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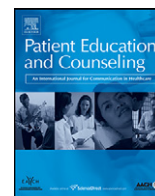
Complementary and alternative medicine use of women with breast cancer: Self-help CAM attracts other women than guided CAM therapies

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ABSTRACT

Objective: Examine stability of use of complementary and alternative medicine (CAM) of breast cancer patients, reasons for CAM use, and sociodemographic, clinical, and psychological predictors of CAM use.
Methods: CAM use was assessed after adjuvant therapy and six months later. Following the CAM Healthcare Model, CAM use was divided into use of provider-directed (guided) and self-directed (self-help) CAM. Stability and reasons for CAM use were examined with McNemar's tests and descriptive statistics. Cross-sectional and longitudinal associations between predictors and CAM use were examined with univariate and multivariate logistical analyses.
Results: Use of provider-directed and self-directed CAM was stable over time ($N = 176$). Self-directed CAM was more often used to influence the course of cancer than provider-directed CAM. Both were used to influence well-being. Openness to experience predicted use of provider-directed CAM, while clinical distress predicted use of self-directed CAM, after adjusting for other predictors. Perceived control did not predict CAM use.
Conclusion: CAM use is stable over time. It is meaningful to distinguish provider-directed from self-directed CAM.
Practice implications: Providers are advised to plan a 'CAM-talk' before adjuvant therapy, and discuss patients' expectations about influence of CAM on the course of cancer. Distressed patients most likely need information about self-directed CAM.

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1. Introduction

The number of cancer patients who use complementary and alternative medicine (CAM) has increased in recent years [1,2]. A European study in 14 countries showed that frequency of CAM use among cancer patients ranges from 14.8% to 73.1%. Compared to other types of cancers (e.g., gynecological and lung cancer), use of CAM in patients with breast cancer is relatively high (45%) [3,4].

A considerable percentage of cancer patients, 23–60%, do not discuss CAM use with their oncologist [5]. Patients fear a negative reaction regarding their CAM use, and perceive physicians' unresponsiveness or opposition toward CAM use as a communication barrier [6]. By taking the initiative to discuss CAM use in a non-judgmental manner, health care providers may enhance the quality of physician–patient communication, which may lead to

higher patient satisfaction, trust, well-being and compliance to regular care [7,8]. Discussing CAM use is also advisable to warn patients about established interaction effects between regular anti-cancer drugs and CAM [9], and to inform patients about the minimal or lack of evidence for CAM efficacy to influence the course of cancer [10].

For providers with reservations about CAM use, more background knowledge about the CAM use of their patients may facilitate communication. Although numerous studies have addressed the CAM use of women with breast cancer [10], there are still unanswered questions. Firstly, only a limited number of prospective studies (e.g., [11]) have investigated how CAM use changes over time. Knowing when patients are most likely to start using CAM during the illness trajectory and whether or not CAM use is stable over time, can inform the timing of patient education. Secondly, previous research shows that CAM is being used for a variety of reasons, including influencing the course of cancer, healing, wanting control and finding hope [2,4,10,12]. Up to now we know less about which CAM types are used to influence the course of cancer and well-being. Such knowledge can increase providers' understanding of patients' motivations. Finally, there is yet a lot to be explored with

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regard to the characteristics of patients who are using CAM. More knowledge might help providers identify patients who are most likely to be interested in a 'CAM talk'.

A considerable number of studies among women with breast cancer have examined the demographic and clinical predictors of CAM use. These studies indicate that younger women and women with a higher education are more likely to use CAM [10]. A large Danish study showed that CAM use twelve to sixteen weeks after surgery was associated with absence of comorbidity, a higher educational level, higher income, higher social status, being divorced or separated, living in the metropolitan area of Copenhagen, and having had chemotherapy. Having had chemotherapy was the only significant factor that was positively associated with CAM use in a multivariate analysis [12] (see also [13,14]).

Psychological variables have also been found to predict CAM use in (breast) cancer patients [2,15–18] (see also [19–21]). However, findings are sometimes inconsistent (e.g., [18]), possibly because of the large variety in CAM types included in studies, which precludes consistency of results.

One meaningful distinction in CAM types is related to the mode of access, as proposed in the CAM Healthcare Model [22]. The CAM Healthcare Model is a modification of the Behavioral Model of Health Services Use of Andersen and Newman [23–25], which is extensively used to analyze predictors of use of health care services within general [26,27] and patient populations (e.g., [28–30]). A main feature of the model is that CAM use is divided into (a) use of provider-directed CAM services, (b) use of self-directed CAM practices, and (c) CAM products and resources. *Provider-directed services* refer to services that require presence of a care provider (e.g., acupuncture). In contrast, patients can perform *self-directed practices* themselves, possibly after receiving instructions from a provider (e.g., meditation). Self-directed practices may attract other patients than the ones who choose to visit a CAM practitioner. *CAM products and resources* refer to products such as herbs and instructional materials. These products, in general, may be easier to access than CAM services and practices [22].

The current study aims to extend existing insights by examining stability of breast cancer patients' CAM use over the first half year after adjuvant therapy, CAM types used to influence the course of cancer and well-being, and cross-sectional and longitudinal predictors of CAM use – all in light of the CAM Healthcare Model. We slightly modified the model. We distinguished self-directed CAM that can be used autonomously, i.e., both self-directed practices and products, from provider-directed CAM which requires the attendance of a provider [22].

In addition to sociodemographic (e.g., age) and clinical (e.g., cancer stage) characteristics, we aimed to examine the relation between a number of psychological variables and provider- and self-directed CAM. Based on previous research, we included openness to experience [31,32], perceived control [16,33], distress [17], and cancer worry as psychological predictors. Breast cancer patients who are more open to new experiences may be more inclined to experiment with and use CAM. Breast cancer patients with higher perceived control may use CAM to maintain a feeling of being in charge with regard to the disease and treatment. Finally, breast cancer patients with higher distress or cancer worry, may use CAM to relieve psychological symptoms [13,14] (see also [34]).

Hence, the following research questions were addressed.

a. What is the prevalence and stability of use of provider-directed and self-directed CAM of breast cancer patients during the first half year after the end of adjuvant chemo- or radiotherapy?
b. What is the prevalence of use of individual types of CAM of breast cancer patients during the first half year after the end of adjuvant chemo- or radiotherapy?

c. Why do breast cancer patients use provider-directed and self-directed CAM, and individual types of CAM during the first half year after the end of adjuvant chemo- or radiotherapy?
d. Which sociodemographic, clinical, and psychological predictors are associated with provider-directed and self-directed CAM use of breast cancer patients over time?

2. Methods

2.1. Procedure and sample

The data used in this study were part of a larger dataset that was collected in a prospective, multicenter, observational Dutch study [35–37]. The study protocol was approved by the Medical Ethical Committees of all six participating hospitals. Women referred to one of the hospitals because of suspected breast cancer were invited by mail. Women were eligible if they were 75 years or younger, did not have a serious psychiatric or somatic disorder that implied hospital admission, comprehended Dutch, followed the usual diagnostic protocol, and did not have a history of cancer before their diagnosis with breast cancer. Also, patients who received adjuvant chemotherapy prior to surgery were excluded to ensure homogeneity in treatment. The participants signed an informed consent before receiving the diagnosis of malignant or benign breast cancer. For ethical reasons, the participants were asked to reconfirm their consent within six weeks after diagnosis. In the current study, only the results of women diagnosed with primary breast cancer and who received adjuvant therapy were included.

2.2. Design

Assessment took place by a self-report questionnaire at six assessments during the first year after diagnosis (see [35–37] for detailed information). CAM use and reasons for CAM use were assessed at two of these six assessments: immediately after adjuvant chemo- or radiotherapy, and six months after adjuvant therapy. Possible predictors of CAM use that were included, were assessed immediately after adjuvant therapy, except openness to experience, which was assessed immediately after surgery. Clinical data were retrieved via medical record audits.

2.3. Measures

2.3.1. CAM use and reasons for CAM use

CAM use and reasons for CAM use were measured by a self-report questionnaire. The questionnaire listed 17 CAM types, as indicated in Table 4. These CAM types were selected on the basis of CAM types reported in previous studies and Dutch patient education materials; the list was not exhaustive. Respondents were invited to indicate use of each CAM type related to their breast cancer diagnosis. There were two response categories per CAM type: 'yes' and 'no'. Respondents were further asked to indicate their reasons for CAM use for the CAM types that they were practicing. Two reasons for use were assessed: use to influence the course of cancer, and to influence the participant's well-being (both with response categories yes/no).

The following CAM types were categorized as *provider-directed CAM*: massage, chiropractic care, acupuncture, energy therapy, naturopathy, scent/aromatherapy, spiritual therapy, biofeedback, hypnosis, and imagination (e.g., Simonton). The following CAM types were categorized as *self-directed CAM*: use of additional vitamins or minerals, herbs, diet, prayer/rituals, relaxation exercises, meditation, and homeopathy.

To increase comparison across studies, individual CAM types were also categorized according to five CAM-categories, as described by the National Center for Complementary and Alternative Medicine (NCCAM) in the USA [38], including:

- biologically based therapies;
- manipulative and body-based therapies;
- mind-body therapies; a sub-distinction is made based on whether prayer and rituals are included or excluded in this category [39];
- energy therapies;
- alternative medical systems.

2.3.2. Sociodemographic predictors

Age at diagnosis and *educational level* were assessed by a self-report questionnaire.

2.3.3. Clinical predictors

Cancer stage was retrieved from patients' medical records.

Type(s) of adjuvant therapy, chemotherapy, and/or radiotherapy, were retrieved from medical records and from patients' own reports. In case of incongruence, it was assumed that a patient received adjuvant therapy.

Complaints after adjuvant therapy were assessed by a self-report questionnaire that listed a number of complaints, such as skin problems and nausea (response categories yes/no). A higher total score (the sum of score 0–9 for radiotherapy and score 0–10 for chemotherapy) indicates more complaints.

2.3.4. Psychological predictors

Openness to experience was assessed with a 12-item subscale of the NEO-Five Factor Inventory [40,41]. A higher score indicates a higher tendency to be curious, creative, adventurous, and open to new ideas.

Perceived control was assessed with the 7-item Mastery Scale [42]. A higher score (7–35) reflects a stronger sense of control over problems and events in life.

Psychological distress was assessed with the General Health Questionnaire [43]. The GHQ-12 is a well-validated instrument [44], which is often used in medical populations, including women with breast cancer [45,46]. A higher score (0–12) indicates more distress. Following Parle et al. [46] and Goldberg and Williams [43] a cut-off score of 4 or higher was used, which indicates occurrence of psychological morbidity.

Cancer worry was assessed with a 3-item adapted version of the Cancer Worry Scale [47]. A higher score (3–12) indicates more worry.

2.4. Statistical analyses

Prevalence and stability of use of provider- and self-directed CAM were examined by using descriptive analyses and McNemar's tests. The variables provider- and self-directed CAM were dichotomized: use was defined as no use versus use of one or more types of provider- or self-directed CAM. Only patients who filled in their CAM use at both assessments were included in the McNemar's test analyses (N = 159).

Prevalence of use of individual types of CAM was examined by using descriptive analyses. The five NCCAM-categories were dichotomized: use was defined as no use versus use of one or more CAM types within that category.

Reasons for use of provider-directed and self-directed CAM, and individual types of CAM were examined by using descriptive analyses. The variables that measured a reason for use of provider- and self-directed CAM, respectively a NCCAM-category, were dichotomized: either none of the CAM types in a category were used for a specific reason or one or more of the CAM types in that category were used for that reason. In each analysis only patients were included who used a particular CAM category or CAM type (excluding non-users), as respondents indicated their reasons for CAM use for the CAM types that they were practicing.

Before examining *which sociodemographic, clinical, and psychological characteristics were associated with provider- and self-directed CAM use immediately after chemo- or radiotherapy*, the internal consistencies of the psychological variables scales were established by calculating Cronbach's alphas. Next, univariate logistical regression analyses were conducted, followed by a multivariate analysis ($p < .05$). Variables with a significance level $<.10$ were retained in the multivariate analysis. To examine *which characteristics predicted provider- and self-directed CAM use six months after chemo- or radiotherapy*, univariate and multivariate logistical regression analyses were conducted, adjusted for CAM use immediately after adjuvant therapy. By taking into account women's previous CAM use, predictors of CAM use over time could be examined irrespective of women's previous CAM use. Only patients who filled in their CAM use at both assessments were included in the logistical analyses. The results are presented as odds ratios (OR). We also examined the characteristics of provider- and self-directed CAM use by using Generalized Estimating Equations. The results were comparable to those of the multivariate logistical analyses. Therefore, only the results of the logistical analyses are presented.

All analyses were conducted with SPSS 16.0 for Windows.

3. Results

3.1. Sample

A total of 3093 women referred to the hospital because of a suspicion of breast cancer, were invited to participate in the study. Of these, 1226 women (40%) gave informed consent, of whom 1094 (89% of 1226) met the inclusion criteria. Of these 1094 women, 912 women could be contacted within six weeks after diagnosis and confirmed their pre-diagnosis consent (response rate 33%, assuming that 89% of 3093 women would meet the inclusion criteria). Of these 912 women, 242 women were diagnosed with breast cancer.

Of the 242 patients, 203 received adjuvant therapy after surgery – after which the first CAM-questionnaire was filled in. Of these, 10 women did not fill in the first CAM-questionnaire, 1 woman completed the first questionnaire but during instead of after adjuvant therapy, and 16 women did not fill any of the questionnaires after adjuvant therapy. Thus, 176 women who completed the first CAM-questionnaire (on average 5.1 months postdiagnosis, SD 2.1), were included in this study. Of these 176 women, 159 also completed the second CAM-questionnaire six months later (on average 11.1 months postdiagnosis, SD 2.3). The patient sample was comparable to the total regional population of women with breast cancer younger than 75 years who were treated with adjuvant therapy, with respect to age and cancer stage (Comprehensive Cancer Center North-Netherlands Cancer Registry, 2005).

The most common reason for drop out was that participation was considered too burdensome. The 27 women who did not fill in the first CAM-questionnaire or dropped out of the study, did not differ from the participating 176 women with respect to age, education, cancer stage (stage 0 and 1 versus stage 2 and 3), or any of the psychological measures as measured after surgery. See Table 1 for sample characteristics.

3.2. Prevalence and stability of use of provider-directed and self-directed CAM

Eighteen percent of the women who completed both CAM-questionnaires, used one or more types of provider-directed CAM

Table 1
Sample characteristics (N = 176).

Characteristics	Total sample[a]
Sociodemographic factors	
Age at diagnosis (median, range)	55 (31–75)
Level of education (N, %)[b]	
Low	74 (42.8)
Intermediate	60 (34.7)
High	39 (22.5)
Clinical factors	
Cancer stage at diagnosis (N, %)[c]	
Early stage (0/1)	72 (41.4)
Later stage (2/3)	102 (58.6)
Type of surgery (N, %)	
Lumpectomy	132 (77.6)
Mastectomy	38 (22.4)
Type(s) of adjuvant therapy (N, %)	
Radiotherapy only	82 (46.6)
Chemotherapy only	24 (13.6)
Radio- and chemotherapy	70 (39.8)
Complaints after adjuvant therapy (0–19) (median, range)	5 (0–16)
Psychological factors	
Openness to experience (12–60) (M, SD)[d]	38.6 (5.2)
Perceived control (7–35) (M, SD)	25.3 (4.5)
Psychological distress (N, %)	
No psychological morbidity (<4)	100 (57.1)
Psychological morbidity (>4)	75 (42.9)
Cancer worry (3–12) (M, SD)	4.4 (1.5)

[a] Presented percentages are valid percentages, missing values excluded.
[b] Educational level was categorized as low (elementary school, low level high school or low level vocational education), intermediate (high level high school or intermediate level vocational education) and high (high level vocational education/college or university).
[c] Cancer stage was categorized as stage 0 or 1 versus stage 2 or 3.
[d] Openness to experience was measured after surgery, all other predictors were measured after adjuvant therapy.

after adjuvant radio- or chemotherapy. Fifty percent of these women also used provider-directed CAM six months later. Seventy-two percent of the women did not use provider-directed CAM at either assessment. Use of provider-directed CAM was stable over time, i.e., the proportion of women who used provider-directed CAM at the two assessments was comparable – not taking into account individual changes in CAM use (McNemar's test, p = 1.00; Table 2).

Fifty-seven percent of the women who completed both CAM-questionnaires, used one or more types of self-directed CAM after adjuvant radio-or chemotherapy (49% if prayer and rituals were excluded). Eighty-four percent of these women also used self-directed CAM six months later. Thirty-three percent of the women did not use self-directed CAM at either assessment. Use of self-directed CAM was stable over time (McNemar's test, p = 1.00; Table 3).

Fourteen percent of the women who completed both CAM-questionnaires, used both provider- and self-directed CAM after

Table 2
Use of provider-directed CAM.

		Use of provider-directed CAM six months after treatment		Total
		No	Yes	
Use of provider-directed CAM immediately after adjuvant therapy	No	109 (71.7%)	15 (9.9%)	124 (81.6%)
	Yes	14 (9.2%)	14 (9.2%)	28 (18.4%)
Total		123 (80.9%)	29 (19.1%)	152 (100.0%)[a]

[a] Of the 159 women who completed the CAM questionnaire at both assessments, 7 women were excluded. They did not fill in any of the questions that addressed use of provider-directed CAM at one of the assessments.

Table 3
Use of self-directed CAM.

		Use of self-directed CAM six months after treatment		Total
		No	Yes	
Use of self-directed CAM immediately after adjuvant therapy	No	53 (33.3%)	15 (9.4%)	68 (42.8%)
	Yes	15 (9.4%)	76 (47.8%)	91 (57.2%)
Total		68 (42.8%)	91 (57.2%)	159 (100.0%)

adjuvant therapy. Six months later 15% of the women used provider- and self-directed CAM at the same time.

3.3. Use of CAM categories and individual types of CAM

The CAM categories that were mostly used, were biologically based therapies (41% use after adjuvant therapy and 35% six months later), and mind-body therapies (33% use after adjuvant therapy and 37% six months later). The top three mostly used individual CAM types at both assessments were use of additional vitamins or minerals, prayer and rituals, and relaxation exercises. Massage was the third mostly used CAM type if prayer and rituals were excluded (Table 4).

3.4. Reasons for use of provider-directed and self-directed CAM, CAM categories and individual types of CAM

Twenty-four percent of the women who used provider-directed CAM, used it to influence the course of cancer after adjuvant therapy, while 52% of the women who used self-directed CAM, used that for the same purpose. Within six months these percentages rose to 47% respectively 65%. All the women who used provider-directed CAM, used these services to influence their well-being, at both assessments. Ninety-five percent of the women who used self-directed CAM, used that to influence their well-being after adjuvant therapy, and 96% of the women used self-directed CAM to influence their well-being six months later.

Reasons for use differed per CAM category and per individual CAM type (Table 4).

3.5. Predictors of CAM use after radio- or chemotherapy and six months later

The Cronbach's alpha coefficients for the psychological predictors ranged from .72 to .87.

3.5.1. Predicting use of provider-directed CAM

Based on univariate analyses (p < .10), age (OR = 0.96), cancer stage (OR = 2.93), adjuvant therapy (OR = 4.33 for chemotherapy only, and OR = 2.71 for radiotherapy and chemotherapy compared to radiotherapy only), complaints after adjuvant therapy (OR = 1.16), and openness to experience (OR = 1.15) were entered in a multivariate analysis to predict use of provider-directed CAM after adjuvant therapy. In the multivariate analysis more openness to experience remained the only significant predictor of use of provider-directed CAM after adjuvant therapy (OR = 1.14, p < .01; Table 5).

Women who were more open to experience, also had higher odds of using provider-directed CAM six months after adjuvant therapy, irrespective of whether they used provider-directed CAM immediately after adjuvant therapy (OR = 1.10, p < .05). No other predictors fulfilled the p < .10 requirement to be entered in a multivariate analysis to predict provider-directed CAM six months after adjuvant therapy.

Table 4
Use of individual types of CAM, per NCCAM-category.

CAM type, organized by category	N (%)[a] immediately after adjuvant therapy	Reason for use: influence cancer	Reason for use: influence well-being	N (%)[a] 6 months after adjuvant therapy	Reason for use: influence cancer	Reason for use: influence well-being
Biologically based with diet[b]	*72 (40.9)*	*14 (37.8)*	*65 (94.2)*	*54 (34.6)*	*22 (64.7)*	*47 (95.9)*
Additional vitamins/minerals	67 (38.3)	12 (36.4)	60 (93.8)	51 (32.7)	16 (57.1)	45 (95.7)
Herbs	12 (7.0)	3 (42.9)	9 (81.8)	11 (7.2)	7 (87.5)	7 (100.0)
Diet	3 (1.8)	1 (50.0)	3 (100.0)	5 (3.3)	4 (100.0)	4 (100.0)
Manipulative and body-based[b]	*22 (12.9)*	*2 (15.4)*	*19 (100.0)*	*23 (14.9)*	*4 (30.8)*	*21 (100.0)*
Massage	21 (12.3)	2 (15.4)	18 (100.0)	23 (14.9)	4 (30.8)	21 (100.0)
Chiropractic	2 (1.2)	–	1 (100.0)	2 (1.3)	1 (100.0)	1 (100.0)
Mind-body therapies incl. prayer[b]	*57 (33.1)*	*17 (58.6)*	*51 (98.1)*	*58 (36.9)*	*17 (53.1)*	*47 (95.9)*
Mind-body excl. prayer[b]	*27 (15.8)*	*6 (42.9)*	*25 (100.0)*	*37 (23.9)*	*7 (36.8)*	*15 (88.2)*
Scent/Aromatherapy	5 (2.9)	1 (33.3)	4 (100.0)	3 (2.0)	1 (100.0)	2 (100.0)
Relaxation exercises	21 (12.3)	3 (30.0)	19 (95.0)	32 (20.6)	4 (28.6)	25 (96.2)
Meditation	13 (7.6)	1 (20.0)	11 (100.0)	12 (7.8)	4 (50.0)	10 (90.9)
Imagination (e.g., Simonton)	2 (1.2)	1 (50.0)	2 (100.0)	1 (0.7)	1 (100.0)	–
Biofeedback	1 (0.6)	–	1 (100.0)	0 (0.0)	–	–
Hypnosis	0 (0.0)	–	–	0 (0.0)	–	–
Prayer/Rituals	43 (25.1)	12 (60.0)	36 (94.7)	33 (21.3)	12 (57.1)	28 (96.6)
Energy therapies[b]	*3 (1.8)*	*0 (0.0)*	*2 (66.7)*	*7 (4.6)*	*3 (60.0)*	*7 (100.0)*
Energy therapy	1 (0.6)	0 (0.0)	0 (0.0)	5 (3.3)	2 (66.7)	5 (100.0)
Spiritual therapy	2 (1.2)	–	2 (100.0)	4 (2.6)	2 (50.0)	3 (100.0)
Alternative medical systems[b]	*17 (9.9)*	*4 (50.0)*	*16 (100.0)*	*14 (9.1)*	*8 (88.9)*	*14 (100.0)*
Acupuncture	2 (1.2)	0 (0.0)	2 (100.0)	1 (0.7)	1 (100.0)	1 (100.0)
Naturopathy	1 (0.6)	–	1 (100.0)	0 (0.0)	–	–
Homeopathy	14 (8.2)	4 (66.7)	13 (100.0)	13 (8.4)	7 (87.5)	13 (100.0)

– Frequency is not displayed due to only missing values or no users.

[a] Presented percentages are valid percentages, missing values excluded. The number of CAM users ranged from 170 to 175 after adjuvant therapy, and from 152 to 156 six months after adjuvant therapy. The results with regard to use of CAM to influence the course of cancer should be interpreted with caution, due to a large number of missing data.

[b] The frequencies and percentages for the categories indicate the number of respondents that used one or more types of CAM from that category.

3.5.2. Predicting use of self-directed CAM

Based on univariate analyses ($p < .10$), cancer stage (OR = 0.56), openness to experience (OR = 1.09), and distress (OR = 2.39), were entered in a multivariate analysis to predict use of self-directed CAM after adjuvant therapy. In the multivariate analysis having a clinical level of distress remained a significant predictor of use of self-directed CAM after adjuvant therapy (OR = 2.17, $p < .05$).

Education (OR = 3.20 for a high level of education), openness to experience (OR = 1.14), perceived control (OR = 0.91), and cancer worry (OR = 1.40) were entered in a multivariate analysis to

Table 5
Predictors of use of provider -and self-directed CAM in a multivariate analysis (N = 159).[a]

Predictor	Use of provider-directed CAM immediately after adjuvant therapy OR (95% CI)[b]	Use of self-directed CAM immediately after adjuvant therapy OR (95% CI)[b]	Use of self-directed CAM six months after adjuvant therapy, adjusted for previous use[c] OR (95% CI)[b]
Sociodemographic factors			
Age at diagnosis	0.98 (0.92–1.03)	–	–
Education	–	–	
Low			1.00 (reference)
Intermediate			0.63 (0.23–1.69)
High			2.40 (0.67–8.60)
Clinical factors			
Cancer stage			
Stage 0 or 1	1.00 (reference)	1.00 (reference)	–
Stage 2 or 3	2.23 (0.58–8.55)	0.56 (0.28–1.10)	
Adjuvant therapy		–	–
Radiotherapy only	1.00		
Chemotherapy only	1.39 (0.23–8.32)		
Radio- + chemotherapy	1.06 (0.17–6.78)		
Complaints after adjuvant therapy	1.05 (0.87–1.28)	–	–
Psychological factors			
Openness to experience	**1.14 (1.03–1.24)**	1.07 (1.00–1.15)	**1.11 (1.01–1.22)**
Perceived control	–	–	0.92 (0.83–1.03)
Distress	–	**2.17 (1.09–4.32)**	–
Cancer Worry	–	–	1.30 (0.94–1.79)
Previous use[c]	–	–	19.74 (8.01–48.66)

[a] Included in the analyses were data from respondents who completed both questionnaires about CAM use. OR, odds ratio; CI, confidence interval.

[b] Printed in bold: multivariate analysis $p < 0.05$.

[c] Adjusted for use of self-directed practices immediately after adjuvant therapy.

predict use of self-directed CAM six months after adjuvant therapy, based on univariate analyses and after taking into account women's previous use of self-directed CAM. The multivariate analysis showed that women who were more open to experience, had higher odds of using self-directed CAM six months after adjuvant therapy, irrespective of whether they used self-directed CAM immediately after adjuvant therapy (OR = 1.11, $p < .05$; Table 5).

When prayer and rituals were excluded as a CAM type, distress (OR = 2.19, $p < .05$) and openness to experience (OR = 1.09, $p < .05$) were significant predictors of self-directed CAM after adjuvant therapy in the multivariate analysis. Furthermore, without prayer and rituals, openness to experience was not a predictor of self-directed CAM six months after adjuvant therapy (OR = 1.07, $p = .14$), but education (OR = 4.55, $p < .05$ for a high level of education), and cancer worry (OR = 1.41, $p < .05$) were significant predictors, after taking into account previous use of self-directed CAM.

4. Discussion and conclusion

4.1. Discussion

Approximately 18% of the respondents in this study used provider-directed CAM services, and 57% of the women used self-directed CAM, at each of the two assessments. The mostly used CAM types were use of additional vitamins or minerals, prayer and rituals, and relaxation exercises. Self-directed CAM was more often used to influence the course of cancer than provider-directed CAM. Both were frequently used to influence well-being. Openness to experience predicted use of provider-directed CAM after adjuvant therapy, while clinical distress predicted use of self-directed CAM after adjuvant therapy, after adjusting for other predictors. Openness to experience predicted use of provider-directed and self-directed CAM six months after adjuvant therapy, irrespective of whether women used provider- respectively self-directed CAM immediately after adjuvant therapy.

The prevalence of CAM use in our study was higher than the 45% prevalence found in a European survey among breast cancer patients [3,4]. It is difficult to explain the differences in results. We cannot deduce that Dutch breast cancer patients use relatively more CAM than other European patients (see also [48]), as it is known that prevalences vary substantially between studies [1,3] due to heterogeneity in study designs, e.g., sampling methods, clinical sample characteristics, range of CAM types included, and the timing of assessment. The CAM category mostly used in this study was biologically based therapies, which corresponds with previous findings [10].

Our results reconfirm the importance of including psychological factors as predictors of CAM use [2,15,16,18]. Distress was a predictor of CAM use, which is in line with some [17,49], but not all previous studies (e.g., [18]). Sollner and colleagues suggest that a significant association between distress and CAM use will only be found in studies that include CAM types that are used to relieve distress, e.g., relaxation exercises [18]. Our finding that distress was only related to self-directed CAM is in line with this suggestion.

Distressed patients might engage in self-directed CAM as part of a self-initiated stepped-care model, in which women first try to self-manage their psychosocial problems before seeking professional help. Another possibility is that women engage in self-directed CAM because their distress remains unrecognized, because they do not receive sufficient support [50], or because they do not want help from (regular) health care providers [51]. If CAM is used as a solution for unrecognized or unresolved distress, standard screening for distress in regular care is advisable, as

adequate recognition of distress may lead to reduced use of self-directed CAM and, thus, fewer costs for patients.

It is questioned whether prayer is a CAM type. Inclusion of prayer in CAM studies tends to inflate CAM use [52]. Our results suggest that including prayer may also possibly mask otherwise significant associations between patients' characteristics and self-directed CAM use, e.g., a higher level of education appears to be especially related to self-directed CAM use over time. Nonetheless, in the logistical analyses without prayer and rituals, distress and openness to experience remained significant predictors. Openness to experience was the only predictor that was associated with provider-directed as well as self-directed CAM in multivariate analyses. As indicated in previous studies [31,32], people who are more open to experience may be more inclined to experiment with CAM in addition to regular health care, possibly as a consequence of holistic or proactive health motivations.

Limitations of this study were the low response rate (33%) and the small number of women who filled in the questions about whether or not they used individual CAM types to influence the course of cancer. It appears that many respondents skipped these questions instead of answering 'no'. We did not know respondents' motivations, and therefore did not impute missing values. This procedure most likely has led to an overestimation of the number of patients who use CAM to influence the course of cancer.

Importantly, we categorized CAM types as provider- or self-directed CAM, but these categories are not mutually exclusive; e.g., a patient may use homeopathic products on recommendation by a homeopathic provider. We based our classification of provider- or self-directed CAM on a listing provided with the CAM Health Care Model [22], but also on our knowledge of the Dutch health care system. For example, homeopathy was categorized as self-directed CAM, as self-help over-the-counter homeopathy products are popular in the Netherlands.

This prospective study extends existing insights by confirming the importance of distinguishing provider- from self-directed CAM. Future studies might examine the association between distress and self-directed CAM with a questionnaire that purposely distinguishes provider- from self-directed CAM, and with qualitative studies to explore (possibly stepped-care) motivations for CAM use. Future studies may also examine other aspects of the CAM Healthcare Model, for example the influence of CAM use on long-term well-being [22].

4.2. Conclusion

The results of the study confirm that the majority of breast cancer patients use CAM. Furthermore, CAM use is stable during the first half year after adjuvant therapy. There are differences in prevalences of use, reasons for use, and psychological predictors of use between provider-directed and self-directed CAM.

4.3. Practice implications

The results potentially make CAM use an important topic to discuss during clinical consultations – depending on the information needs of the patient.

Given the relative stability of CAM use after adjuvant therapy, we advise health care providers to plan the 'CAM-talk' with women with breast cancer before (or during) adjuvant therapy. We also advise providers to address patients' expectations. Patients need to know that scientific evidence about the efficacy of CAM to influence the course of cancer is lacking. However, it is also important that providers nevertheless acknowledge and respect that patients use CAM and possibly believe in such efficacy, despite current scientific facts [3].

Providers may take into account patients' preferences for provider- or self-directed CAM when discussing CAM. Women with a clinical level of distress most likely want information about self-directed CAM. Their interest in self-directed CAM may also indicate a need for more attention for distress in general. As some self-directed, biologically based products may interact with regular medication, physicians should discuss with the women how their CAM products of choice can be safely integrated in regular health care.

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Conflict of interest

None of the authors have a conflict of interest that could inappropriately influence or be perceived to influence this article.

Disclosure

We confirm all patient/personal identifiers have been removed or disguised so the patient/person(s) described are not identifiable and cannot be identified through the details of the story.

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