-the physician and patient; 2) both patients and physicians must actively contribute to the process of treatment specification; 3) bilateral exchange of information; 4) mutual agreement between the patient and physician regarding the treatment decision. Interventional studies manipulating the variable, or observational studies assessing outcomes associated with varying levels of the construct, were admissible. Moreover, included studies needed to assess SDM either as an examined variable in an observational study or as the sole modified variable in an interventional study. The latter restriction was intended to allow for a discrete assessment of the impact of SDM on QOL.

*Outcome variable:* did the study assess QOL as a variable, using either a cross-sectional or longitudinal measure? Quality of life was conceptualized as a measure of patient well-being and two approaches to operationalizing the construct were permitted: 1) a measure that minimally assesses the physical, mental and social domains of functioning; and 2) a single holistic general health measure.

*Study design:* did the study use a comparative design? Non-comparative designs such as case series and exploratory research were excluded from the review.

Five percent of abstracts (N=834) were independently screened by two reviewers; differences were resolved by discussion. Dual screening was used to assess the reliability of the study selection method. The remaining references were screened by one reviewer. Any queries were discussed by both reviewers and resolved by consensus.

***Quality appraisal, data extraction and analysis***

The design characteristics of all included studies were assessed using quality assessment tools adapted from the United Kingdom’s National Institute for Health and Care Excellence (NICE).(24) The utilized checklist is drawn from NICE guidelines which have been broadly used to guide policy decision-making. The checklists aim to appraise the four broad dimensions of participant characteristics, study characteristics, outcomes, and analytic methods. Each study was awarded an overall score, based on the NICE scoring guidelines, of low, intermediate or high quality. The checklist tool used to assess cohort studies is presented in the appendix. The checklists used to assess cross-sectional studies and trials were close adaptations of this tool. The various items on the checklist were scored on a categorical scale. This scale is described in further detail in the appendix. Scores assigned to checklist items were then used to guide a holistic assessment of study internal and external validity. This latter assessment was not subject to score thresholds and was determined holistically using section scores derived from the checklists.

Data extraction was effected using standardized forms drawn from a Cochrane review.(25) The tool extracted data on each study’s methods, participants, setting, study or intervention description, outcomes, main findings, secondary findings and limitations.

Dual, independent quality appraisal and data extraction was conducted for five of the identified studies. The remaining studies were independently appraised and had data extracted by a single reviewer; a second reviewer checked for accuracy and any disagreements were resolved by discussion.

A meta-analysis was not undertaken due to the heterogeneity in QOL measurement. A narrative synthesis was undertaken to integrate the relevant evidence. Specifically, the synthesis notes the direction of the observed effects in conjunction with appraised methodological quality.

***Funding***

This study had no external funding source.

**Results**

***Search results***

Seventeen studies were included in the analysis; Figure 2 shows the flow of literature through the review.

[Insert **Figure 2** Flow of literature through the review]

***Quality assessment***

The large number of cross-sectional studies, constituting over half (9/17) of all included studies, meant that internal validity was generally poor. Only two studies were assessed as having a low risk of bias for internal validity. The external validity of the literature was moderate but variable. Completed quality appraisal checklists for all included studies are available from the authors on request.

***Study characteristics***

The reviewed literature included three experimental studies, including one randomized controlled trial (RCT) (26) and two quasi-experimental studies.(27, 28) Fourteen observational studies were also identified, including nine cross-sectional surveys (29-36) and five prospective cohort studies.(37-41) Measures of SDM in included observational studies largely took the form of questionnaires assessing perceived patient involvement in treatment decision-making. The reviewed studies were conducted in the USA (N=7), the Netherlands (N=3), Canada (N=2), Korea (N=2), Norway (N=1), Germany (N=1) and both in Australia and Canada (N=1). The QOL measures fell in two broad categories: general health measures assessing holistic QOL and disease-specific measures focusing on areas of functioning impacted by the relevant cancer type. Both of these measures were operationalized as questionnaires with attached rating scales. Questions included those assessing perceived well-being and queries inquiring about specific functional capacities. The characteristics and findings of the reviewed literature are summarized in Table 1.

***Participant characteristics***

A total of 5,060 participants were involved in the included studies. 681 participants (13.5%) were included in studies of experimental design and 4379 participants (86.5%) were enrolled in studies of observational design, reflecting the much greater relative size of the observational literature examining the topic. The reporting of demographic information was variable. Reporting of age and gender distribution was mostly complete, while studies reported less frequently on variables such as ethnicity, income and education.

[Insert **Table 1** Summary of study characteristics and findings]

***Evaluation of SDM-QOL association***

Ten of the seventeen studies included in the review found a positive association between decision role and at least one QOL outcome. (27, 29-34, 36-38) Observed effect directions are summarized in Table 2. The “Direction of Effect” column states the number of included studies showing each association type between SDM and QOL (positive, negative or no association). The “Direction Adjusted by Quality Score” column was derived by numerically weighing each study according to its assessed internal validity score (++: 3, +: 2, -: 1) and summing the resultant values to determine the strength of the evidence supporting each effect direction. This determination allows for a pseudo-quantitative synthesis of the literature.

[Insert **Table 2** Comparative assessment of the association between SDM and QOL]

***Association with generic QOL***

Seven cross-sectional surveys assessed the association with regard to generic QOL outcomes (as opposed to disease-specific quality of life measures). One found no association between treatment SDM and generic QOL.(42) Two surveys found better overall generic QOL for patients assuming more active treatment decision roles.(32, 33) The remainder had mixed findings. One survey found that SDM is associated with improved outcomes on the global health status and existential QOL subscales,(34) another found an association with improved outcomes on the general health and the vitality QOL subscales.(29) A survey assessing the association with generic QOL found that an active decision role predicted better physical functioning.(31) Finally, a survey found an association between SDM and improved outcomes on the mental health subscale.(30) These four latter surveys had null findings for associations pertaining to other subscales of generic QOL.

Five prospective cohort studies examined the relationship between SDM and generic QOL. Four of these studies found no effect of SDM on generic QOL outcomes during any of the follow-up intervals. (37, 39-41). On the other hand, Schou et al. found that participation in treatment decision-making was associated with better physical, social and cognitive functioning at 3 months and with better physical and role functioning at 12 months. (38)

Two quasi-experimental studies also examined the association between SDM and generic QOL. One found that the SDM intervention was associated with better generic QOL, (27) while the other found no relationship between study arm and generic QOL outcomes.(28). Finally, a single RCT examined the association between SDM and generic QOL; the study found no effect of the intervention on generic QOL outcomes. (26)

***Association with disease-specific QOL***

Three cross-sectional surveys examined the association with disease-specific QOL. One found better disease-specific QOL outcomes for more involved breast and prostate cancer patients.(33) Another survey found better QOL with respect to a single disease-specific subscale – urinary – among prostate cancer patients who reported active involvement in treatment decision-making and null findings for other subscales.(36). Finally, a survey reported no association between treatment SDM and quality of life in a palliative cancer care setting. (36)

Two prospective cohort studies examined the association between SDM and disease-specific QOL in cancer. One observed no association between SDM and head and neck cancer specific QOL (40) while the other found SDM positively associated with prostate cancer specific well-being. (37)

Two quasi-experimental studies assessed the impact of interventions inducing SDM on disease-specific QOL. One study reported better breast cancer specific QOL for the intervention group.(27) The other reported no differences in disease-specific QOL outcomes across the study arms.(28)

***Secondary review outcomes***

Three of the included studies examined factors associated with patient involvement in decision-making. All of these studies were of observational design, with one prospective cohort study (41) and two cross-sectional studies. (30, 34) All three found that younger age was associated with greater involvement in treatment decision-making.(29, 32, 37) One study found that higher income and more education were associated with greater decisional involvement.(29) One found that less severe disease was associated with greater involvement in treatment decision-making.(37)

**Discussion**

***Main findings***

The review examined the association between treatment shared decision-making and QOL among cancer patients and retrieved seventeen studies that met pre-specified inclusion and exclusion criteria. The reviewed literature used a wide range of generic and disease-specific instruments to measure QOL outcomes. Outcome measures were too heterogeneous to permit a meta-analysis. The studies were instead synthesized in narrative fashion. There was weak evidence for a positive association between SDM and QOL outcomes. As illustrated in Table 2, the bulk of the literature found either no association or a positive association between SDM and QOL. These tentative findings should be treated with caution since the summary synthesis method does not account for the literature’s commonplace use of each QOL subscale as a separate outcome. This inflates the potential for type I error and suggests that the evidence for enhanced QOL associated with SDM is even weaker than suggested by the summary presented in Table 2. Moreover, the observed heterogeneity in the operationalization of SDM and the commonplace use of patient involvement as a proxy for SDM in observational studies further constrain the conclusions.

***Secondary findings***

Only a small number of studies also examined variables that may moderate the effect of SDM on QOL outcomes. As such, the ability to explore the degree to which any of these variables may have moderated the association between SDM and QOL was limited. The likely confounders identified by the review were variables associated with involvement in decision-making in observational studies. The review found support for an association between younger age, higher income and less severe disease and greater involvement in decision-making. The strongest evidence linked younger age with greater involvement and the remaining variables found support only in individual studies. These findings suggest that these variables will need to be controlled in future assessments of the association between SDM and QOL. Moreover, comparative analysis of the study findings offers suggestive evidence for the role of ethnic background as a moderating variable. Indeed, the only study that noted a negative association between SDM and QOL was conducted in an exclusively African-American sample. (36) This conforms to the hypothesis suggesting ethnic differences in the impact of SDM (43) and merits further investigation.

***Interpretation and implications***

There is very little evidence of a negative association between SDM and QOL and suggestive evidence of a positive association between the two constructs. The implementation of SDM approaches may ultimately be beyond the scope of this assessment and the lack of evidence of impaired QOL may be sufficient to justify SDM methods, particularly considering patient preferences for SDM. The information age has created more educated and better-informed patients who now have radically altered expectations with respect to health care. (44) Patients increasingly view and conduct themselves as consumers of health services.(45) Patients overwhelmingly prefer some involvement in treatment decision-making (46) and this finding has been found to apply cross-culturally.(47) Hence, the implementation of SDM may ultimately be necessitated by patient demand rather than clinical utility. Moreover, SDM has been convincingly shown to increase patient clinical knowledge, reduce decisional conflict and improve satisfaction. (48)

The mixed findings derived from the studies included in this review call for further research examining this topic. In particular, there is a need for RCTs that examine QOL outcomes over follow-up periods exceeding 12 months. Outcomes pertaining to a chronic disease such as cancer must ideally be assessed over an extended time period. A long-term measure would optimally capture both the immediate and distal impact of SDM. It is also important to power these studies specifically to investigate the SDM-QOL association; only a single study included in this review was powered (power = 80%, α = 0.05) to examine this relationship.(27) There is a need for better standardization with regard to measures of patient involvement in decision-making and the outcome measures used to assess QOL outcomes in cancer. There is also a need for reviews that explicitly examine potential moderating variables. None of the reviewed studies empirically examined mechanisms linking SDM and QOL. The elucidation of the mechanisms driving any observed effect is crucial since the divergent models identified in the Introduction bear radically different implications. (49)

The implementation of SDM paradigms is another instance of the tension between the clinical and epidemiological perspectives. It has been noted that health systems around the world are already under serious stress, with primary care consultations in the USA often restricted to 15 minutes.(2) The implementation of SDM is therefore characterized by potential opportunity costs. The use of SDM paradigms might therefore ultimately require value judgments and compromises.

***Strengths and limitations of the review***

This review has a number of strengths. The use of a sensitive search strategy and inclusive study selection criteria reduce publication bias and allow for a comprehensive assessment of the study questions. In addition, the systematic review was guided by external standards drawn from the NICE methods manual (24) and the PRISMA statement. (50) These guidelines enhance both the quality and the applicability of the review. The review also benefitted from the use of formal quality assessment tools in guiding its interpretation of findings. This approach allowed for the examination of a broad cross-section of the literature while accounting for variability in the validity of the included studies.

This review had a number of limitations. First, the quality of the extant literature is poor, with more than half of the included studies of cross-sectional design. Second, there was a great deal of heterogeneity regarding the operationalization of SDM and the outcome measures used to assess QOL. The former reduces the cohesion of the literature and the comparability of the included studies while the latter precludes meta-analytic approaches and thereby hampers synthesis. Moreover, the inherent conceptual heterogeneity of SDM and QOL hampers a comprehensive assessment of the literature and can limit the derived findings. Third, the inflation of type I error caused by multiple testing broadly impacted the literature. In particular, the various subscales of QOL instruments are commonly treated as separate outcomes and this increases the probability of spurious findings. Fourth, the immense conceptual scope of the examined constructs may have impaired the sensitivity of the search. It is conceivable that studies assessing these underlying constructs using hitherto unidentified terms may have been missed by the utilized search strategy. Fifth, non-participation biases in QOL studies in cancer could skew outcomes and reduce external validity, with the most impaired patients refusing to participate. However, there is some evidence to suggest that this is not a significant effect. (51)

SDM is quickly becoming the dominant paradigm for treatment decision-making in cancer. At the same time, the rise of the Outcomes Model of health care has made QOL a vitally important measure.(8) These concurrent trends have necessitated efforts to assess the impact of SDM on QOL outcomes. There is weak evidence that aspects of SDM approaches are positively associated with QOL outcomes and very little evidence of a deleterious effect. The weak evidence for a positive association between aspects of SDM and QOL is further constrained by the heterogeneity in the study definitions of SDM. In particular, the observational literature examining this topic largely assesses patient involvement as its exposure variable and therefore only captures part of the SDM construct. Overall, the current literature is generally of poor methodological quality and predominantly set in high-income countries. This latter observation is relevant since SDM preferences have been found to vary across socio-economic strata (52) and across cultures.(53) The literature is also plagued by heterogeneity with regard to both the operationalization of SDM and the measurement of QOL outcomes.

A number of studies found suggestive evidence pointing to variables moderating the association between SDM and QOL. In particular, age, income and disease severity were identified as potential moderating variables. The review findings motivate the undertaking of better designed studies with well-defined outcome and SDM measures.

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**Table 1** Summary of study characteristics and findings

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Participants** | **Follow-up** | **Quality**  **score\*** | **QOL measure**† | **Comparators/Exposures** | **Primary findings** |
| Randomized controlled trial | | | | | | |
| Leighl et al.  2011 (26) | Disease: Metastatic colorectal cancer  N: 207  Mean Age: 62 years  Ethnicity: Not reported  Gender: ~62% male  Country: Canada/ Australia | 4 weeks | ++/+ | FACT-G  (Generic) | Standard consultation [control] vs. Standard consultation + decision aid (booklet and audiotape/disc facilitating SDM) [Intervention] | Patients completed the physical, emotional and functional subscales of the FACT-G scale. There was little evidence of a difference in QOL scores across the study arms |
| Quasi-experimental | | | | | | |
| Molenaar et al.  2001 (27) | Disease: Early-stage breast cancer  N: 180  Mean Age: 55.4 years  Ethnicity: Not reported  Gender: Female  Country: Netherlands | 9 months | ++/+ | MOS20/ EORTC  QLQ-BR23  (Generic/ Disease-specific) | Standard care [control] vs. Standard care + decision aid (interactive CDROM facilitating SDM) [Intervention] | The intervention had an overall positive effect on both generic QOL and breast cancer specific QOL |
| Tol-Geerdink et al.  2008 (28) | Disease: Early-stage prostate cancer  N: 294  Mean Age: 69.9 years  Ethnicity: Not reported  Gender: Male  Country: Netherlands | 6 months | +/+ | Health  rating scale / EORTC QLQ-PR25  (Generic/ Disease-specific) | Fixed treatment dose [control] vs. Decision aid pertaining to treatment dose selection (semi structured interview facilitating SDM [Intervention] | The arm involved in decision-making did not show any different QOL outcomes |
| Prospective cohort | | | | | | |
| Street & Voigt  1997 (39) | Disease: Early-stage breast cancer  N: 60  Mean Age: 60.8 years  Ethnicity: 93% white  Gender: Female  Country: USA | 12 months | +/- | FACT-B  (Generic) | Perceived treatment choice at time of decision vs. Didn’t perceive treatment choice at time of decision | Perceived decision control at the time of the decision did not predict later QOL along any of the four subscales (physical, functional, emotional and social) |
| Schou et al.  2005 (38) | Disease: Early-stage breast cancer  N: 195  Mean Age: 56 years  Ethnicity: Not reported  Gender: Female  Country: Norway | 12 months | +/- | EORTC QLQ-C30  (Generic) | Reported receiving treatment choice vs. Reported not receiving treatment choice | Participation in treatment decision-making was associated with better physical and role functioning |
| Giedzinska-Simons  2007 (37) | Disease: Prostate cancer  N: 72  Mean Age: 62.6 years  Ethnicity: 95% white  Gender: Male  Country: USA | 1 month | +/- | FACT-G/ FACT-P  (Generic/ Disease-specific) | Reported involvement in treatment decision-making vs. Didn’t report involvement in treatment decision-making | Patient involvement in treatment decision-making did not predict any of the generic QOL outcomes but did independently predict prostate cancer well-being |
| Vogel et al.  2009 (41) | Disease: Non-metastatic breast cancer  N: 135  Mean Age: 54 years  Ethnicity: Not reported  Gender: Female  Country: Germany | 6 months | +/+ | EORTC QLQ-C30  (Generic) | Reported decision role with regard to treatment decision: Passive vs. Collaborative vs. Active | Actual level of involvement in decision-making was not associated with QOL scores |
| Suzuki  2012 (40) | Disease: Head and neck cancer  N: 52  Mean Age: 58 years  Ethnicity: 42.3% Caucasian, 38.5% African-American  Gender: 71% male  Country: USA | 6 weeks | +/- | FACT-H&N  (Generic/Disease-specific) | Level of perceived involvement at the time of treatment decision (measured using a categorical ordinal variable) | In a hierarchical linear regression model, pre-treatment levels of perceived involvement in treatment decision-making did not predict QOL at follow-up |
| Cross-sectional | | | | | | |
| Jansen et al.  2004 (42) | Disease: Early-stage breast cancer  N: 448  Mean Age: ~58 years  Ethnicity: Not reported  Gender: Female  Country: Netherlands | N/A | -/+ | Visual Analogue Scale/ EuroQol  (Generic) | Perceived involvement in treatment decision-making: Yes vs. No | No overall effect of perceived choice on QOL |
| Hack et al.  2006 (32) | Disease: Mostly early-stage breast cancer  N: 205  Mean Age: 59.5 years  Ethnicity: 38% English/Canadian, 11.2% Ukrainian, 8.3% French, 42.5% ‘Other’  Gender: Female  Country: Canada | N/A | -/+ | EORTC QLQ-C30  (Generic) | Perceived decision role at the time of treatment: Passive vs. Collaborative vs. Active | Those actively involved in choosing their surgical treatment had significantly higher overall QOL (mean score, 78.9; S.D., 15.6) than patients who indicated collaborative (mean score, 72.7; S.D., 22.4) or passive (mean score, 68.9, S.D., 18.0) roles |
| Kim et al.  2008 (34) | Disease: Stage I-III stomach cancer  N: 432  Mean Age: Not reported.  80% 22-64 years  Ethnicity: Not reported  Gender: 73% male  Country: Korea | N/A | -/++ | MQOL/ EORTC QLQ-C30  (Generic) | Perceived involvement in treatment decision-making: Yes vs. No | Subjects involved in decision-making reported better global health status/QOL on QLQ-C30 and better existential MQOL subscale scores but similar scores on other subscales |
| Andersen et al.  2009 (29) | Disease: Stage I-IV breast cancer  N: 636  Mean Age: 55 years  Ethnicity: 83% white  Gender: Female  Country: USA | N/A | -/++ | SF-36  (Generic) | Perceived participation in treatment decision-making (assessed using a 3-tier ordinal categorical variable and analysed using regression) | Involvement in decision-making predicted QOL on the general health and vitality subscales |
| Hack et al.  2010 (33) | Disease: Breast or prostate cancer  N: 1057  Mean Age: 56.5 years (breast), 67.4 years (prostate)  Ethnicity: Not reported  Gender: 60% Female  Country: Canada | 12 weeks | -/++ | FACT-B/ FACT-P  (Generic/Disease-specific) | Perceived decisional role: Passive vs. Collaborative vs. Active | Active decisional role predicted better outcomes on the emotional and functional scales of FACT-B and on FACT-G scores |
| Andersen et al.  2012 (30) | Disease: Ovarian cancer (mostly advanced)  N: 219  Mean Age: 62.6 years  Ethnicity: 86% white  Gender: Female  Country: USA | N/A | -/+ | SF-36  (Generic) | Perceived participation in treatment decision-making (assessed using a 3-tier ordinal categorical variable and analysed using regression) | After controlling for demographic, disease and treatment variables, there was no statistically significant association for involvement in decision-making overall. However, involvement in decision-making regarding surgery was associated with better mental health |
| Mo et al.  2012 (35) | Disease: Terminal cancers (11+ types)  N: 93  Mean Age: 59.2 years  Ethnicity: Not reported  Gender: 55.9% male  Country: Korea | N/A | -/+ | EORTC QLQ-C15 PAL  (Disease-specific) | Full involvement in treatment decision-making (“Yes” to both awareness of diagnosis and involvement in treatment decision) vs. No full involvement in treatment decision-making (“No” to either) | There was a trend toward better quality of life in the less involved patient group but this did not reach statistical significance |
| Atherton et al.  2013 (31) | Disease: 10 common cancer types  N: 594  Mean Age: Not reported.  54% >60 years  Ethnicity: 97.5% white  Gender: 54% female  Country: USA | N/A | -/++ | SF-36  (Generic) | Perceived role in treatment decision-making: Passive vs. Collaborative vs. Active | Active decision-making role was associated with higher physical component scale scores and higher physical index scores, but was not associated with mental component scale scores |
| Palmer et al.  2013 (36) | Disease: Prostate cancer  N: 181  Mean Age: 61.3 years  Ethnicity: African-American  Gender: Male  Country: USA | N/A | -/++ | EPIC  (Disease-specific) | Perceived role in treatment decision-making: Passive vs. Collaborative vs. Active | Controlling for treatment type, marital status and education, active participants reported lower overall urinary subscale scores. Though not significant for the other scales, passive patients had higher scores on all EPIC domains with the exception of sexual function |

\* Quality scores assessed according to adapted NICE appraisal checklists; left score: internal validity; right score: external validity. Study quality was scored on a three-tier scale with the following demarcations: “-” = low quality, “+” = intermediate quality, “++” = high quality.

† Refers to the outcome measure used to assess QOL.

**Table 2** Comparative assessment of the association between SDM and QOL

|  |  |  |
| --- | --- | --- |
| **QOL Type** | **Direction of Effect\*** | **Direction Adjusted by Quality Score†** |
| Generic | ↑ : 8 studies | ↑ : 11 points |
| ↔ : 6 studies | ↔ : 12 points |
| ↓ : 0 studies | ↓ : 0 points |
|  | | |
| **QOL Type** | **Direction of Effect\*** | **Direction Adjusted by Quality Score†** |
| Disease-specific | ↑ : 3 studies | ↑ : 7 points |
| ↔ : 3 studies | ↔ : 4 points |
| ↓ : 1 studies | ↓ : 1 point |

\*: Direction of the association between SDM and QOL (↑: positive, ↔ : no effect, ↓ : negative)

† : Summed scores adjusted by assessed internal validity (++ : 3 points , + : 2 points, - : 1 point)

**Figure 1** Mechanisms hypothesized to mediate the association between SDM and QOL

**General Health Polity Model**

Patient selection of care options that correspond to personal values and preferences

Improved QOL outcomes

Note: Treatment suitability is case-by-case and so an improvement may be observed in the absence of overall differences in treatment mode

Patient participation in treatment decision-making

Increase in perceived patient anxiety

Increase in perceived patient control

Improved QOL outcomes

Worse QOL outcomes

**Biopsychosocial Model**

Alteration in patient behaviors (i.e. increased clinical compliance)

Improvement in health outcomes, including QOL outcomes

**Behavioral Model**

**Figure 2** Flow of literature through the review

**Records identified through database searching**   
(n = 16,686)

## Screening

## Included

## Eligibility

## Identification

**Additional records identified through other sources**   
(n = 40)

**Records screened**   
(n = 16,726)

**Records excluded**(n=16,408)

**Full-text articles assessed for eligibility**(n = 318)

**Full-text articles excluded**(n = 274)

**Studies meeting eligibility criteria**(n = 44)

**Unique studies included in synthesis**(n = 17)

**Duplicates removed**(n = 27)

**Appendix – Search Strategies**

**Cochrane Database of Systematic Reviews**

(shared decision making OR SDM OR shared decision-making OR shared-decision-making OR patient participation OR participatory decision\* OR informed decision making OR informed decision-making OR informed-decision-making OR decision aid\*) AND (cancer OR oncology OR neoplasm\* OR carcinoma OR hodgkin\* OR leukemia OR leukaemia OR lymphoma OR melanoma OR metastatic OR tumo\* OR sarcoma\*) AND (quality of life OR QOL OR HRQoL OR well-being OR satisfaction OR functional status OR health status OR HRQL OR quality adjusted life year\* OR QALY\* OR health state OR health\* year\* equivalent\* OR HYE\* OR life quality OR utilit\* OR short form 36 OR SF-36 OR short form 12 OR SF-12 OR euroqol OR EQ-5D OR QWB OR health utilities index OR HUI OR medical outcomes survey OR MOS OR Rosser OR time trade off OR TTO OR standard gamble)

**Embase + Embase Classic**

(shared decision making OR SDM OR shared decision-making OR shared-decision-making OR patient participation OR participatory decision\* OR informed decision making OR informed decision-making OR informed-decision-making OR decision aid\* OR exp decision making/) AND (cancer OR oncology OR neoplasm\* OR carcinoma OR hodgkin\* OR leukemia OR leukaemia OR lymphoma OR melanoma OR metastatic OR tumo\* OR sarcoma\* or exp neoplasm/) AND (quality of life OR QOL OR HRQoL OR well-being OR satisfaction OR functional status OR health status OR HRQL OR quality adjusted life year\* OR QALY\* OR health state OR health\* year\* equivalent\* OR HYE\* OR life quality OR utilit\* OR short form 36 OR SF-36 OR short form 12 OR SF-12 OR euroqol OR EQ-5D OR QWB OR health utilities index OR HUI OR medical outcomes survey OR MOS OR Rosser OR time trade off OR TTO OR standard gamble OR exp neoplasm/)

**Medline**

(shared decision making OR SDM OR shared decision-making OR shared-decision-making OR patient participation OR participatory decision\* OR informed decision making OR informed decision-making OR informed-decision-making OR decision aid\* OR exp Decision Making/ OR exp Decision Support Techniques) AND (cancer OR oncology OR neoplasm\* OR carcinoma OR hodgkin\* OR leukemia OR leukaemia OR lymphoma OR melanoma OR metastatic OR tumo\* OR sarcoma\*OR exp Neoplasms/)

AND (quality of life OR QOL OR HRQoL OR well-being OR satisfaction OR functional status OR health status OR HRQL OR quality adjusted life year\* OR QALY\* OR health state OR health\* year\* equivalent\* OR HYE\* OR life quality OR utilit\* OR short form 36 OR SF-36 OR short form 12 OR SF-12 OR euroqol OR EQ-5D OR QWB OR health utilities index OR HUI OR medical outcomes survey OR MOS OR Rosser OR time trade off OR TTO OR standard gamble OR exp "Quality of Life"/)

**PsycINFO**

(shared decision making OR SDM OR shared decision-making OR shared-decision-making OR patient participation OR participatory decision\* OR informed decision making OR informed decision-making OR informed-decision-making OR decision aid\* OR exp Decision Making/ OR exp Decision Support Systems/ OR exp Client Participation/) AND (cancer OR oncology OR neoplasm\* OR carcinoma OR hodgkin\* OR leukemia OR leukaemia OR lymphoma OR melanoma OR metastatic OR tumo\* OR sarcoma\* OR exp Neoplasms/) AND (quality of life OR QOL OR HRQoL OR well-being OR satisfaction OR functional status OR health status OR HRQL OR quality adjusted life year\* OR QALY\* OR health state OR health\* year\* equivalent\* OR HYE\* OR life quality OR utilit\* OR short form 36 OR SF-36 OR short form 12 OR SF-12 OR euroqol OR EQ-5D OR QWB OR health utilities index OR HUI OR medical outcomes survey OR MOS OR Rosser OR time trade off OR TTO OR standard gamble OR exp "Quality of Life"/)

**Web of Science**

(shared decision making OR SDM OR shared decision-making OR shared-decision-making OR patient participation OR participatory decision\* OR informed decision making OR informed decision-making OR informed-decision-making OR decision aid\*) AND (cancer OR oncology OR neoplasm\* OR carcinoma OR hodgkin\* OR leukemia OR leukaemia OR lymphoma OR melanoma OR metastatic OR tumo\* OR sarcoma\*) AND (quality of life OR QOL OR HRQoL OR well-being OR satisfaction OR functional status OR health status OR HRQL OR quality adjusted life year\* OR QALY\* OR health state OR health\* year\* equivalent\* OR HYE\* OR life quality OR utilit\* OR short form 36 OR SF-36 OR short form 12 OR SF-12 OR euroqol OR EQ-5D OR QWB OR health utilities index OR HUI OR medical outcomes survey OR MOS OR Rosser OR time trade off OR TTO OR standard gamble)

**CINAHL Plus**

(shared decision making OR SDM OR shared decision-making OR shared-decision-making OR patient participation OR participatory decision\* OR informed decision making OR informed decision-making OR informed-decision-making OR decision aid\*) AND (cancer OR oncology OR neoplasm\* OR carcinoma OR hodgkin\* OR leukemia OR leukaemia OR lymphoma OR melanoma OR metastatic OR tumo\* OR sarcoma\*) AND (quality of life OR QOL OR HRQoL OR well-being OR satisfaction OR functional status OR health status OR HRQL OR quality adjusted life year\* OR QALY\* OR health state OR health\* year\* equivalent\* OR HYE\* OR life quality OR utilit\* OR short form 36 OR SF-36 OR short form 12 OR SF-12 OR euroqol OR EQ-5D OR QWB OR health utilities index OR HUI OR medical outcomes survey OR MOS OR Rosser OR time trade off OR TTO OR standard gamble)

**PsycEXTRA**

(shared decision making OR SDM OR shared decision-making OR shared-decision-making OR patient participation or participatory decision\* OR informed decision making OR informed decision-making or informed-decision-making or decision aid\* OR exp Client Participation/ OR exp Decision Making/ OR exp Decision Support Systems/) AND cancer OR oncology OR neoplasm\* OR carcinoma OR hodgkin\* OR leukemia OR leukaemia OR lymphoma OR melanoma OR metastatic OR tumo\* OR sarcoma\* OR exp Neoplasms/) AND (quality of life OR QOL OR HRQoL OR well-being OR satisfaction OR functional status OR health status OR HRQL OR quality adjusted life year\* OR QALY\* OR health state OR health\* year\* equivalent\* OR HYE\* OR life quality OR utilit\* OR short form 36 OR SF-36 OR short form 12 OR SF-12 OR euroqol OR EQ-5D OR QWB OR health utilities index OR HUI OR medical outcomes survey OR MOS OR Rosser OR time trade off OR TTO OR standard gamble OR exp "Quality of Life"/)

**Open Grey, New York Academy of Medicine Grey Literature Report, RAND Corporation, National Institute for Health and Care Excellence, Institute of Medicine**

shared decision making AND cancer

**Google**

shared decision making AND quality of life AND cancer

**Quality Appraisal Scoring Guidelines**

|  |  |
| --- | --- |
| **++** | The study minimises the risk of bias with respect to the referenced aspect of design. All or the most important aspects of the dimension have been addressed. |
| **+** | Indicates that design quality is not clear from the way the study is reported, or that the study may not have accounted for all potential sources of bias for that particular aspect of study design. The design dimension has been partly addressed and for aspects which have not been fully addressed, this failure is unlikely to have significantly altered study findings. |
| **−** | Substantial sources of bias may persist. All or nearly all referenced dimensions have not been addressed and findings are likely to have been significantly altered. |
| **Not reported (NR)** | The study fails to report how this aspect of study design was handled or implemented. |
| **Not applicable (NA)** | The referenced design dimension is not applicable for the particular study under review. |

|  |  |  |
| --- | --- | --- |
| **Study identification:** |  | |
| **Study design:** |  | |
| **Section 1: Population** | | |
| **1.1 Is the source population or source area well described?** |  | Comments: |
| **1.2 Is the eligible population or area representative of the source population or area?** |  | Comments: |
| **1.3 Do the selected participants or areas represent the eligible population or area?** |  | Comments: |
| **Section 2: Method of selection of exposure (or comparison) group** | | |
| **2.1 Selection of exposure (and comparison) group. How was selection bias minimised?** |  | Comments: |
| **2.2 Was the contamination acceptably low?** |  | Comments: |
| **2.3 How well were likely confounding factors identified and controlled?** |  | Comments: |
| **2.4 Is the setting applicable to the region?** |  | Comments: |
| **Section 3: Outcomes** | | |
| **3.1 Were the outcome measures and procedures reliable?** |  | Comments: |
| **3.2 Were the outcome measurements complete?** |  | Comments: |
| **3.3 Were all the important outcomes assessed?** |  | Comments: |
| **3.4 Was there a similar follow-up time in exposure and comparison groups?** |  | Comments: |
| **3.5 Was follow-up time meaningful?** |  | Comments: |
| **Section 4: Analyses** | | |
| **4.1 Was the study sufficiently powered to detect an intervention effect (if one exists)?** |  | Comments: |
| **4.2 Were multiple explanatory variables considered in the analyses?** |  | Comments: |
| **4.3 Were the analytical methods appropriate?** |  | Comments: |
| **4.4 Was the precision of association given or calculable? Is association meaningful?** |  | Comments: |
| **Section 5: Summary** | | |
| **5.1 Are the study results internally valid (i.e. unbiased)?** |  | Comments: |
| **5.2 Are the findings generalisable to the source population (i.e. externally valid)?** |  | Comments: |