

Characteristics of cancer patients using homeopathy compared with those in conventional care: a cross-sectional study

C. Guethlin^{1,2*}, H. Walach³, J. Naumann², H.-H. Bartsch⁴ & M. Rostock^{4,5}

¹Institute for General Practice, Johann-Wolfgang Goethe-University, Frankfurt/Main; ²Department of Evaluation Research in Complementary Medicine, University Hospital, Freiburg/Breisgau, Germany; ³School of Social Sciences and Samueli Institute, University of Northampton, European Office, Northampton, UK; ⁴Department of Rehabilitation, Tumour Biology Center at Albert-Ludwigs-University Freiburg, Freiburg/Breisgau, Germany and ⁵Institute of Complementary Medicine, University Hospital Zurich, Zurich, Switzerland

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Background: There are only few studies on cancer patients who are treated in complementary and alternative medicine clinics and comparing them with patients in conventional care. We will present the comparison of characteristics of two patient cohorts: one was treated in a homeopathic cancer care clinic and one was treated in a conventional oncology care (CC) outpatient clinic.

Patients and methods: Six-hundred and forty-seven patients were included in this cross-sectional cohort study and had to fill in questionnaires [health-related quality of life (QoL) (Functional Assessment of Cancer Therapy—General Scale), depression and anxiety (Hospital Anxiety and Depression Scale), fatigue (Multidimensional Fatigue Inventory) and expectancies toward treatment]. Clinical data were extracted from medical records. This study presents the comparison of both cohorts.

Results: Patients in the homeopathy cohort are younger, better educated and more often employed than patients in the CC cohort. The most pronounced differences indicate longer disease histories and different diagnostic and clinical pretreatment variables. Despite the clinical differences, QoL as well as anxiety, depression and fatigue was similar in both the groups.

Conclusions: Homeopathic treatment is sought by cancer patients at a different phase during the course of the disease, which has particular implications for research. However, expectancies toward the benefit of the treatment as well as QoL data are similar.

Key words: cohort study, complementary therapies, cross-sectional, homeopathy, medical oncology

introduction

Homeopathy is one of the most popular approaches in complementary and alternative medicine (CAM) in cancer care in Europe ranging from 6% across cancer diagnoses [1, 2] up to 24% in breast cancer patients [3–5]. Homeopathy is a comprehensive CAM system which is based upon a theory and practice which has evolved independent from conventional medicine.

In a review summarizing randomised, controlled trials on homeopathic treatment in cancer patients, the authors concluded that homeopathy may mitigate the side-effects of chemotherapy and radiotherapy, resulting in improved quality of life (QoL), especially in breast cancer patients [6]. The usefulness of homeopathy as supportive care strategy is further

corroborated by a prospective observational study which demonstrated that homeopathy had a positive influence on QoL (as measured by the European Organisation for Research and Treatment of Cancer–Quality of Life Questionnaire-30 items) as well as on fatigue and hot flushes [7]. Results from basic research looking at the effects of homeopathic dilutions on the progression of cancer show conflicting results: Jonas et al. [8] found that both the number and the volume of prostate tumors in rats decreased after homeopathic treatment in an initial study but was unable to replicate that in subsequent attempts [9–11] found no measurable effects in cancer cell and animal models in basic research.

In light of the high prevalence of CAM approaches in cancer treatment, it is worthwhile to investigate what type of patients turn to CAM treatment and why. We studied patients from a homeopathic clinic specialized in oncology and compared the results with a cohort of cancer patients recruited at the same time period from a conventional oncology outpatient clinic. A similarly designed controlled registration study in Switzerland showed that more patients in the CAM cohort (anthroposophic

*Correspondence to: Dr C. Guethlin, Institute for General Practice, Johann-Wolfgang Goethe-University, Frankfurt/Main, Theodor-Stern-Kai 7, 60590 Frankfurt/Main, Germany. Tel: +49-69-6301-83882; Fax: +49-69-6301-6428; E-mail: guethlin@allgemeinmedizin.uni-frankfurt.de

medicine) were female, higher educated and from an urban environment. Patients in the CAM cohort also had poorer performance status and a longer disease history since first diagnosis [12]. Typical sociodemographic characteristics of cancer patients treated with CAM are: female, well educated and younger [13–17]. Clinical variables which predict CAM use are advanced disease status [18] and a multitude of anticancer treatments [14]. Some studies investigated CAM use and the association with the cancer treatment phase. They found that in the initial phase after diagnosis, the most frequent users of CAM are breast cancer patients, whereas in a later phase of the disease, lung cancer patients were identified as the most frequent users [2]. Therefore, it could be assumed that CAM use and probably also the expectancies attached to it depend not only on the cancer type but also on the course of the disease.

Often-cited reasons of CAM use is boosting general health and well-being rather than the hope of curing the cancer [14, 19]. CAM users are known to have worse QoL health status than nonusers [17, 20]. There are conflicting results regarding the question if patients who are unsatisfied with conventional oncology care (CC) are more likely to turn to CAM [21, 22].

This cross-sectional study on characteristics of cancer patients using homeopathy was part of a larger longitudinal cohort study investigating both the questions who turns to homeopathy and what is the course of the disease when compared with patients who stay in conventional care. The objective of the study presented here was to describe patient cohorts and disease variables of cancer patients who begin classical homeopathy compared with cancer patients who begin conventional treatment.

patients and methods

recruitment

From 2004 to 2007, we recruited 647 cancer patients for a prospective study with several cross-sectional and longitudinal research questions. Patients were entered into the study consecutively when presenting at a homeopathic or a conventional outpatient clinic for the first time. No specific inclusion and exclusion criteria were imposed as one of the cross-sectional research questions was the comparison of the two groups (presented here). One cohort represents the cancer patient group that seeks treatment at a specialized homeopathic clinic in Switzerland (founded by Spinedi in Orselina, Switzerland, referred to as HOM). The other cohort was the usual cancer patient group receiving treatment at a conventional outpatient oncology unit which applies state-of-the-art diagnosis and treatment. It was originally intended to recruit four potential matching partners in the group receiving conventional care to compare with one patient treated with homeopathy. Therefore, we recruited more conventionally treated patients than patients treated with homeopathy but failed to reach the initial recruitment goal due to recruitment problems in the conventional care clinic.

Informed consent was sought through the doctors but it was pointed out to the patients that the questionnaire will go directly to the study center and will not be seen by the respective doctors. Thus, anonymity of answers was guaranteed. Anonymity was also ensured during data entry and analysis. The study was approved by the Ethics Committee of the University Freiburg, Germany as well as the Ethics Committee, Bellinzona, Switzerland.

the overall study

A longitudinal cohort study documented the course of the disease in homeopathic and in conventionally treated patients over a follow-up period

of 12 months per cohort and sought to compare treatment outcomes in subgroups after a well-defined matching process (data not shown here). Two types of data were collected; we extracted data from medical records and sent out questionnaires to the patients at baseline, 3, 6, 9 and 12 months after the initial interview. Via medical records we collected disease variables like cancer type, cancer stage, time since first diagnosis and time since progress of disease and treatment variables like frequency of the courses of chemotherapy and radiotherapy, surgery, etc. As the comprehensiveness of medical records differed widely between the CC and the homeopathic clinic, we made every effort to get medical records from homeopathic patients through their conventional doctors or hospital admissions.

The patient surveys contained validated questionnaires measuring QoL (Functional Assessment of Cancer Therapy—General Scale, FACT-G and Functional Assessment of Chronic Illness Therapy—Spiritual Scale, FACIT-Sp [23]), anxiety and depression [Hospital Anxiety and Depression Scale (HADS) [24]], fatigue [Multidimensional Fatigue Inventory (MFI) [25]] and expectancies (baseline measurement) as well as satisfaction with treatment (not at baseline).

We employed Access 2000 to store and SPSS 15.0 to analyze the data.

this study

We will report on the baseline data, i.e. extracted from questionnaires and from medical records. Comparisons of both the groups are being made in order to get more insight into cancer patients treated with homeopathy compared with CC cancer patients and to inform the matching process later employed in the overall study. We follow the STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) guidelines on reporting results of observational studies [26].

statistical analysis

As this is the comparison of baseline characteristics of the two patient groups, we employed unpaired 2-sample *t*-test to test for differences whenever appropriate. In case of nominal data chi-square tests and in case of ordinal data Wilcoxon tests were carried out. Measures used are indicated in the tables.

results

patient characteristics

Figure 1 shows the number of patients included into this analysis. The HOM cohort comprises 259 patients and the CC cohort 380 cancer patients. As there were eight patients who were recruited into the study but provided no questionnaires or medical data, we excluded them from further analysis. We achieved a return rate of questionnaires of 97% of all 259 homeopathy patients and 82% of all 380 CC patients. We were able to collect 100% of the medical records of CC patients and 93% of the records of homeopathy patients.

comparison of baseline data

Table 1 summarizes sociodemographic data which show the most pronounced differences in relation to age (HOM patients are on average 6 years younger) and to education. A significantly greater percentage of homeopathy patients had higher education leading to a university degree. Another significant difference was found in employment status with more homeopathy patients being (still) employed. This may also be a result of more self-employment in the homeopathy group (data not shown). Both the groups had higher rates of female patients, but there is no difference between the groups.

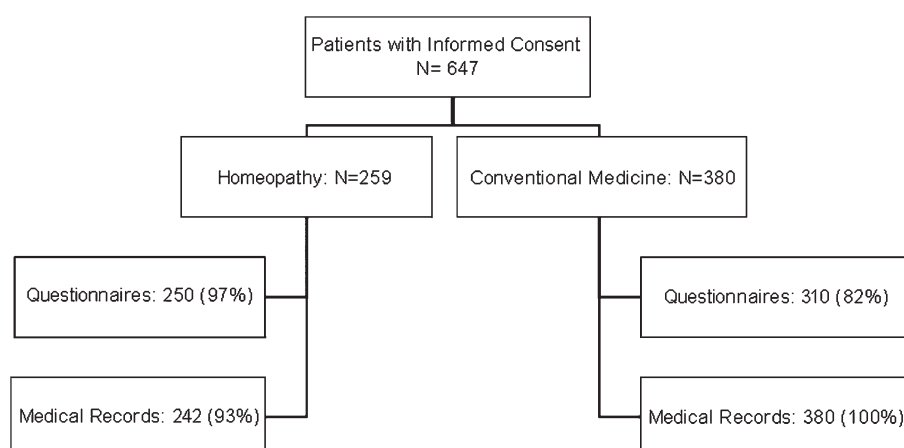


Figure 1. Flowchart of records and questionnaires.

Table 1. Sociodemographics

	HOM, N = 250	Conventional care, N = 310	P values
Gender, N (% ^a)			
Female	177 (70.8)	199 (64.8)	n.s. ^b
Age			
Mean (SD)	53.8 (12.6)	59.9 (12.0)	0.000 ^c
Marital status, N (% ^a)			
Married/with partner	174 (69.6)	226 (73.6)	
Single/without partner	76 (30.4)	81 (26.3)	n.s. ^b
Education, N (%)			
Elementary school	40 (16.1)	147 (47.7)	
Lower secondary	67 (27.0)	76 (24.7)	0.000 ^b
Upper secondary	134 (54.0)	78 (25.3)	
Highest degree, N (%)			
University	107 (43.0)	49 (16.2)	0.000 ^b
Other	142 (57.0)	254 (83.8)	
Employment status, N (%)			
Yes	75 (30.6)	47 (15.5)	
No	171 (69.8)	256 (84.6)	0.000 ^b

^aPercentages refer to valid data (excluding missing data).

^bChi-square test, one-sided.

^ct-test, one-sided.

HOM, homeopathy; SD, standard deviation; n.s., not significant.

Table 2 illustrates important clinical data at the time of cancer diagnosis. In both the groups, the largest subgroup consists of breast cancer patients (32% in HOM and 37% in CC cohort). In terms of differences between the groups, it has to be noted that in the CC cohort, there are about two times as many colorectal cancer patients compared with HOM (15% versus 7%) and more melanoma patients in the HOM cohort (5% versus 1%). The most significant difference though is the tumor stage: in 27% of the HOM cohort patients, there was no unequivocal tumor stage present because results from some relevant diagnostic procedures were not available or had not been even carried out versus 10% in the CC cohort; 4% of the HOM cohort patients had refused any diagnostic examination versus 0.5% in the CC cohort.

Table 2. Clinical variables at the time of the first diagnosis

	HOM, N = 243	Conventional care, N = 380	P values
Type of cancer, N (%)			
Breast	77 (31.8)	140 (36.8)	n.s. ^a
Prostate	18 (7.4)	13 (3.4)	n.s. ^a
Colorectal	16 (6.6)	57 (15.0)	0.0005 ^a
Melanoma	13 (5.4)	5 (1.3)	0.0003 ^a
Other	118 (48.8)	165 (43.4)	
Tumor stage, N (%)			
Stage 1–3	123 (50.6)	237 (62.4)	
Stage 4	55 (22.6)	103 (27.1)	0.000 ^a
Unclear	65 (26.7)	40 (10.5)	

^aChi-square test, one-sided.

HOM, homeopathy; n.s., not significant.

In addition to the lack of precise diagnostic procedures, there were also differences with respect to conventional treatment. In the HOM cohort, 86% of patients had conventional treatment in comparison with the CC cohort: 95.5% had conventional treatment in the past or are in the process of realization; 8% of the HOM cohort refused conventional therapy before seeking homeopathic treatment. Those HOM patients who received conventional treatment were significantly more often treated with chemotherapy and/or radiotherapy. There was no difference in the amount of unconventional strategies except vitamins (data drawn from patient questionnaire). Vitamins were significantly more often used by HOM patients (Table 3).

Table 4 illustrates the disease variables at the time of study entry, i.e. the time when patients started either homeopathic treatment or conventional treatment in the usual care oncology clinic. At the time of study entry, the differences between the two groups were even more pronounced compared with the time of the first diagnosis. HOM patients had been ill for a longer time and were significantly less likely to be in a curative disease stage. In addition, the percentage of HOM patients whose tumor stage remained unclear was substantial (18% compared with 7% CC patients).

Table 3. Course of the treatment since first diagnosis

	HOM, N = 243	Conventional care, N = 380	P values
Conventional therapy, N (%)			
Yes	210 (86.4)	363 (95.5)	0.000 ^a
No treatment indicated	4 (1.7)	11 (2.9)	
Patient declined	21 (7.7)	4 (1.1)	
Which therapies? N (%)			
Operation	169 (69.4)	270 (71.1)	n.s. ^a
Chemotherapy	122 (50.0)	124 (32.6)	0.000 ^a
Radiotherapy	78 (32.2)	72 (18.9)	0.000 ^a
Hormonotherapy	35 (14.5)	51 (13.4)	n.s. ^a
Unconventional therapy ^b , N (%)			
Mistletoe	32 (12.8)	40 (12.9)	n.s. ^a
Vitamins	92 (36.8)	62 (20.1)	0.000 ^a
Herbal medicine	38 (15.2)	50 (16.2)	n.s. ^a
Enzymes	14 (5.6)	14 (4.5)	n.s. ^a

^aChi-square test, one-sided.^bDrawn from patients' questionnaire (HOM: N = 250, CC: N = 310) as in medical records CAM therapies were noted very rarely.

HOM, homeopathy; n.s., not significant; CAM, complementary and alternative medicine.

Table 4. Disease variables at the time of study entry (in months)

	HOM	Conventional care	P values
Time since first diagnosis (median, all patients)	10 (N = 243)	3 (N = 380)	0.000 ^a
Time from first diagnosis to tumor progress (median, only patients with tumor progress)	34.5 (N = 76)	23 (N = 100)	n.s. ^a
Time from tumor progress to study entry (median, only patients with tumor progress)	7 (N = 77)	3 (N = 101)	0.0004 ^a
Tumor stage, N (%)			
Stage 1–3	69 (29.9)	161 (43.1)	
Not curative	121 (52.4)	187 (50.0)	0.000 ^b
Unclear	41 (17.7)	26 (7.0)	

^aMann–Whitney *U* test, one-sided.^bChi-square test, one-sided.

HOM, homeopathy; n.s., not significant.

Table 5 summarizes the results of QoL measurements, depression and anxiety and fatigue measures collected with the baseline questionnaire.

There were striking similarities between both the groups with regard to subjective well-being. Both the groups score rather low with respect to their subjective QoL and anxiety and depression compared with historical controls [27–30].

Regarding what patients expect from homeopathic or from conventional anticancer treatment, it became obvious that there were very similar expectancies in both the groups (see Table 6). Despite some statistical significant differences, we do not interpret these as being clinically relevant and therefore conclude

Table 5. Quality of life, depression, anxiety and fatigue

	HOM, N = 250	Conventional care, N = 310	P values	Historical controls
FACT-G, mean (SD)	74.2 (14.8)	74.2 (17.8)	n.s. ^a	81.9 (15.9) [27]
FACIT-Sp, mean (SD)	31.8 (8.4)	30.9 (8.9)	n.s. ^a	
HADS-D, mean (SD)	8.4 (1.7)	8.3 (1.7)	n.s. ^a	6.2 (3.1) [28]
HADS-A, mean (SD)	9.8 (1.6)	10.0 (1.5)	n.s. ^a	5.4 (4.6) [28]
MFI, mean (SD)				
General fatigue	12.1 (2.7)	12.0 (3.2)	n.s. ^a	12.1 (4.3) [29]
Physical fatigue	12.4 (5.2)	11.9 (5.3)	n.s. ^a	11.8 (4.1) [29]
Reduced activity	12.2 (4.9)	12.1 (5.4)	n.s. ^a	11.6 (4.4) [29]
Reduced motivation	8.9 (3.5)	9.3 (4.4)	n.s. ^a	8.5 (3.4) [29]
Mental fatigue	10.4 (4.5)	9.8 (5.0)	n.s. ^a	10.2 (4.6) [29]

^a*t*-test, one-sided.

HOM, homeopathy; FACT-G, Functional Assessment of Cancer

Therapy—General Scale; HADS-A, Hospital Anxiety and Depression Scale-Anxiety; HADS-D, Hospital Anxiety and Depression Scale-Depression; SD, standard deviation; n.s., not significant; FACIT-Sp, Functional Assessment of Chronic Illness Therapy—Spiritual Scale; MFI, Multidimensional Fatigue Inventory.

Table 6. Expectancies

	HOM, N = 250	Conventional care, N = 310	P values
I expect the treatment to ...			
have specific antitumor effect (range: not at all to very much), mean (SD)	3.5 (0.8)	3.6 (0.7)	n.s. ^a
support the body in fighting the disease (range: not at all to very much), mean (SD)	3.9 (0.4)	3.6 (0.7)	0.001 ^a
enhance life expectancy (range: not at all to very much), mean (SD)	3.7 (0.7)	3.6 (0.7)	n.s. ^a
enhance physical well- being (range: not at all to very much), mean (SD)	3.7 (0.6)	3.4 (0.9)	0.002 ^a
enhance psychological well-being (range: not at all to very much), mean (SD)	3.5 (0.9)	3.1 (1.1)	0.000 ^a

^a*t*-test, one-sided.

HOM, homeopathy; SD, standard deviation; n.s., not significant.

from our data that even the expectancies for homeopathic treatment as anticancer strategy are comparable to the expectancies of patients who received conventional treatment. Additionally, a very high percentage of homeopathy patients also hoped that homeopathy would be able to diminish adverse effects of conventional treatment (88%, data not shown).

discussion

The objective of this study was to investigate whether cancer patients recruited from a specialized homeopathy clinic were

different from patients recruited from conventional care when entered into the study at the time point of starting treatment.

We present data from the two groups of cancer patients: one cohort was recruited in a homeopathic clinic in Switzerland specialized in treating cancer patients and the other cohort was recruited in a large oncology outpatient clinic. Both the groups were recruited at the beginning of their respective treatments. It can be seen from the results that there are some striking similarities between the groups: both cohorts have low QoL and high expectancies toward anticancer effects of treatment. However, there are more relevant differences than similarities. Cancer patients seeking homeopathy seem to start their treatment at a much later phase during their course of disease compared with patients beginning conventional treatment. Moreover, in accordance with other studies, the patients in the HOM cohort were ~6 years younger, better educated and were more likely to be employed compared with patients in the CC cohort. The latter was not only due to the younger age but also due to more patients from the HOM cohort being self-employed (data not shown) and thus, they would be forced to earn their income even during their cancer disease. With regard to clinical variables, the HOM cohort consists of patients presenting with slightly different cancer diagnoses (more melanoma, less colorectal cancer). The most pronounced differences were seen in the amount of imprecise tumor stages in the HOM cohort. About a quarter of the patients were not diagnosed according to state-of-the-art principles at the time when the cancer was detected or their diagnostic results were not available through the homeopathic clinic to verify the exact tumor stage.

The course of the treatment following the cancer diagnosis was also different regarding two aspects: the percentage of patients who refused to be treated with conventional treatment was much higher in the HOM cohort (in total 8%). However, about half of the homeopathy patients had received chemotherapy in the past, and ~30% had undergone radiotherapy when beginning homeopathic treatment, whereas only 30% of the CC patients had already received chemotherapy and ~19% had had radiotherapy. This is indicative of a different phase in the course of the disease: whereas patients often seek homeopathy after the conventional treatment is finished, patients in the CC group present to the oncology clinic usually after surgery or after diagnosis of disease progression.

It was obvious that there were relevant clinical differences between these two groups of patients. However, it was unexpected that the results regarding QoL scales and measurements of emotional distress would be almost identical.

In another prospective observational study investigating the benefit of homeopathy in a cohort of patients who were referred to a British National Health Service homeopathic hospital [7], 39% of the British cohort was in a metastatic state compared with 52% in our sample. In our study as well as in the British study, anxiety and depression scores (HADS) were much higher than in a historical control group. Whereas in the historical control group, anxiety was 6.2 and depression was 5.4 [27], patients who started treatment seem to be more stressed [anxiety: 9.8 (HOM) and 10.0 (CC) in our study; 9.4 in the

British study and depression: 8.4 and 8.3, respectively, in our study; 7.3 in the British study] irrespectively of HOM or CC treatment. This is somewhat in accordance with other data showing that depression predicts CAM use in breast cancer patients [29] but explains only high scores in the cohort which sought homeopathy. In our study also, the CC cohort showed high anxiety and depression scores, probably due to different reasons. Whereas the HOM cohort consists of patients having a long disease history, the patients in the CC cohort seem to suffer from the shock of being diagnosed (or tumor progress being diagnosed).

Despite the long disease history and progressed tumor stage, expectancies toward the benefit of homeopathy were quite high.

Since homeopathy is a medical system in its own right in addition to conventional medicine, which is particularly sought by patients who come to a specialized homeopathic clinic, these differences cannot be generalized to other CAM treatments.

Hence, for research purposes, it is necessary to differentiate between types of CAM treatment. If the research aim is a comparison of whole-system CAM therapies (like homeopathy) with conventional therapy, it is important to bear the substantial differences in mind, especially when studying the outcomes QoL and survival. QoL might be particularly impaired due to adverse effects of conventional treatment when patients turn to homeopathy. Survival data that is measured starting from the point when cancer patients begin homeopathic treatment is by no means comparable with the data of cancer patients who begin conventional treatment as the likelihood of having shorter survival periods clearly depends on the disease status.

conclusions

We found that the initiation of homeopathy treatment in cancer patients is likely to occur at a different phase during the course of the disease compared with the start of conventional treatment. Although both the groups of patients have very high expectancies toward cure through either homeopathy or conventional treatment and show comparable QoL measures and measures of emotional distress, other important disease variables are vastly different. Thus, when investigating homeopathy in comparison with conventional treatment, it is not useful to apply general designs like recruiting the control group as well as the homeopathy group at the time of starting treatment. It would be more advisable to recruit patients from conventional care after defining specific criteria per patient which match with criteria of a recruited homeopathy patient.

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disclosure

None of the authors have a conflict of interest.

references

- Molassiotis A, Margulies A, Fernandez-Ortega P et al. Use of complementary and alternative medicine in cancer patients: a European survey. *Ann Oncol* 2005; 16: 655–663.
- Lafferty WE, Tyree PT, Devlin SM et al. Complementary and alternative medicine provider use and expenditures by cancer treatment phase. *Am J Manag Care* 2008; 14(5): 326–334.
- van der Weg F, Streuli RA. Use of alternative medicine by patients with cancer in a rural area of Switzerland. *Swiss Med Wkly* 2003; 133(15–16): 233–240.
- Schönekeas K, Mücke O, Mücke R et al. Anwendung komplementärer/alternativer Therapiemaßnahmen bei Patientinnen mit Brustkrebs [Use of complementary/alternative therapy methods by patients with breast cancer]. *Forsch Komplementarmed Klass Naturheilkd* 2003; 10(6): 304–308.
- Molassiotis A, Scott JA, Kearney N et al. Complementary and alternative medicine use in breast cancer patients in Europe. *Support Care Cancer* 2006; 14(3): 260–267.
- Milazzo S, Russell N, Ernst E. Efficacy of homeopathic therapy in cancer treatment. *Eur J Cancer* 2006; 42: 282–289.
- Thompson EA, Reilly D. The homeopathic approach to symptom control in the cancer patient: a prospective observational study. *Palliat Med* 2002; 16(3): 227–233.
- Jonas WB, Gaddipati JP, Rajeshkumar NV et al. Can homeopathic treatment slow prostate cancer growth? *Integr Cancer Ther* 2006; 5(4): 343–349.
- MacLaughlin BW, Gutschmuths B, Pretner E et al. Effects of homeopathic preparations on human prostate cancer growth in cellular and animal models. *Integr Cancer Ther* 2006; 5(4): 362–372.
- Thangapazham RL, Rajeshkumar NV, Sharma A et al. Effect of homeopathic treatment on gene expression in Copenhagen rat tumor tissues. *Integr Cancer Ther* 2006; 5(4): 350–355.
- Thangapazham RL, Gaddipati JP, Rajeshkumar NV et al. Homeopathic medicines do not alter growth and gene expression in prostate and breast cancer cells in vitro. *Integr Cancer Ther* 2006; 5(4): 356–361.
- Pampallona S, von Rohr E, van Wegberg B et al. Socio-demographic and medical characteristics of advanced cancer patients using conventional or complementary medicine. *Onkologie* 2002; 25(2): 165–170.
- Yates JS, Mustian KM, Morrow GR et al. Prevalence of complementary and alternative medicine use in cancer patients during treatment. *Support Care Cancer* 2005; 13(10): 806–811.
- Patterson RE, Neuhauser ML, Hedderson MM et al. Types of alternative medicine used by patients with breast, colon, or prostate cancer: predictors, motives, and costs. *J Altern Complement Med* 2002; 8(4): 477–485.
- Cahan A, Gilon D, Manor O et al. Clinical experience did not reduce the variance in physicians' estimates of pretest probability in a cross-sectional survey. *J Clin Epidemiol* 2005; 58(11): 1211–1216.
- Navo MA, Phan J, Vaughan C et al. An assessment of the utilization of complementary and alternative medication in women with gynecologic or breast malignancies. *J Clin Oncol* 2004; 22(4): 671–677.
- Hlubocky FJ, Ratain MJ, Wen M et al. Complementary and alternative medicine among advanced cancer patients enrolled on phase I trials: a study of prognosis, quality of life, and preferences for decision making. *J Clin Oncol* 2007; 25(5): 548–554.
- Paltiel O, Avitzour M, Peretz T et al. Determinants of the use of complementary therapies by patients with cancer. *J Clin Oncol* 2001; 19(9): 2439–2448.
- Shih V, Chiang JYL, Chan A. Complementary and alternative medicine (CAM) usage in Singaporean adult cancer patients. *Ann Oncol* 2009; 20(4): 752–757.
- Burstein HJ, Gelber S, Guadagnoli E et al. Use of alternative medicine by women with early-stage breast cancer. *N Engl J Med* 1999; 340(22): 1733–1739.
- Hann D, Allen S, Ciambone D et al. Use of complementary therapies during chemotherapy: influence of patients' satisfaction with treatment decision making and the treating oncologist. *Integr Cancer Ther* 2006; 5(3): 224–231.
- Weis J, Bartsch HH, Pott-Hennies F et al. Complementary medicine in cancer patients: demand, patients' perspective and psychological attitudes. *Onkologie* 1998; 21: 144–149.
- Cella D, Tulsky DS, Gray G et al. The Functional Assessment of Cancer Therapy scale: development and validation of the general measure. *J Clin Oncol* 1993; 11(3): 570–579.
- Hermann C, Buss U, Snaith R. Hospital Anxiety and Depression Scale [German Version]. Bern, Switzerland: Huber Verlag 1995.
- Smets EM, Garssen B, Bonke B et al. The Multidimensional Fatigue Inventory (MFI) psychometric qualities of an instrument to assess fatigue. *J Psychosom Res* 1995; 39(3): 315–325.
- von Elm E, Altman DG, Egger M et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Ann Intern Med* 2007; 147(8): 573–577.
- Cella D, Hahn EA, Dineen K et al. Meaningful change in cancer-specific quality of life scores: differences between improvement and worsening. *Qual Life Res* 2002; 11: 207–221.
- Zigmond A, Snaith R. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983; 67(6): 361–370.
- Bartsch HH, Weis J, Moser MT. Cancer-related fatigue in patients attending oncological rehabilitation programs: prevalence, patterns and predictors. *Onkologie* 2003; 26(1): 51–57.
- Montazeri A, Sajadian A, Ebrahimi M et al. Depression and the use of complementary medicine among breast cancer patients. *Support Care Cancer* 2005; 13(5): 339–342.