

INVITED EDITORIAL

New challenges in psycho-oncology: Economic evaluation of psychosocial services in cancer: Challenges and best practice recommendations

Haitham Tuffaha^{1,2}  | Najwan El-Saifi^{1,2}  | Suzanne Chambers^{1,3}  | Paul Scuffham^{1,2} 

¹Griffith University Menzies Health Institute Queensland, Nathan, Queensland, Australia

²Griffith University Centre for Applied Health Economics, Nathan, Queensland, Australia

³Faculty of Health, University of Technology Sydney, Sydney, New South Wales, Australia

Correspondence

Haitham Tuffaha, Centre for Applied Health Economics, School of Medicine, Griffith University, Nathan, 4111 QLD, Australia.

Email: haitham.tuffaha@griffith.edu.au

KEYWORDS

cancer, costs and cost analysis, distress, evaluation, health economics, oncology, psycho-oncology, psychosocial, psychotherapy, review

1 | INTRODUCTION

A substantial proportion of cancer patients experience heightened psychological distress that may include anxiety, depression, fear of cancer recurrence, and cancer-specific distress.^{1,2} Improving psychological outcomes of cancer patients across the continuum of care (ie, from diagnosis to survivorship) is a key aspect of oncology care, and as such there is an increasing expectation and requirement that cancer care service providers assess and address patients' psychosocial needs.³ These services vary in complexity depending on the level of psychosocial support required, care setting, and resource availability.⁴ There is a large body of evidence demonstrating the effectiveness of psychosocial care interventions in reducing depression and anxiety and improving quality of life of cancer patients.⁵⁻⁷ Nevertheless, and due to increasing health care costs, decision makers require evidence on the cost-effectiveness (ie, value for money) of new services before they can make decisions to fund and implement them in practice. Economic evaluations are increasingly performed to generate evidence about the value for money of new health care interventions.

Economic evaluation involves the comparative analysis of the costs and consequences of alternative options.⁸ There are four types of economic evaluations: cost-minimization analysis, cost-effectiveness analysis, cost-utility analysis, and cost-benefit analysis.⁸ Cost-minimization analysis assumes that the evaluated interventions have equivalent outcomes but different costs, and accordingly, the decision can be made on the basis of the difference in total cost alone. In cost-effectiveness analysis, however, the incremental costs are compared with the incremental outcomes, as measured in natural units (eg, life-years gained, unit improvement in Symptom Distress Scale). A disadvantage of cost-

effectiveness analysis is that it does not enable direct comparison of interventions treating different conditions with different outcomes. In cost-utility analysis, outcomes are expressed as quality-adjusted life-years (QALYs) gained. The QALY adjusts the length of time gained through an intervention by the quality of life associated with health status.⁸ Given that cost-utility analysis uses a generic outcome measure (ie, QALY), it allows decision makers to compare different interventions for different conditions. In cost-effectiveness and cost-utility analyses, the incremental benefits and costs are generally expressed as the incremental cost-effectiveness ratio (ICER) which is the difference in cost divided by the difference in health effect between the evaluated interventions. The ICER must be compared with the decision maker's willingness-to-pay threshold which, in a limited budget health care system, represents the opportunity cost of health benefits forgone elsewhere from the investment in the new intervention.⁸ An alternative approach to using an ICER is to estimate the incremental net monetary benefit, which is the increase in effect multiplied by the willingness-to-pay-threshold, less the increase in cost. The new intervention is considered cost-effective if the incremental net benefit is positive. An analysis that measures both the costs and outcomes in monetary units is called cost-benefit analysis.

2 | ECONOMIC EVALUATIONS OF PSYCHOSOCIAL INTERVENTIONS IN CANCER

We have identified three systematic reviews of economic evaluation studies of psychosocial interventions in cancer (details in

Appendix).⁹⁻¹¹ Gordon et al reviewed the evidence on the economic value of psychosocial interventions to alleviate anxiety and depression among cancer survivors.¹⁰ Dieng et al conducted a systematic review to assess the cost-effectiveness of psychosocial interventions for improving psychological adjustment among people with cancer.⁹ More recently, Jansen et al reviewed the current evidence on the cost-effectiveness and cost-utility of psychosocial care interventions in cancer patients.¹¹ The three reviews found that there are relatively limited numbers of cost-effectiveness studies of psychosocial services for cancer patients in the literature. The most recent review in 2016 by Jansen et al identified only 11 studies, reflecting the relatively small number of economic evaluations in this field.¹¹ Generally speaking, most of the reviewed psychosocial interventions were likely to be cost-effective; however, none of the reviews made a conclusive recommendation about the most cost-effective type of psychosocial intervention because of the heterogeneity in the interventions and populations evaluated.⁹⁻¹¹ A number of limitations and challenges have been identified in the reported evaluations, particularly around the lack of clear economic question posed, the high dependence on designing and conducting economic evaluation alongside a single clinical trial, the narrow scope in measuring costs, the limited application of cost-utility analysis using QALYs gained as a health outcome, and the quality of economic evaluation reporting. Table 1 summarizes key limitations and challenges reported in the literature reviews of cost-effectiveness studies of psychosocial interventions. Improving the quality of the design, conduct and reporting of the economic evaluation of psychosocial services in oncology will strengthen the evidence to guide decisions on the funding and incorporation of these services in cancer care programs. Therefore, the purpose of this paper is to discuss these limitations and challenges and provide recommendations to improve the quality of economic evaluations in this field.

2.1 | The health economics question

The incremental costs and consequences of an intervention compared with existing alternatives depend on the characteristics of the population(s) or subgroups who will benefit from the intervention, the specifications of the interventions compared, the time duration over which the costs and consequences will occur, and to whom these costs and consequences accrue (ie, perspective). Therefore, a health economic question should clearly state the target population(s) of the intervention, the alternatives being compared (ie, comparators), the perspective of the analysis, and the time horizon to examine both the costs and consequences.^{12,13} A clear and well-defined question will inform the type and design of the economic evaluation as well as the relevant costs and consequences that will be included in the analysis. Importantly, this question should relate to the decision-making context; that is, what decision it is intended to inform and for which decision maker. For instance, the economic evaluation might be intended to guide a decision to fund a psychosocial service by a local hospital or group of hospitals (eg, a National Health Service Trust in the UK), or to inform a reimbursement decision by a national body (eg, Medicare Benefit Schedule in Australia). Unfortunately, the majority of the economic evaluations were piggybacked on clinical trials to “demonstrate”

the cost-effectiveness of the studied services without a clear link to a decision problem or decision-making context. Failing to understand the decision-making context and decision maker's needs will affect the usefulness of any economic evaluation to support decisions on psychosocial oncology services.

It should be acknowledged; however, that we are increasingly witnessing more complexity in the design and delivery of psychosocial services. We often see multicomponent services that are delivered by multidisciplinary teams to target one or more oncology populations.^{4,14} For instance, Duarte et al evaluated the cost-effectiveness of a collaborative care program for major depression in patients with cancer.¹⁵ This service was delivered by cancer nurses supervised by psychiatrists who worked collaboratively with the oncology team and primary care physician. The service comprised establishing a therapeutic relationship with the patients, providing information about depression and its treatment, delivering brief evidence-based psychological interventions, and monitoring patients' progress.¹⁵ In this case, it would be challenging to define the comparator since usual care may include any or a combination of the modules provided. Furthermore, it is unclear which component of the service contributes most to the costs and outcomes or which outcomes of the service are most relevant (eg, cost saving, health outcomes, or improved patient experience). One solution in dealing with this complexity is to engage with decision makers and key stakeholders to develop a clear and relevant health economics question, and to adopt a comprehensive approach in identifying, measuring, and evaluating relevant costs and outcomes.

2.2 | Economic evaluation design and conduct

Most of the economic evaluations of psychosocial interventions were conducted alongside clinical trials. Of the 11 studies identified in the systematic review by Jansen and colleagues, nine studies were conducted alongside a single randomized controlled trial while only two studies used a decision analytic model.¹¹ In economic evaluations alongside trials, all resources used by patients, such as hospital admissions, diagnostic tests, and medications are identified, measured, valued, and recorded for each patient over the trial follow-up and according to the perspective of the economic evaluation. In addition, all outcomes relevant to the research question are measured and costs are assigned to the resources used. Both costs and outcomes are then averaged across all patients in the different trial arms to obtain mean cost and mean outcome for each group.^{12,16}

An important challenge in the design of economic evaluations alongside clinical trials is that the sample sizes of these trials are often calculated based on the primary clinical outcomes and not economic outcomes (eg, costs or QALYs); consequently, the economic comparisons can be underpowered. Whilst it is possible to have formal hypotheses for economic analyses, this approach is not recommended, and its use is limited. Drummond and colleagues have argued that the purpose of an economic evaluation is to inform decisions rather than to make inference.⁸ They have criticized the high dependence on the size of the *P* value to accept or reject an intervention as it is unlikely for clinical trials to be powered to find a statistically significant difference in economic outcomes.⁸ Moreover, there is a risk of substantial

TABLE 1 Summary of literature reviews of economic evaluations of psychosocial services in cancer

Review/Year	Aim	Included Studies	Key Results	Issues Identified
Gordon et al ¹⁰ 2011	To assess the cost effectiveness of psychosocial approaches treating depression and/or anxiety in patients with cancer	Jacobsen et al (2002), Lemieux et al (2006), Mandelblatt et al (2008), Ritz et al (2000), Strong et al (2008).	<ul style="list-style-type: none"> - most interventions showed improvements in some psychological outcomes. - three studies reported slightly but not significantly higher health care costs for their intervention than their comparison groups. 	<ul style="list-style-type: none"> - the results of the review studies were inconclusive and subject to a lack of transparent reporting. - the studies were weakened by omitting some resource types and the lack of power to detect meaningful cost differences. - the studies generally focused on health outcomes and costs in 1 year and the sustainability of intervention benefits were not assessed.
Dieng et al ⁹ 2016	To conduct a systematic review to assess the cost-effectiveness of psychosocial interventions for improving psychological adjustment among people with cancer.	Arving et al (2014), Bares et al (2002), Gordon et al (2005), Kimman et al (2011), Lemieux et al (2006), Mandelblatt et al (2008), Sabariego et al (2011), Strong et al (2008).	<ul style="list-style-type: none"> - six studies reported psychosocial interventions to be cost-effective for improving health-related quality of life, mood, pain, distress or fear of cancer progression, compared with usual care. - of the six psychosocial interventions identified as cost-effective, three were cognitive-behavioral therapy-based interventions. 	<ul style="list-style-type: none"> - no conclusive recommendation for the most cost-effective type of psychosocial intervention could be provided. - there was a lack of clearly defined economic questions in most of the studies. - all included studies were within-trial economic evaluations - the category costs were narrow in scope - limited use of the QALYs as an outcome. - lack of transparency and consistency in reporting the methods and findings of economic evaluations.
Jansen et al ¹¹ 2016	To evaluate current evidence from studies investigating cost-effectiveness or cost-utility of psychosocial care in cancer patients	Arving et al (2014), Chatterton et al (2016), Choi Yoo et al (2014), Duarte et al (2015), Lemieux et al (2006), Lengacher et al (2015), Mandelblatt et al (2008), Mewes et al (2015), Sabariego et al (2011), Strong et al (2008), Walker et al (2014)	<ul style="list-style-type: none"> - psychosocial care is likely to be cost-effective at different, potentially acceptable, willingness-to-pay thresholds. - two studies found that costs were lower while the intervention was more effective. - one study showed lower costs in the psychosocial intervention (cognitive behavioral therapy) group compared with the control group while effectiveness was almost equal. - the other eight studies found that psychosocial care is more effective albeit at higher costs. 	<ul style="list-style-type: none"> - no clear conclusions can be drawn regarding the most cost-effective psychosocial service due to heterogeneity among studies. - societal perspective was not considered; none of the studies reported productivity losses. - limited use of the QALY as an outcome measure.

Abbreviation: QALY, quality-adjusted life-years.

losses to the health system when a cost-effective service is rejected based on lack of statistical significance.⁸ Thus, the recommended approach is to estimate the cost-effectiveness of interventions and to conduct appropriate sensitivity analysis to characterize and present uncertainty to decision makers.^{8,12} Recently, Bayesian approaches, such as value of information analysis, have been proposed as an alternative to sample size calculations and to characterize and measure decision uncertainty.¹⁷

Another limitation of depending on a single clinical trial to conduct economic evaluation is the poor external validity (ie,

generalizability) of the results.¹² Clinical trials are typically designed to evaluate the efficacy of interventions but not the effectiveness or cost-effectiveness of the interventions in real-world practice. For example, what is considered a usual or standard care in a clinical trial may not be the standard of care in practice. Furthermore, clinical trials have restrictions regarding the inclusion and exclusion criteria of participants together with protocol-driven costs and outcomes data collection, and thus, the data from a given trial population may not be generalizable to other populations and or jurisdictions.¹² In addition, the follow-up time in clinical trials may not be long enough to capture

all relevant costs and outcomes.¹² For instance, most of the psychosocial interventions identified had follow-up durations from 6 to 12 months.¹² Pragmatic trial designs can offer some compromise between the goals of internal validity and generalizability; these trials help evaluate effectiveness and cost effectiveness of an intervention under something closer to real-world conditions. Nevertheless, pragmatic trials cannot overcome all limitations of conducting economic evaluations alongside clinical trials (eg, the short follow-up duration).^{8,12}

A preferred approach of informing decision making is to use decision-analytic models where trial-based data are coupled with full evidence synthesis. A decision model provides an appropriate structure to describe the decision problem and the impact of all relevant parameters under evaluation. Within this framework, all existing relevant evidence can be brought together and translated into estimates of the costs and outcomes for the evaluated interventions to inform the cost-effective option.^{8,12} For example, Walker et al used the best available evidence to estimate the cost-effectiveness, from the perspective of a budget-constrained health care system, of systematic integrated management of cancer patients with co-morbid major depression compared with usual practice.¹⁸ They constructed a model consisting of two linked parts: the first represented the process of identification of depressed patients from the cancer population; and the second captured patient outcomes and costs over a time horizon of 5 years including the effects of depression treatments. Evidence was taken from reviews of relevant clinical trials and from observational studies, together with data from a large depression screening service.¹⁸

2.3 | The scope of resource use and costs

All important and relevant costs should be included in the evaluation to obtain reliable cost-effectiveness results. The relevance and importance of these costs are driven by the description of the psychosocial service and the evaluation perspective. This could be the perspective of the patient, the health system, or the society. In a societal perspective, all costs and health effects are considered regardless of who incurs the costs and who obtains the effects.^{8,13} In general, costs should include direct medical and nonmedical costs as well as indirect costs. Direct medical costs are expenses related to the medical condition or intervention (eg, visits to health care provider, treatments). Direct non-medical costs refer to costs that are borne by patients and their caregivers while receiving health care (eg, cost of traveling to a clinic). Indirect non-medical costs refer to the resources forgone due to the medical condition or the intervention (eg, lost productivity due to absence from work). Usually, economic evaluations take health system perspective, and hence, the focus is typically on direct medical costs.^{8,13} For instance, all studies included in the review by Dieng and colleagues reported direct medical costs, including treatment costs, outpatient hospital visits, and hospitalization costs, but only three studies reported indirect medical costs such as lost production in terms of both paid work and domestic tasks.⁹ Indirect costs can be particularly substantial if the psychosocial intervention requires considerable commitments of

patients and their caregivers (especially for those of working age), and therefore, their inclusion in economic evaluations is increasingly recommended to avoid misleading conclusions.^{8,9} The Second Panel on Cost-Effectiveness in Health recommended in their updated Cost Effectiveness Analysis guidelines that all economic evaluations should report results from both the health service and societal perspectives.¹³

Nevertheless, taking a societal perspective by including all direct and indirect costs may be a cumbersome and costly approach for the research team. Therefore, it is advised to prioritize high costs as well as those that are expected to differ between the alternative services compared.^{8,12} Furthermore, to enhance this process and to improve comparability across studies, standardization of cost variables captured from both the health service perspective and societal perspective is recommended. For instance, a minimum set of costs should include the costs to develop and run the psychosocial service (eg, staff training, offices, educational material), the cost of health and social care utilization (eg, counseling sessions), out-of-pocket costs borne by patients and caregivers to receive care (eg, travel cost), and the costs of productivity loss. We recommend that secondary data be used to capture direct medical costs (eg, using electronic health records or claims). In the absence of these or when it is difficult to link data from various sources, diaries can be developed to help patient recall and record their health care utilization (eg, visits to hospital) as well as their out-of-pocket expenses and time off work to receive treatment. There are validated instruments to capture direct and indirect costs. The Database of Instruments for Resource Use Measurement, for example, is an open-access database of resource-use questionnaires.¹⁹ Additionally, a number of instruments have been developed to measure health related productivity loss such as the iMTA Productivity Cost Questionnaire.^{20,21}

2.4 | Limited application of cost-utility analysis using QALYs

Several economic evaluations of psychosocial interventions reported ICERs based on psychological outcomes such as anxiety, coping, pain, distress, and mood.⁹⁻¹¹ For example, Mandelblatt et al evaluated the cost effectiveness of psycho-educational counseling in improving distress in women treated with surgery for breast cancer and reported the results in terms of the additional cost per unit improvement in the Revised Impact of Events Scale.²² However, this type of cost-effectiveness analysis is narrowed to a single outcome of interest which may not be sufficient to capture all benefits of psychosocial interventions. Furthermore, it would be hard to compare the cost-effectiveness of various psychosocial interventions addressing different outcomes. Therefore, it is recommended to conduct cost-utility analyses whereby incremental benefits are expressed in QALYs gained as a standard measure of health outcome. The QALY adjusts the length of time gained through an intervention by the utility value of the resulting health status. Utility values range from zero (ie, death) to one (ie, perfect health).^{8,23,24} These utility weights can be obtained practically using generic (ie, not disease specific) multi-attribute utility instruments (MAUIs) which comprise a self-reported health-related

quality of life (HRQoL) instrument and an algorithm to transform the HRQL scores on to a utility scale.^{8,23,24}

A commonly used MAUI in oncology is the EQ-5D which assesses five attributes of HRQL (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression)²⁵; other instruments include Short Form 6D,²⁶ Health Utilities Index,²⁷ and the Assessment of Quality of Life (AQoL).²⁸ Among the few cost-utility studies of psychosocial services, the EQ-5D was used by Strong et al to evaluate nurse-delivered collaborative care for the management of depression,²⁹ Duarte et al who evaluated the cost-effectiveness of a collaborative care program for major depression,¹⁵ and most recently by van der Spek et al who assessed the cost-effectiveness of meaning-centred group psychotherapy for cancer survivors.³⁰ Chatterton et al used the AQoL-8D in the economic evaluation of a psychological intervention for high distress cancer patients and caregivers.³¹ Nevertheless, these instruments are generic (ie, not disease specific), and therefore, their ability to accurately measure HRQoL in cancer patients is questionable.⁸ This is why researchers may prefer to use disease specific questionnaires to measure HRQoL such as the Functional Assessment of Cancer Therapy-Breast Cancer scale or the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire QLQ-C30; however, these are not preference-based instrument and thus cannot be used directly to estimate utility weights. One solution is to map cancer-specific non-preference-based questionnaires to preference-based measures.³² For example, Arving and colleagues used a published algorithm to transform QLQ-C30 scores into EQ-5D values to calculate QALYs gained in their economic evaluation of psychosocial support interventions for breast cancer patients.³³ Nevertheless, developing mapping algorithms can be methodologically challenging and the estimates obtained are often uncertain. An alternative emerging approach is the development of cancer-specific preference-based measures. Currently, there are two such instruments, the EORTC-8D and the QLU-C10D,^{34,35} both were developed based on the QLQ-C30 questionnaire. The EORTC recommends the use of the new QLU-C10D instrument over the EORTC-8D, as it has broader dimensions and was developed using a broader cancer population; however, additional work is required to generate valuations (ie, weights) and to validate this instrument.²⁴ Of note is that for the QLU-C10D, an Australian utility scoring algorithm was published recently.³⁶ Scoring algorithms for utility weights should be based on the population preferences of the country where the decision making will occur. Therefore, we expect many additional algorithms to be developed for the USA, UK, and other countries in the future.

Despite the wide acceptance of QALYs as a measure of health outcome in economic evaluations, there are a number of issues that should be considered when conducting cost-utility analyses of psychosocial interventions for cancer patients. Firstly, not all health systems accept the assessment of cost-effectiveness based on incremental cost per QALY gained. For instance, the Institute for Quality and Efficiency in health care in Germany considers the cost effectiveness of new technologies within a specific disease area based on disease specific outcomes.⁸ Similarly, the focus of evaluations in the US is the comparative effectiveness of interventions rather than cost-effectiveness although there is an increasing interest

in cost-utility analysis by certain organizations in the US such as the Institute for Clinical and Economic Review. Thus, it is important to consider the decision context and the requirements by decision makers before embarking in this analysis. Secondly, that decision context is also essential to consider when selecting the best instrument to estimate QALYs. Until the new cancer specific preference-based instruments are validated, we recommend the use of generic MAUIs, since these are validated, widely used in economic evaluations, have country specific weights and have been translated to different languages. In choosing a generic MAUI, the instrument used should be fit for purpose to adequately measure the changes in HRQoL across the interventions of interest in the sense that its attributes (ie, dimensions) should cover the attributes important to the patient population, the condition, and the decision maker.^{8,23,24} For psychosocial services, we recommend using either the AQoL-8D or EQ-5D. However, the AQoL-8D is preferred over the EQ-5D in patients with complex psychosocial needs, since five of its eight dimensions relate to psychosocial health (Coping, Relationships, Self-worth, Happiness, and Mental Health).³⁷ Thirdly, QALYs may not always capture the full benefits of the psychosocial cancer interventions, particularly those benefits that are not health related but are important to the patients, decision makers, and the society in general. Examples of these benefits include equity, patient experience with the process of care, and improved productivity by returning to work. Recently, there has been interest in moving beyond the QALY in an attempt to better capture benefits of cancer interventions.^{24,38} One approach for these additional aspects of benefit to be taken into account alongside QALYs is to monetise these using willingness-to-pay studies so that all benefits are expressed in monetary terms, which can be then compared with costs in a cost-benefit analysis.^{24,39} However, it might be challenging in practice to estimate the willingness-to-pay for certain elements such as equity or elimination of fear.

2.5 | Reporting of cost-effectiveness analyses

There has been an increasing interest in improving and standardizing the reporting of economic evaluation. This is important to communicate these evaluations to various audiences clearly and transparently and to allow better comparison of studies from different jurisdictions. The most prominent guidelines on the reporting of economic evaluations are the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) and the recommendations from the Second Panel on Cost-Effectiveness in Health and Medicine.^{13,40} The two guidelines provide reporting checklists for cost-effectiveness analyses. The reader can refer to the full checklists, but in summary, it is essential to provide (1) brief description of the decision problem and study objectives; (2) the health economics question in terms of the interventions, population(s), comparators, perspectives (ie, health system or societal), and time horizon; (3) study design (trial-based or model-based), key costs and outcomes data and their sources, and the discount rate applied for future costs and benefits (eg, 5% annual rate); (4) the base case results of the analysis and sensitivity analyses; (5) discussion of key findings, limitations, and implications;

and (6) key conclusions.^{13,40} Nevertheless, additional local or setting specific requirements (eg, by reimbursement body) should be also considered by researchers and analysts when reporting their economic evaluations.

3 | CONCLUSIONS AND RECOMMENDATIONS

There is an increasing need to evaluate the cost-effectiveness of psycho-oncology services in cancer to generate the necessary evidence to guide decision making. To be useful for this purpose, these evaluations should be of high quality and relevance to the decision-making needs. The following are general recommendations to improve the quality of the design, conduct, and reporting of economic evaluations of psychosocial services in cancer:

- Engagement with decision makers and stakeholders early in the design of economic evaluation is essential to align economic data collection and analysis with the decision-making contexts and needs. This should result in the development of a clear and well-defined health economics question.
- Depending on the health economic questions, a fit-for-purpose economic evaluation should be designed either using patient level data collected alongside clinical trials, or preferably, synthesizing evidence from various sources and using analytical modeling to estimate the long-term costs and outcomes of alternative options.
- All relevant and important costs should be collected including direct medical and relevant non-medical costs as well as and indirect costs. Using standardized forms and instruments is advisable to facilitate and streamline data collection.
- It is recommended to conduct cost-utility analyses whereby incremental benefits are expressed in QALYs gained as a standard measure of the health outcomes. To calculate QALYs, utilities can be obtained using a MAUI with the appropriate dimensions and levels to adequately measure the changes in HRQoL across the interventions of interest. Other benefits of the psychosocial service (eg, improved patient experience or equity) can be presented to decision makers to supplement the results of cost-utility analyses and better inform deliberations for decision making.
- The reporting of the economic evaluations should follow to the recommendations of the CHEERS statement and/or the recommendations from the Second Panel on Cost-Effectiveness in Health and Medicine.^{24,38}

ETHICS

Not applicable.

CONFLICT OF INTEREST

None declared.

ORCID

Haitham Tuffaha  <http://orcid.org/0000-0003-2993-3480>

Najwan El-Saifi  <http://orcid.org/0000-0002-4651-0810>

Suzanne Chambers  <http://orcid.org/0000-0003-2369-6111>

Paul Scuffham  <http://orcid.org/0000-0001-5931-642X>

REFERENCES

1. Thewes B, Kaal SEJ, Custers JAE, et al. Prevalence and correlates of high fear of cancer recurrence in late adolescents and young adults consulting a specialist adolescent and young adult (AYA) cancer service. Supportive care in cancer: official journal of the multinational association of. *Support Care Cancer*. 2018;26(5):1479-1487.
2. Walker J, Hansen CH, Martin P, et al. Prevalence, associations, and adequacy of treatment of major depression in patients with cancer: a cross-sectional analysis of routinely collected clinical data. *The Lancet Psychiatry*. 2014;1(5):343-350.
3. Holland J, Watson M, Dunn J. The IPOS new international standard of quality Cancer Care: integrating the psychosocial domain into routine care. *Psychooncology*. 2011;20(7):677-680.
4. Watson M, Dunn J. The multidisciplinary art and science of cancer care: integrating psycho-oncology. *Future oncology (London, England)*. 2016;12(24):2775-2778.
5. Chambers SK, Hyde MK, Smith DP, et al. New challenges in psycho-oncology research III: a systematic review of psychological interventions for prostate cancer survivors and their partners: clinical and research implications. *Psychooncology*. 2017;26(7):873-913.
6. Faller H, Schuler M, Richard M, Heckl U, Weis J, Kuffner R. Effects of psycho-oncologic interventions on emotional distress and quality of life in adult patients with cancer: systematic review and meta-analysis. *J Clin Oncol Off J Am Soc Clin Oncol*. 2013;31(6):782-793.
7. Parahoo K, McDonough S, McCaughan E, et al. Psychosocial interventions for men with prostate cancer: a Cochrane systematic review. *BJU Int*. 2015;116(2):174-183.
8. Drummond MFSM, Claxton K, Stoddart GL, Torrance GW. *Methods for the Economic Evaluation of Health Care Programmes*. Oxford:2015.
9. Dieng M, Cust AE, Kasparian NA, Mann GJ, Morton RL. Economic evaluations of psychosocial interventions in cancer: a systematic review. *Psychooncology*. 2016;25(12):1380-1392.
10. Gordon LG, Beesley VL, Scuffham PA. Evidence on the economic value of psychosocial interventions to alleviate anxiety and depression among cancer survivors: a systematic review. *Asia Pac J Clin Oncol*. 2011;7(2):96-105.
11. Jansen F, van Zwielen V, Coupe VM, Leemans CR, Verdonck-de Leeuw IMA. Review on cost-effectiveness and cost-utility of psychosocial care in cancer patients. *Asia Pac J Oncol Nurs*. 2016;3(2):125-136.
12. Ramsey SD, Willke RJ, Glick H, et al. Cost-effectiveness analysis alongside clinical trials II—an ISPOR good research practices task force report. *Value in health: the journal of the International Society for Pharmacoeconomics and Outcomes Research*. 2015;18(2):161-172.
13. Sanders GD, Neumann PJ, Basu A, et al. Recommendations for conduct, methodological practices, and reporting of cost-effectiveness analyses: second panel on cost-effectiveness in health and medicine. *JAMA*. 2016;316(10):1093-1103.
14. Tsiachristas A, Stein KV, Evers S, Rutten-van Molken M. Performing economic evaluation of integrated care: highway to hell or stairway to heaven? *Int J Integr Care*. 2016;16(4):3.
15. Duarte A, Walker J, Walker S, et al. Cost-effectiveness of integrated collaborative care for comorbid major depression in patients with cancer. *J Psychosom Res*. 2015;79(6):465-470.
16. Petrou S, Gray A. Economic evaluation alongside randomised controlled trials: design, conduct, analysis, and reporting. *BMJ (Clinical research ed)*. 2011;342(d561):1069-1073.

17. Tuffaha HW, Reynolds H, Gordon LG, Rickard CM, Scuffham PA. Value of information analysis optimizing future trial design from a pilot study on catheter securement devices. *Clinical trials (London, England)*. 2014;11(6):648-656.
18. Walker S, Walker J, Richardson G, et al. Cost-effectiveness of combining systematic identification and treatment of co-morbid major depression for people with chronic diseases: the example of cancer. *Psychol Med*. 2014;44(7):1451-1460.
19. The Database of Instruments for Resource Use Measurement [Available from: <http://www.dirum.org/>].
20. Bouwmans C, Krol M, Severens H, Koopmanschap M, Brouwer W, Hakkaart-van Roijen L. The iMTA Productivity Cost Questionnaire: A Standardized Instrument for Measuring and Valuing Health-Related Productivity Losses. *Value in health*. 2015;18(6):753-758.
21. Tang K. Estimating Productivity Costs in Health Economic Evaluations: A Review of Instruments and Psychometric Evidence. *Pharmacoeconomics*. 2015;33(1):31-48.
22. Mandelblatt JS, Cullen J, Lawrence WF, et al. Economic evaluation alongside a clinical trial of psycho-educational interventions to improve adjustment to survivorship among patients with breast cancer. *J Clin Oncol Off J Am Soc Clin Oncol*. 2008;26(10):1684-1690.
23. Blinman P, King M, Norman R, Viney R, Stockler MR. Preferences for cancer treatments: an overview of methods and applications in oncology. *Ann Oncol*. 2012;23(5):1104-1110.
24. Devlin NJ, Lorgelly PK. QALYs as a measure of value in cancer. *J Cancer Policy*. 2017;11:19-25.
25. Brooks R. EuroQol: the current state of play. *Health policy (Amsterdam, Netherlands)*. 1996;37(1):53-72.
26. Brazier J, Roberts J, Deverill M. The estimation of a preference-based measure of health from the SF-36. *J Health Econ*. 2002;21(2):271-292.
27. Horsman J, Furlong W, Feeny D, Torrance G. The health utilities index (HUI): concepts, measurement properties and applications. *Health Qual Life Outcomes*. 2003;1(1):54.
28. Hawthorne G, Richardson J, Osborne R. The Assessment of Quality of Life (AQoL) instrument: a psychometric measure of health-related quality of life. *Quality of life research: an international journal of quality of life aspects of treatment, care and rehabilitation*. 1999;8(3):209-224.
29. Strong V, Waters R, Hibberd C, et al. Management of depression for people with cancer (SMaRT oncology 1): a randomised trial. *Lancet (London, England)*. 2008;372(9632):40-48.
30. van der Spek N, Jansen F, Holtmaat K, et al. Cost-utility analysis of meaning-centered group psychotherapy for cancer survivors. *Psychooncology*. 2018;27(7):1772-1779.
31. Chatterton ML, Chambers S, Occhipinti S, et al. Economic evaluation of a psychological intervention for high distress cancer patients and carers: costs and quality-adjusted life years. *Psychooncology*. 2016;25(7):857-864.
32. Aaronson NK, Ahmedzai S, Bergman B, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. *JNCI: Journal of the National Cancer Institute*. 1993;85(5):365-376.
33. Arving C, Brandberg Y, Feldman I, Johansson B, Glimelius B. Cost-utility analysis of individual psychosocial support interventions for breast cancer patients in a randomized controlled study. *Psychooncology*. 2014;23(3):251-258.
34. Rowen D, Brazier J, Young T, et al. Deriving a preference-based measure for cancer using the EORTC QLQ-C30. *Value Health*. 2011;14(5):721-731.
35. King MT, Costa DSJ, Aaronson NK, et al. QLU-C10D: a health state classification system for a multi-attribute utility measure based on the EORTC QLQ-C30. *Qual Life Res*. 2016;25(3):625-636.
36. King MT, Viney R, Simon Pickard A, et al. Australian utility weights for the EORTC QLU-C10D, a multi-attribute utility instrument derived from the cancer-specific quality of life questionnaire, EORTC QLQ-C30. *Pharmacoeconomics*. 2018;36(2):225-238.
37. Campbell JA, Hensher M, Neil A, et al. An exploratory study: a head-to-head comparison of the EQ-5D-5L and AQoL-8D for long-term publicly waitlisted bariatric surgery patients before and 3 months after bariatric surgery. *Pharmacoeconomics - open*. 2017.
38. Garrison LP Jr, Neumann PJ, Willke RJ, et al. A health economics approach to US value assessment frameworks—summary and recommendations of the ISPOR special task force report [7]. *Value in health: the journal of the International Society for Pharmacoeconomics and Outcomes Research*. 2018;21(2):161-165.
39. Wildman J, McMeekin P, Grieve E, Briggs A. Economic evaluation of integrated new technologies for health and social care: suggestions for policy makers, users and evaluators. *Soc Sci Med*. 2016;169:141-148.
40. Husereau D, Drummond M, Petrou S, et al. Consolidated Health Economic Evaluation Reporting Standards (CHEERS) statement. *BMJ (Clinical research ed)*. 2013;f1049:346.

How to cite this article: Tuffaha H, El-Saifi N, Chambers S, Scuffham P. New challenges in psycho-oncology: Economic evaluation of psychosocial services in cancer: Challenges and best practice recommendations. *Psycho-Oncology*. 2018;1-8. <https://doi.org/10.1002/pon.4933>

APPENDIX

A review of systematic review was undertaken to identify systematic reviews of economic evaluations of psychosocial interventions in cancer. Searches were conducted in PubMed, MEDLINE, EMBASE, CINAHL, PsycINFO, Cochrane library, and DARE (see Figure A1). Covering the period from January 2008 to September 2018 using the following search terms for title

(Cancer* OR neoplasm* OR tumor*) AND (psychosocial OR "cognitive and behavioural intervention" OR "patient education" OR psychotherapy OR "cognitive therapy" OR psychoeducation OR psychotherapy OR "social support" OR "supportive therapies" OR psychodynamics OR "psychoanalytic therapy") AND (cost-effectiveness OR "cost utility" OR "cost benefit" OR "cost analysis" OR "costs and cost analysis"). MeSH terms included: *neoplasms, patient education, psychoanalytic therapy, psychotherapy, supportive therapies, social support, psycho education, cognitive therapy, costs and cost analysis, and health care utilization*.

Searches were limited to full-text, English language articles involving humans.

Titles and abstracts of retrieved articles were screened by two independent reviewers (H.T., N.E.S.) against the following inclusion criteria; review of articles on economic evaluations of psychosocial interventions, where the economic evaluations' limitations were reported. Extracted information included authors, year, aim, studies included within the review, main results, and a summary of the economic evaluation issues identified.

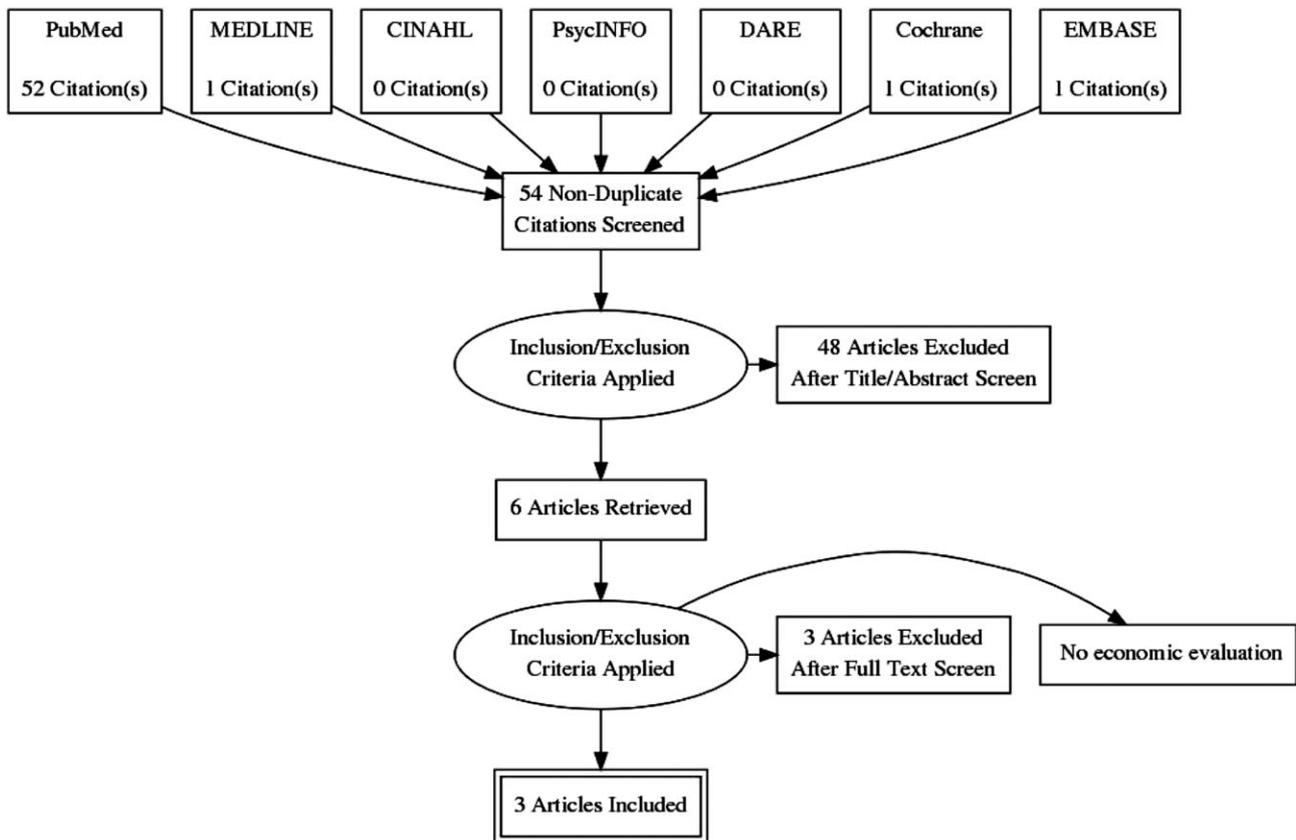


FIGURE A1 Flowchart of the literature search