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PAPER

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Cost-utility analysis of meaning-centered group psychotherapy for cancer survivors

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Abstract

Background: Meaning-centered group psychotherapy for cancer survivors (MCGP-CS) improves meaning, psychological well-being, and mental adjustment to cancer and reduces psychological distress. This randomized controlled trial was conducted to investigate the cost-utility of MCGP-CS compared with supportive group psychotherapy (SGP) and care-as-usual (CAU).

Methods: In total, 170 patients were randomized to MCGP-CS, SGP, or CAU. Intervention costs, direct medical and nonmedical costs, productivity losses, and health-related quality of life were measured until 6 months follow-up, using the TIC-P, PRODISQ, data from the hospital information system, and the EQ-5D. The cost-utility was calculated by comparing mean cumulative costs and quality-adjusted life years (QALYs).

Results: Mean total costs ranged from €4492 (MCGP-CS) to €5304 (CAU). Mean QALYs ranged .507 (CAU) to .540 (MCGP-CS). MCGP-CS had a probability of 74% to be both less costly and more effective than CAU, and 49% compared with SGP. Sensitivity analyses showed these findings are robust. If society is willing to pay €0 for one gained QALY, MCGP-CS has a 78% probability of being cost-effective compared with CAU. This increases to 85% and 92% at willingness-to-pay thresholds of €10 000 and €30 000, which are commonly accepted thresholds.

Conclusions: MCGP-CS is highly likely a cost-effective intervention, meaning that there is a positive balance between the costs and gains of MCGP-CS, in comparison with SGP and CAU.

KEYWORDS

cancer, cost-effectiveness, cost-utility analysis, existential, group psychotherapy, MCGP, meaning, meaning-centered psychotherapy, oncology, psychotherapy

1 | INTRODUCTION

Due to continuing innovations in the detection and treatment of cancer, more and more cancer patients become long-term survivors.[1] However, often cancer survivorship comes with long-lasting hindrances in the patient's life, such as limitations of activities in daily living, physical limitations, work-related problems, and psychological problems.[2] Several interventions have been shown to be effective in improving these problems, including psychological interventions.[3] Carlson and Bultz[4] argued that psychological treatment is effective

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and potentially leads to a decrease in health care use in cancer patients and may therefore be a corner stone in cost-effective cancer care, to meet the growing need for psychosocial oncology care. However, economic evaluations of psychosocial interventions for cancer patients altogether are scarce.[5]

Meaning-centered group psychotherapy (MCGP) was developed to sustain or enhance a sense of meaning in advanced cancer patients and has shown to be effective in increasing spiritual well-being and quality of life and reducing hopelessness, depression, and desire for hastened death.[6]

Recently, a randomized controlled trial was conducted to evaluate the efficacy of meaning-centered group psychotherapy for cancer survivors (MCGP-CS).[7] This study showed that MCGP-CS, compared with supportive group psychotherapy (SGP) and care-as-usual (CAU), was effective in improving sense of meaning, psychological well-being, and mental adjustment to cancer, and to reduce psychological distress up until 6 months after intervention. The evidence of beneficial effects of meaning-focused interventions is growing,[6,8-12] yet no studies have been performed from an economical perspective. A cost-utility analysis (CUA) is a method that analyses the ratio between the costs and the gains of an intervention. The gains in these analyses are expressed as quality-adjusted life years (QALYs), meaning the number of years with improved quality of life for an individual that are gained because of the intervention. The outcomes of CUAs are used, by, for instance, policy makers, as a tool to compare health care interventions in terms of costs and benefits. The aim of the present study was to evaluate the cost-utility of MCGP-CS in comparison with SGP and CAU among cancer survivors, within the context of a randomized trial (RCT).

2 | METHODS

2.1 | Setting and participants

The trial was performed in the Netherlands from August 2012 to May 2015; approval was obtained from the Medical Ethical Committee of the Leiden University Medical Center. Participants were recruited via hospitals and public media. Inclusion criteria were cancer diagnosis in the last 5 years, treated with curative intent, main treatment completed, ability to attend all therapy sessions, expressed need for psychological help/support, and at least one psychosocial complaint (eg, depressed mood, anxiety, coping issues, life questions, meaning making problems, and relationship problems). Exclusion criteria were severe cognitive impairment, current psychological treatment, and insufficient mastery of Dutch language. The study protocol and results on the efficacy of MCGP-CS were published elsewhere.[7,13]

2.2 | Design and randomization

Economic data were collected alongside the RCT at baseline, and at 3 and 6 months follow-up.[7,13] This study was a 3-study arm RCT with computer-generated block randomization that was prepared by an independent researcher. Participants were allocated to a group. When the group counted between 7 and 10 survivors, the group was randomly assigned by the independent researcher using a list of sequentially numbered allocations to one of the 3 study arms. Participants and psychotherapists were aware of the allocated arm, whereas data managers were blinded to the allocation.

2.3 | Meaning-centered group psychotherapy for cancer survivors

The experimental study arm was MCGP-CS, a manualized 8-week group intervention that makes use of didactics, group discussion, and experiential exercises that focus around themes related to meaning and cancer survivorship. This intervention is an adaptation of MCGP for advanced cancer patients. The sessions took 2 hours each and were held weekly; most sessions address a source of meaning, eg, creativity as source of meaning. The participants used a workbook and received homework assignments every week. MCGP-CS was led by a psychotherapist with experience in treating patients with cancer. The main purpose of the MCGP-CS is to sustain or enhance a sense of meaning or purpose in the patient's life, in order to cope better with the consequences of cancer.

2.4 | Supportive group psychotherapy

The control condition is an 8-week social support group, which does not focus on meaning.[14] The sessions took 2 hours and were held weekly; each session focusses on a relevant topic for survivors, such as vocational issues, coping with family and friend, and body image. Each group was supervised by a psychotherapist with experience in treating patients with cancer. The psychotherapist had an unconditionally positive regard and emphatic understanding, stimulated patients to actively share their experiences, and focused on positive emotions, and expression of feelings.

2.5 | Care-as-usual

Participants in the CAU study arm did not participate in one of the group interventions. If a patient in the CAU study arm asked for psychological help after allocation, he or she was referred to their general practitioner (GP).

2.6 | Outcome assessment

Patient Reported Outcome Measures (PROMs) measuring the efficacy of MCGP-CS were collected at all time points: baseline (T0), after 1 week (T1), 3 months (T2), and 6 months (T3). Cost evaluation outcomes were collected at T0, T2, and T3.

Direct medical and direct nonmedical cost data were collected with the Trimbos and iMTA questionnaire on Costs associated with Psychiatric illness (TiC-P).[15] The TiC-P measures the use of healthcare facilities (eg, number of visits to the GP) and other facilities (eg, participation in self-help groups or use of informal care) in the past 4 weeks, and medication use (ie, antidepressants, painkiller, and sedative) in the past 2 weeks. In addition, healthcare utilization within the hospital during the study (ie, visits to the medical specialist, day treatment, and hospital admission) was collected using the hospital information system. Unit resource use (GP visits, hospital days, etc) was multiplied by their appropriate integral cost prices.[16] Traveling costs to health care services, including parking costs, were calculated by multiplying

unit resource use by average distance to the location (eg, GP or hospital) times the price per km. All prices were adjusted to 2014 prices using the consumer price index.

Productivity losses through lost workdays (absenteeism) and reduced quantity or quality of performed paid work (presenteeism) were sampled with the appropriate modules of the Productivity and Disease Questionnaire (PRODISQ).[17] Productivity losses due to presenteeism was calculated by multiplying the days of less productivity at work by the estimated amount of lost quantity or quality of the performed work (ranging from 0 to 10 on a 10-point scale). Indirect no-medical costs due to absenteeism and presenteeism were calculated by multiplying productivity losses by respectively age and gender specific costs[16] using the human capital approach.

Health-related quality of life was assessed with the EuroQoL-5D (EQ-5D); the utility score was obtained using the Dutch index tariff.[18,19]

2.7 | Intervention costs

Intervention costs were calculated using a bottom-up approach. The costs of MCGP-CS per patient consisted of costs for intake by a psychotherapist (€21.98), direct time of a psychotherapist for the provision of eight 2-hour MCGP-CS sessions in groups of 8 (€175.87 per patient), indirect time of a psychotherapist of 1 hour per MCGP-CS session (€87.94 per patient), and costs of a workbook (€2.50). The costs of supportive group psychotherapy (SGP) were similar, minus the workbook costs. Total costs per patient were €288 for patients in the MCGP-CS group and €286 for patients in the SGP group.

2.8 | Statistical analyses

All analyses were performed using the IBM Statistical Package for the Social Science version 22 (IBM Corp, Armonk, NY, USA) and STATA version 12.1 (StataCorp LP, Texas, USA). Descriptive statistics were used to describe patient characteristics, costs, and EQ-5D utility scores.

To assess the cost-utility of MCGP-CS compared with SGP and with CAU, and the cost-utility of SGP compared with CAU, a base case intention-to-treat CUA was performed including all 170 patients. Missing data were imputed as total costs or utility score per time point per treatment arm using multiple imputation (predictive mean matching) by chained equations. Data were imputed only for those time points that were missing. Linear and logistic regression analyses were performed to investigate which variables (socio-demographic, clinical and several PROMs used for measuring the efficacy of MCGP-CS[13]) were associated with missing data, observed costs or EQ-5D utility scores. Variables that were found to be associated with missing data (Life Orientation Test-Revised total score), total cost (work situation, cancer type, time since last treatment, age, and MAC fighting spirit), or EQ-5D utility score (work situation, history of psychological treatment, gender, and Personal Meaning Profile (PMP) total score) were included in the multiple imputation model. In addition, variables found to differ statistically between the treatment groups at baseline (gender, The Ryff Scales of Psychological Well-Being (SPWB) positive relations, and spiritual change) were included in the multiple imputation model. Ten imputed datasets were created and analyzed separately. Results of the 10 analyses were pooled using Rubin's (1987) rules.[20]

Subsequently, cumulative costs and QALYs per patient were calculated. Costs between T0 and T3, as measured using the TIC-P and PRODISQ, were calculated for the 3 groups using linear interpolation, by summing costs in the last 4 weeks at time point T0 and multiplying by 2 for the time periods T0 to T1 (8 weeks), and summing the costs in the last 4 weeks at time points T2 and T3, multiplying by their corresponding time period of 3 months (respectively, T1 to T2 and T2 to T3). Total cumulative costs per patient were calculated by summing costs measured using the TIC-P and PRODISQ with intervention costs and costs measured using the hospital information system. The number of QALYs per patient was calculated by multiplying the EQ-5D utility score by the appropriate time period it accounts for using linear interpolation, with the same calculation as the cumulative costs.

An incremental cost-utility ratio for each of the comparisons (MCGP-CS vs CAU; MCGP-CS vs SGP; SGP vs CAU) was calculated by dividing the incremental costs by the incremental effects using the following formula: (mean $\text{Costs}_{\text{intervention}}$ − mean $\text{Costs}_{\text{comparator}}$)/(mean $\text{QALYs}_{\text{intervention}}$ − mean $\text{QALYs}_{\text{comparator}}$).

To study the impact of uncertainty on the cost and QALY estimates per treatment group, we used bootstrapping with 5000 replications. The results were projected on a cost-utility plane. In the cost-utility plane, we depicted the incremental costs between conditions (MCGP-CS vs CAU; MCGP-CS vs SGP; SGP vs CAU), on the y-axis, while the incremental QALYs were presented on the x-axis, resulting in 4 different quadrants. The northeast quadrant indicates that the intervention is more expensive and more effective compared with the control group, the southeast (SE) quadrant indicates that the intervention is less expensive and more effective, the southwest quadrant indicates that the intervention is less expensive and less effective, and finally, the northwest quadrant indicates that the intervention is more expensive and less effective. When the intervention is more effective but at additional costs (northeast quadrant), a trade-off has to be made between gained QALYs and additional costs. A cost-utility acceptability curve was therefore plotted, which presents the probability that the intervention is cost-effective compared with the control group for different willingness-to-pay thresholds for one QALY gained.

To assess the robustness of the findings of the base case analysis, 3 additional analyses were performed: (1) a complete cases CUA including only patients with complete data at all time points; (2) an intention to treat analysis in which costs and quality of life measured at T2 were hypothesized to be representative for the time periods T0 to T2 (instead of the T0 measurement in the base case intention-to-treat analyses); and (3) an analysis in which we investigated whether adjusting for variables at baseline (total costs at baseline, EQ-5D score at baseline, gender, SPWB positive relations, spiritual change, and employment status) had a major impact (a change of ≥20%) on incremental costs or incremental effects.

3 | RESULTS

Of the 184 eligible participants, 170 completed the baseline questionnaire and were randomly assigned to MCGP-CS (n = 57), SGP (n = 56),

or CAU (n = 57). There were no significant differences between the 3 groups, except for more males in the MCGP-CS condition (Table 1). In the SGP group, 1 patient deceased after randomization, but before the start of the intervention.

3.1 | Direct and indirect medical costs and productivity costs

In the 4 weeks prior to baseline assessment (T0), the total mean costs in the MCGP-CS group were €521 (SD = 1185), in the SGP group €478 (SD = 670), and in the CAU group €550 (SD = 1007) (*P* = .93). In all 3 groups, the productivity costs were the largest expense. For the mean costs per time point per study arm of the study participants, see Table S1.

3.2 | Health-related quality of life

There was no statistically significant difference in the EQ-5D utility scores between the 3 conditions at baseline (*P* = .99). For the mean EQ-5D utility scores per group per time point, see Table S1.

3.3 | Cost-utility analyses

Table 2 shows the results of the base case intention-to-treat CUA with imputed data (n = 170). There was no statistically significant difference in costs and QALYs between the 3 conditions. When comparing MCGP-CS to CAU, the incremental costs were €−812 (95% CI, −2830 to 1350), and the incremental effects were .033 (95% CI, −.007 to .074). The uncertainty surrounding this finding was assessed using bootstrapping and projected on a cost-utility plane

TABLE 1 Participant characteristics

	MCGP-CS (n = 57)	SGP (n = 56)	CAU (n = 57)	*P*	χ^2
Age, mean (SD)	58.6 (10.7)	55.5 (9.6)	57.3(10.4)	.340	2.58
Sex, female N (%)	40 (70%)[b]	49 (88%)	51 (90%)	.012	8.83
Level of education				.156	6.65
Low	18 (32%)	9 (16%)	17 (30%)		
Medium	20 (35%)	25 (45%)	14 (26%)		
High	19 (33%)	22 (39%)	25 (44%)		
Religion				.181	3.42
Christian	23 (40%)	32 (57%)	30 (53%)		
No religion	34 (60%)	24 (43%)	27 (47%)		
Marital status, single N (%)	12 (21%)	9 (16%)	13 (23%)	.650	0.86
Work situation					
Paid job	26 (46%)	31 (57%)	31 (56%)	.441	1.64
No paid job/retired	30 (54%)	23 (43%)	24 (44%)		
Household composition					
Lives alone	10 (18%)	11 (20%)	11 (19%)		
Lives with partner	28 (49%)	27 (48%)	21 (37%)		
Lives with children	2 (4%)	1 (2%)	3 (5%)		
Lives with partner and children	17 (30%)	17 (30%)	22 (39%)		
Type of cancer				.071	8.63
Breast	30 (53%)	40 (71%)	42 (74%)		
Colon	15 (26%)	12 (21%)	10 (18%)		
Other	12 (21%)	4 (7%)	5 (9%)		
Months since last cancer treatment median (range)	19 (6-58)	16 (5-52)	18 (3-55)	.888	0.24[a]
Type of treatment					
Chemotherapy, N (%)	26 (53%)	34 (61%)	36 (67%)	.124	4.18
Surgery, N (%)	57 (100%)	56 (100%)	56 (98%)	.369	1.99
Radiation, N (%)	31 (54%)	32 (57%)	33 (58%)	.924	0.16
Hormonal therapy, N (%)	22 (30%)	28 (47%)	30 (47%)	.280	2.54
History psychological treatment, N (%)				.724	3.65
Received psychological treatment in the last year	12 (21%)	11 (20%)	7 (13%)		
Received psychological treatment >1 y ago	21 (37%)	21 (37%)	17 (31%)		
Never received psychological treatment before	24 (42%)	24 (43%)	31 (56%)		
Significant negative event in past 2 y other than cancer, N (%)	27 (47%)	31 (54%)	33 (55%)		

[a]Kruskall Wallis.

[b]Significant difference between MCGP-CS and CAU.

TABLE 2 Results of the different cost-utility analyses

	Costs (€) Mean (SEM)	QALYs Mean (SEM)	Incremental Costs € (95% CI)			Incremental Effect QALYs (95% CI)		
			MCGP–CAU	MCGP–SGP	SGP–CAU	MCGP–CAU	MCG–SGP	SGP–CAU
Base case analysis (n=170)			−812 (−2830 to 1350)	−53 (−1826 to 1979)	−759 (−2625 to 972)	.033 (−.007 to .074)	.029 (−.012 to .070)	.004 (−.036 to .044)
MCGP-CS (n=57)	4492 (778)	.540 (.016)						
SGP (n=56)	4545 (580)	.511 (.014)						
CAU (n=57)	5304 (722)	.507 (.014)						
Sensitivity analysis: complete case analysis (n=110)			−560 (−4146 to 2594)	−575 (−2774 to 2192)	15 (−3514 to 2635)	.024 (−.028 to .072)	.030 (−.016 to .071)	−.006 (−.049 to .039)
MCGP-CS (n=42)	4066 (1001)	.550 (.018)						
SGP (n=41)	4641 (770)	.520 (.013)						
CAU (n=27)	4626 (1371)	.526 (.018)						
Sensitivity analysis: costs at T2 representative for T0-T2 (n=170)			−843 (−2736 to 1168)	−139 (−1723 to 1726)	−704 (−2444 to 845)	.041 (−.004 to .087)	.037 (−.007 to .082)	.004 (−.041 to .049)
MCGP-CS (n=57)	4197 (725)	.544 (.018)						
SGP (n=56)	4336 (499)	.507 (.015)						
CAU (n=57)	5040 (678)	.503 (.018)						

Abbreviations: CAU, care-as-usual; CI, confidence interval; MCGP-CS, meaning-centered group psychotherapy for cancer survivors; QALYs, quality-adjusted life years; SGP, supportive group psychotherapy.

*Significant difference between the 2 groups ($P < .05$).

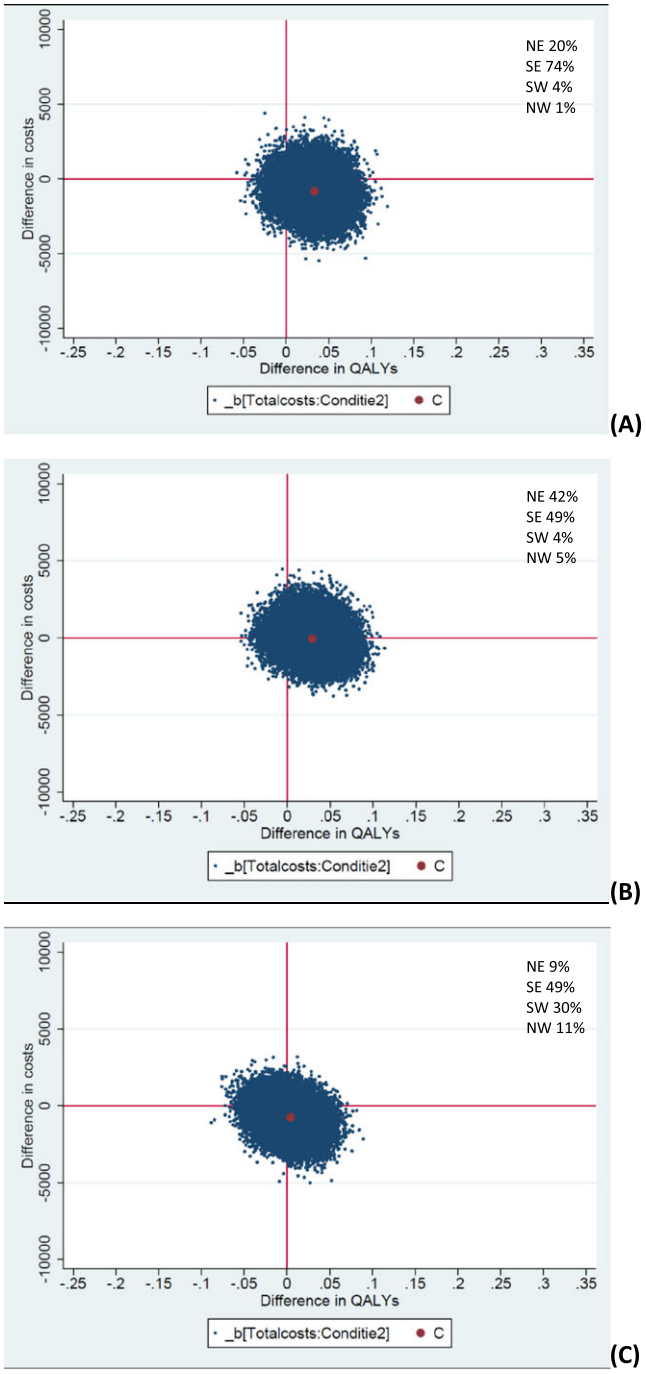

FIGURE 1 Cost-effectiveness planes. (A) Meaning-centered group psychotherapy for cancer survivors (MCGP-CS) compared with care-as-usual (CAU); (B) MCGP-CS compared with supportive group psychotherapy (SGP); (C) SGP compared with CAU

(Figure 1). The same data were used to plot the acceptability curve (see Figure S1), showing the probability that MCGP-CS was cost-effective compared with CAU, for a range of willingness-to-pay thresholds. Of the bootstrapped cost-utility pairs, 74% fell in the SE quadrant, representing the probability that MCGP-CS is more effective and less costly than CAU. The probability of MCGP-CS being more effective in gaining QALYs than CAU is 94%, and the probability that MCGP-CS is less costly compared with CAU is 78%. MCGP-CS has a 78% probability of being cost-effective if society is willing to pay €0 for one gained QALY, this increases to 85% at a willingness-to-pay threshold of €10 000 and to 92% at €30 000 (see Figure S1).

The incremental costs in the comparison of MCGP-CS to SGP, were €−53 (95% CI, −1826 to 1979), and the incremental effects were .029 (95% CI, −.012 to .070). Of the bootstrapped cost-utility pairs, 49% fell in the SE quadrant, representing the probability that MCGP-CS is more effective and less costly than SGP. The probability of MCGP-CS being more effective in gaining QALYs than SGP is 91%, and the probability that MCGP-CS is less costly compared with SGP is 53% (Figure 1). MCGP-CS has a 52% probability of being cost-effective if society is willing to pay €0 for one gained QALY, this increases to 63% at €10 000 and to 77% at €30 000 (see Figure S1).

Between SGP and CAU, the incremental costs were €−759 (95% CI, −2625 to 972), and the incremental effects were .004 (95% CI, −.036 to.044). Of the bootstrapped cost-utility pairs, 49% fell in the SE quadrant, representing the probability that SGP is more effective and less costly than CAU. The probability of SGP being more effective in gaining QALYs than CAU is 58%, and the probability that SGP is less costly compared with CAU is 79% (Figure 1). SGP has an 80% probability of being cost-effective if society is willing to pay €0 for one gained QALY, this does not increase if society is willing to pay more (Figure S1).

3.4 | Sensitivity analyses

To assess the robustness of findings, additional analyses were performed (Table 2). The complete case and extra intention-to-treat analyses showed that MCGP-CS had a probability of 54% to 78% to be less costly and more effective compared with CAU, that MCGP-CS had a probability of 55% to 64% to be less costly and more effective compared with SGP, and that SGP had a probability of 22% to 47% to be less costly and more effective compared with CAU. In addition, adjusting for differences in variables at baseline did not influence incremental costs or incremental effects with more than 20%. These findings indicate that the results of the base case intention-to-treat CUA are robust.

4 | DISCUSSION

This is the first economic evaluation of a meaning-focused intervention for cancer patients, incorporating both medical costs and nonmedical costs (eg, productivity losses and informal care costs). Evidence of the superiority of MCGP-CS over CAU and SGP, in terms of efficacy, was already found in a previous study.[7] The cost-utility analyses in the present study show that MCGP-CS is likely to be cost-effective compared with both control groups, meaning that there is a positive ratio between the costs and gains of MCGP-CS. The results indicate that MCGP-CS is more effective and less costly compared with CAU and showed that MCGP-CS is probably more effective, but not less costly than SGP. It was found that MCGP-CS has a 78% probability of being cost-effective, compared with CAU; if society is willing to pay €0 for one gained QALY, this increases to 85% at €10 000/QALY and to 92% at €30 000/QALY. Commonly accepted willingness-to-pay thresholds are €20 000 to €30 000 per QALY.[21,22]

Economic evaluations of psychosocial interventions for cancer patients up until now are scarce; most of these studies find promising results showing that psychosocial interventions for cancer patients can be good value for money.[5,23-25] As this is the first study to assess the cost-utility of a meaning-focused group intervention for cancer survivors from a societal perspective, we are not able to directly compare our findings with previous studies. One economic evaluation has been conducted on supportive-expressive group therapy (SEGT), which focuses on emotional expression, social support, coping, and also on existential issues, including meaning.[26] This study among metastatic breast cancer patients did not find evidence for lower costs in the intervention group, which is in contrast to our findings. A possible explanation is that our study used a broader scope of medical costs and included productivity costs and informal care costs. Also, our study targeted cancer survivors, while the SEGT-study targeted advanced cancer patients.

4.1 | Study limitations

The present study has some limitations. First, the estimates of medical costs outside the hospital were based on self-report, which might be less accurate than data from public registers. However, there is empirical support that medical self-report data are comparable to register collected data.[27] Also, by using self-report data, we were able to measure important costs from a societal perspective, such as informal care costs and productivity losses due to presenteeism, which are not registered in public registers. Second, the assessments at all time points did not fully cover the actual costs made during the study period, so for the cost calculation, we partly had to rely on estimates. However, we conducted several sensitivity analyses around these estimates, showing that the findings were robust. Third, these results are based on the Dutch situation and cost prices, which are not necessarily generalizable to other countries. Finally, the results need to be interpreted with caution, because the differences in QALYs gained and total costs between the 3 conditions did not reach statistical significance, and the trial was underpowered to detect such differences. For this reason, a probabilistic approach to economic analyses alongside trials is applied, rather than reliance upon significance levels.[28]

4.2 | Future directions

We have some recommendations for future studies. Economic evaluations are scarce and often underpowered, which calls for more studies, including meaning-focused treatments, to obtain better insight into to what extent these interventions for cancer patients are economically beneficial. Furthermore, future studies should take total costs from a societal perspective into account. In this study, we took patient-related costs into account, including informal care costs. Besides these costs, however, there might be an effect on costs made by caregivers as well (eg, productivity losses due to caregiving, or increased health care use due to caregiving burden). It would be interesting if future economic evaluations on psychosocial interventions would take costs made by caregivers into account, to give a more complete insight in the value for money of these interventions.

5 | CONCLUSIONS

The results of this study show that MCGP-CS is more effective and less costly than CAU, while it is probably more effective and equally expensive, compared with SGP. More research on the economic benefits of psychosocial interventions in oncology, from a societal perspective, are needed.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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