ORIGINAL ARTICLE – CLINICAL ONCOLOGY

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Use and perception of complementary and alternative medicine among cancer patients: the CAMEO-PRO study

Complementary and alternative medicine in oncology

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Abstract

Background It is estimated that about half of cancer patients use at least one form of complementary and alternative medicines (CAM) in their life but there is a strong reticence of patients in talking about CAM with their oncologist. Primary aim of this study was to inform patients about CAM, focusing on their supposed benefits, toxicities and interactions with conventional therapeutic agents. The study also explored patients' perception about CAM and ascertained the level of CAM use among cancer patients of an Italian academic hospital.

Methods From April 2016 to April 2017, the observational pilot trial "CAMEO-PRO" prospectively enrolled 239 cancer patients that were invited to attend a tutorial about CAM at the Department of oncology, University Hospital of Udine, Italy. Before and after the informative session, patients were asked to fill a questionnaire reporting their knowledge and opinion about CAM.

Results Overall, 163 (70%) women and 70 (30%) men were enrolled. Median age was 61 years. At study entry, 168 (72%) patients declared they had never been interested in this topic previously; 24 patients (11%) revealed the use of a type of alternative therapy and 58 (28%) revealed the use of complementary therapy. In total, 139 (55.2%) patients attended the informative session. Bowker's test of symmetry demonstrated statistically significant opinion's change after the session on 9 out of 14 explored items.

Conclusions Informative sessions seem to have a relevant impact on patients' perceptions and opinions about CAM.

Keywords Complementary and alternative medicine · Alternative medicine · Quackery · Supportive care · Communication in oncology

Introduction

The acronym CAM stands for the complementary and alternative medicines which comprise the non-conventional medicines sometimes proposed as alternatives to the medical prescribed treatments or proposed in association with conventional medicine. However, there is no real dichotomy between "alternative" and "complementary" medicines, since treatments may be alternative or complementary depending on patients' intent when using them. In the oncological field, CAM have always been a subject of debate, both for their underverified clinical value and for

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their potential damages to individual patients and society (Bozza et al. 2015).

It is estimated that in the US approximately 30–40% of the general population use CAM and, among those who use them, about 80% comprise patients with chronic pathologies (Harris et al. 2012). The European figure, obtained from a survey conducted on 956 patients in 14 countries (Molassiotis et al. 2005), confirms the growth trend of CAM reporting that 35.9% of oncological patients use them during their course of care (Kessler et al. 2001). However, data on the Italian situation are limited. A study of 803 oncological patients from the Tuscany region focusing solely on the complementary therapies reported 37.9% of users. Among them, 89.6% reported receiving benefit and 66.3% only informed their physician about their use (Bonacchi et al. 2014). A recent multicentre survey conducted in Italy on 468 patients, revealed that nearly 49% were presently using or had recently used CAM. Notably, in this study, the definition of CAM included herbal remedies, supplements and vitamins (Berretta et al. 2017).

From the case studies of patients interviewed about their use of CAM, the reasons cited for their use were improvement of psychophysical wellbeing in 76% of the cases and, in the oncological field, to strengthen the ability of the body to fight cancer (11–41% cases) or to reduce the side effects of chemotherapy (3–74%). Many patients declared they have benefited from the use of CAM use even if these benefits did not often coincide with the initial reason for using them. Only a small number of the interviewed (less than 5%) reported collateral effects, most of which had been transient.

CAM treatments account for a significant part of the public spending in several countries. In the US, it is estimated that annual spending regarding alternative treatments is around 27 million dollars per year (Eisenberg et al. 1998). The Italian figure, according to Bonacchi et al. (2014), reported that 39.3% of complementary therapy users has to face an annual expenditure of over 250 euros. Therefore, close to the primary objective of the demonstration of their efficacy, it is crucial to evaluate cost-effectiveness of these therapies.

Age, sex and level of education constitute predictors of CAM use (Gansler et al. 2008). Pre-existing psychiatric illnesses (Burstein et al. 1999), an inauspicious diagnosis with a brief expectation of life (Risberg et al. 1997) and participation in support groups (Boon et al. 2000) are other factors associated with CAM use.

According to the European survey (Molassiotis et al. 2005), principal sources of information are friends or relatives in 87.1% of cases, the Internet and mass media in 37.7%, and physicians and health workers in 21.6%. Patients do not often declare the use of CAM to their physician (Bonacchi et al. 2014), if not expressly requested to do so (Metz et al. 2001). Despite the popularity of CAM, many oncologists revealed little knowledge of the subject (Newell and Sanson-Fisher 2000) and less than a quarter started a discussion with their patients about this topic (Schofield et al. 2003).

Among the potential toxicities of CAM, there are side effects due to their mechanisms of action: indirect effects due to the interaction with other medicines with a consequent reduction of the effectiveness of these last, or onset of unexpected events (Tables 1, 2). Furthermore, it is not uncommon for patients using CAM to delay in accessing potentially effective official therapies prescribed for the care and control of the symptoms caused by the tumor.

Alternative therapies have been shown to be ineffective in almost all cases: however, some randomized trials involving the vast and varied panorama of the complementary therapies have suggested they may have some benefits, although the evidence is still limited and in some cases lacking of scientific validation. These studies are often limited by lack of a control group, the placebo effect, and the difficulty in evaluating particular outcomes such as quality of life.

Patients and methods

Complementary and Alternative MEdicine in Oncology-Physicians infoRm Oncological patients (CAMEO-PRO) is an observational prospective study, active in our center from April 2016 to April 2017.

This spontaneous and non-sponsored study, approved by an ethics committee, consecutively enrolled patients who were receiving, or had previously received, at least one oncological treatment at Department of Oncology, Academic Hospital of Udine.

At the time of enrollment, the patients received information about the study. After signing a written informed consent, patients were asked to fill in an anonymous questionnaire (Q1). They were then invited to attend an information session about complementary and alternative medicines in

Table 1 Direct toxicity of some of the most known CAM (Ernst 2002; Haller and Benowitz 2000; MacGregor et al. 1989; Moertel et al. 1982; Miller et al. 1998; Ashar and Vargo 1996; Jatoi et al. 2003; Yang et al. 2010; Teschke et al. 2013; Boudreau and Beland 2006)

S. John's worth	Nausea, hypersensitivity reactions
Ginseng	Diarrhea, headache, nausea, hypertension
Echinacea	Hypersensitivity reactions
Gingko	Vomit, headache
Green tea	Vomit, insomnia, diarrhea
Shark cartilage	Vomit, constipation, hepatitis
Laetrile	Vomit, seizures, respiratory failure
Bicarbonate of sodium	Hydroelectrolyte imbalances
Aloe	Diarrhea, hepatitis

Table 2 CAM and interactions with anticancer drugs (Budzinski et al. 2000; Golden et al. 2009; Lee et al. 2006; Sparreboom et al. 2004)

	Mechanism of interaction	Antitumor drugs
Green tea	Inhibition cytochrome P450	Anthracyclines, taxanes, bortezomib
Ginko Biloba	Inhibition CYP3A4 and CYP2C19	Many anticancer drugs and EGFR-TKI
Echinacea	Induction CYP3A4	Many anticancer drugs and EGFR-TKI
Soy	Phytoestrogens	Tamoxifen
Ginseng	Inhibition CYP3A4	Many anticancer drugs and EGFR-TKI
St. John's worth	Induction of many cytochromes	All the anticancer drugs
Essiac	Inhibition CYP3A4	Many anticancer drugs
Mistletoe	Inhibition CYP3A4	Many anticancer drugs
Aloe	Inhibition CYP3A4	Many anticancer drugs

oncology. The trial participation was voluntary and did not interfere with clinical practice. After the session, the attending patients were required to fill in a second anonymous questionnaire (Q2) to assess any changes in their opinions about the topic. A number was assigned to the patients and to the baseline questionnaire, to correctly match any second questionnaire after the session.

Inclusion criteria were diagnosis of cancer, to be followed at the Department of Oncology of Udine, to have received at least one anti-cancer treatment, the ability to provide informed consent and Karnofsky performance status ≥ 60.

The Q1 questionnaire ("Appendix 1"), based on those already published by Molassiotis and Saghatchian, was designed to elicit the patient's demographic characteristics, social and family situation, clinical data reported by the patient and, more importantly, their perceptions about the disease and the treatment received, knowledge about CAM, their source of information, the possible uses of CAM, the reasons for using them and their satisfaction with CAM. The last part of the questionnaire comprised statements regarding CAM for which patients were asked to express a level of agreement.

The Q2 questionnaire ("Appendix 2") replicated the last part of the previous questionnaire to detect any change in perceptions and opinions after the information session and the patient's satisfaction with the content and delivery of the session.

The 1.5-h information sessions were conducted by doctors with the support of a video projector and slides. The first hour was devoted to illustrating the most popular alternative and complementary therapies with a special focus on the evidence available to date, toxicities, possible interactions with oncological treatment and the need to declare their use during clinical visits; the second part of the session was reserved for questions and discussion.

Statistical analysis

Patients' characteristics were summarized by descriptive analysis, with a special emphasis on demographic and social aspects.

Continuous variables were reported though the median and interquartile range, whereas categorical variables were described by frequency distributions.

Differences in baseline answers, according to the patients' characteristics and use of CAM, were investigated by means of chi-square test or Fisher's exact test as per sample size constrains.

Stratification was applied to highlight whether baseline characteristics could influence the answering patterns.

Differences in answering patterns before and after the information session were investigated through Bowker's test of symmetry. The statistical significance level was set at $P < 0.05$.

Statistical analysis was performed using SAS software, Version 9.4 [SAS Institute Inc. (2014) Cary, NC].

Results

A total of 239 patients were enrolled, 163 females (68.2%), 70 males (29.3%); 6 patients did not declare their sex (2.5%). The median age was 61 years (range 23–8). The most frequent educational level was high school diploma; 98 patients (41.2%) had a high school and 68 (29.1%) a junior high school degree. The primary tumor sites involved were the breast (42.4%), gastrointestinal tract (27.8%), lung (11.7%), and genitourinary tract (10.8%). More than 90% of patients declared they knew the purpose of their treatment, only 1.7% declared that they did not know it, and 6.9% were not sure (Table 3).

Patients were asked to state their main sources of information about health. It was possible to cite more than one source: the most frequent were family doctors (70.1%), the internet (41.4%), family (20.1%), friends (17.8%) and other health professionals, e.g., naturopath (9.8%).

Most patients, 168 (72.7%), stated that they had never been interested in CAM before, in contrast to almost a third (27.2%) who reported they were already interested before enrollment in the study. The alternative therapies mentioned more frequently were the Di Bella multitherapy (83.0%), Stamina (33.3%) and Simoncini (13.4%), Artemisia

Table 3 Sociodemographic and clinical characteristics of the sample

	Median	Range
Age (n=236)	61	23–85

	Number (n)	Percentage (%)
Sex (n=233)		
Male	70	30.0
Female	163	70.0
Education (n=234)		
Primary school	35	14.9
Junior high school	68	29.1
Senior high school	98	41.8
Bachelor degree	5	2.1
Master degree	28	11.5
Occupation (n=231)		
Employee	61	26.4
Self-employed	24	10.9
Manager	3	1.3
Health professional	9	3.9
Unemployed	6	2.6
Retired	104	45.0
Housewife	24	10.4
Marital status (n=234)		
Married	154	65.9
Separated	22	9.4
Widowed	25	10.7
Cohabitant	9	3.8
Engaged	3	1.2
Single	21	9.0
Children (n=235)		
No	62	26.4
Yes	173	73.6
Monthly income (n=223)		
<1000 €	32	14.3
1000–2000 €	101	45.3
2000–3500 €	65	29.1
3500–6000 €	17	7.6
>6000 €	1	0.5
No fixed income	7	3.1
Primary cancer site (n=231)		
Breast	98	42.4
Gastrointestinal	63	27.8
Genitourinary	25	10.8
Lung	27	11.7
Skin	5	2.7
Nervous system	4	1.7
Other	9	3.9
Previous surgery (n=233)		
Yes	166	71.2
No	67	28.8
Tumor recurrence (n=223)		
Yes	96	43
No	106	47.5

Table 3 (continued)

	Number (n)	Percentage (%)
I am not sure	20	9.0
Current therapy		
Chemotherapy (n=214)	172	80.4
Endocrine treatment (n=147)	32	21.8
Biological therapy (n=151)	55	36.4
Clinical trial participation (n=199)		
Yes	33	14.2
No	199	85.8
Knowledge about the purpose of treatment (n=230)		
Yes	210	91.3
No	4	1.7
I am not sure	16	7.0
Purpose of treatment (n=225)		
To avoid disease recurrence	97	4.1
To keep disease under control	27	12.0
To control symptoms	128	56.9

	Median
Satisfaction about communication on	
Diagnosis (n=229)	9.00
Prognosis (n=211)	8.71
Purpose of therapy (n=206)	8.86

(14.5%), Hamer (18.2%) and Pantellini (10.7%) methods. Among the complementary therapies most cited were acupuncture (74.1%), homeopathy (71.7%), herbal remedies (34.9%), reflexology (30.7%), aromatherapy (25.3%) and reiki (22.9%).

A total of 24 patients (11% of those who responded to the question) declared their use of at least one alternative treatment during their oncological care path. The main alternative treatments used were the Pantellini (7 cases), Artemisia (6 cases) and Essiac (4 cases) approaches. Furthermore, 58 patients (28.4% of respondents) declared the use of at least one complementary treatment. The main complementary treatments used were homeopathy (30 cases), herbal remedies (23 cases), reflexology (14 cases), acupuncture (13 cases), and reiki (7 cases).

The 24 patients using CAM, cited the most frequent reasons for their use as being "to have more chances of healing", "to prevent or to reduce collateral effects from conventional medicine", "to regain better psychophysical wellbeing" and "Firmly believing in their being unharmful even if probably ineffective". Satisfaction levels for CAM were very high, with more than half the patients revealing a level of satisfaction higher than 6. Only a small percentage of respondents gave feedback about the economic burden of CAM; for this reason, it was not possible to draw any conclusions on this issue. (Table 4).

Table 4 Knowledge and use of CAM

	n	%
Previously interested in CAM (n = 231)		
Yes	63	27.3
No	168	72.7
Source of information (n = 226)		
Internet	96	42.5
Family doctor	157	69.5
Television	24	10.6
Chemist	28	12.4
Radio	6	2.6
Friends	40	17.7
Family	47	20.8
Other physicians	11	4.9
Other health professionals? (es. naturopath)	22	9.7
Other (books, papers, etc.)	12	5.3
Most known alternative therapies (n = 160)		
Artemisia	23	14.4
Shark cartilage	8	5.0
Escozul	14	8.7
Essiac	8	5.0
High-dose vit. C	16	10.0
Gerson method	9	5.6
Hamer method	29	18.1
Pantellini method	17	10.6
Simoncini method	21	13.1
Stamina method	53	33.1
Di Bella multitherapy	132	82.5
Bonifacio serum	12	7.5
Mistletoe	12	7.5
Use of alternative therapies (n = 218)		
Yes	24	11.0
No	194	89.0
Reasons for using alternative therapies (n = 24)		
To prevent or reduce collateral effects from conventional medicine	12	
To prevent or reduce symptoms	8	
To regain better psychophysical well-being	12	
To have more chances of healing	14	
To fight illness better	9	
Firmly believing in their being unharmful even if probably ineffective	12	
Most used alternative therapies (n = 24)		
Artemisia	6	
Essiac	4	
Pantellini method	7	

	n	Rate (%)
Satisfaction for use (n = 19)		
1–5 (low)	4	21.0
6–8 (middle)	9	47.4
9–10 (high)	6	31.6
Most known complementary therapies (n = 166)		
Acupuncture	123	74.1

Table 4 (continued)

	n	Rate (%)
Aromatherapy	42	25.3
Ginseng and Guarana	20	12.0
Hypnotherapy	17	10.2
Music therapy	26	15.7
Homeopathy	119	71.7
Reiki	38	22.9
Reflexology	51	30.7
Herbal remedies	58	34.9
Use of complementary therapies (n = 204)		
Yes	59	28.9
No	145	71.1
Most used complementary therapies (n = 57)		
Homeopathy	30	
Herbal remedies	23	
Reflexology	14	
Acupuncture	13	
Reiki	7	
Satisfaction for use (n = 56)		
1–5 (low)	12	21.4
6–8 (middle)	31	55.3
9–10 (high)	13	23.2

Considering both alternative and complementary medicines, age younger than 45 ($P = 0.0053$), female gender ($P = 0.0128$), senior high school education ($P = 0.0382$) and breast cancer ($P = 0.0455$) were factors associated with the use of CAM. Compared to the remaining study population, patients using CAM declared a greater degree of agreement with the following items in the basal questionnaire: "I clearly know the difference between alternative and complementary treatment" ($P < 0.001$), "Even if they do not work as traditional therapies, CAM can help quality of life" ($P < 0.001$), "Chemotherapy is harmful and causes side effects that negatively affect patients' quality of life" ($P = 0.0033$), "Even if the alternative therapies are probably ineffective, they are unharmful" ($P = 0.0027$), "Complementary therapies may reduce the side effects of conventional medicine" ($P = 0.0188$), "CAM fill the need for more humane and personalized treatments" ($P = 0.035$), "I have chosen or would choose CAM" ($P < 0.001$), "I would use alternative therapies if I had no more viable conventional medicine options" ($P = 0.0023$).

A total of 139 patients attended information sessions. Bowker's test of symmetry demonstrated statistically significative opinion changes after the session regarding 9 out of 14 explored items. Changes in opinions and their statistical relevance are presented in Table 5.

The Q2 questionnaire also focused on the interest and usefulness of the information session and patients were asked about their thoughts on the topic. Notably, positive

Table 5 Changes in opinions and statistical relevance among patients attending informative sessions

Item	Strongly disagree Before	Strongly disagree After	Disagree Before	Disagree After	Partially agree Before	Partially agree After	Strongly agree Before	Strongly agree After	Total responders	P value
I clearly know the difference between alternative and complementary treatment	26	6	31	5	38	29	16	72	196	<0.001
Alternative therapies are a valid alternative to conventional medicine	39	76	47	30	23	6	4	1	201	<0.001
Alternative therapies do not need to be scientifically validated	77	87	26	16	8	4	2	6	195	0.08
Pharmaceutical companies have no economic interest in conducting studies about CAM	23	20	23	28	36	35	22	21	184	0.54
Even if they do not work as traditional therapies CAM can help quality of life	22	47	36	40	44	15	7	7	186	<0.0001
Chemotherapy is harmful and causes side effects that negatively affect patients' quality of life	9	32	30	37	59	31	15	13	197	<0.0001
Even if the alternative therapies are probably ineffective, they are unharmful	29	71	40	29	33	9	10	3	191	<0.0001
Alternative therapies can be dangerous and side effects are not well known yet	11	3	19	6	56	28	22	71	190	<0.0001
The use of alternative therapies can hinder a correct therapeutic path	12	2	29	5	44	41	28	65	195	<0.0001
Complementary treatments may reduce the side effects of conventional medicine	11	10	32	20	53	54	16	28	194	0.11
CAM fill the need for more humane and personalized treatments	16	22	23	19	54	48	14	18	188	0.48
I have chosen or would choose to use CAM	30	55	29	20	30	19	15	10	182	0.003
If I underwent CAM therapies I would inform my doctor	7	2	5	4	21	14	79	92	194	0.25
I would use alternative therapies if I had no more viable conventional medicine options	18	34	22	29	30	25	41	23	196	0.0016

Item	Level of agreement	CAM users Observed frequency	CAM users Estimated frequency	CAM users %	CAM non-users Observed frequency	CAM non-users Estimated frequency	CAM non-users %	Total responders	P value
I clearly know the difference between alternative and complementary treatment	Strongly disagree	3	16.9	1.52	51	37	25.7	198	<0.001
	Disagree	12	16.5	6	41	36.4	20.7		
	Strongly agree	15	8.7	7.5	13	19.2	6.5		
	Partially agree	32	19.7	16.1	31	43.2	15.6		
Even if they do not work as traditional therapies, CAM can help quality of life	Strongly disagree	5	13.7	2.6	36	27.2	19.1	188	<0.001
	Disagree	18	21.4	9.5	46	42.5	24.4		
	Strongly agree	14	5.6	7.4	3	11.3	1.6		
	Partially agree	26	22.1	13.8	40	43.8	21.2		
Chemotherapy is harmful and causes side effects that negatively affect patients' quality of life	Strongly disagree	0	4.7	0.0	15	10.2	7.5	199	0.0033
	Disagree	13	16.1	6.5	38	34.8	19.1		
	Strongly agree	13	8.8	6.5	15	19.1	7.5		
	Partially agree	36	32.9	18	68	71	34.1		

Table 5 (continued)

Item	Level of agreement	CAM users				CAM non-users				Total responders	P value
		Observed frequency	Estimated frequency	%		Observed frequency	Estimated frequency	%			
Even if the alternative therapies are probably ineffective, they are unharmful	Strongly disagree	17	17.6	8.1		37	36.3	19.1		193	0.0027
	Disagree	15	21.5	7.7		51	44.4	26.4			
	Strongly agree	13	6.2	6.7		6	12.7	3.1			
	Partially agree	17	17.3	8.8		36	35.6	18.6			
Complementary therapies may reduce the side effects of conventional medicine	Strongly disagree	7	8.6	3.5		19	17.3	9.6		196	0.0188
	Disagree	7	14.5	3.5		37	29.4	18.8			
	Strongly agree	13	11.6	6.6		22	23.3	11.2			
	Partially agree	38	30.1	19.3		53	60.8	27			
CAM fill the need for more humane and personalized treatments	Strongly disagree	7	8.4	3.6		19	17.5	10		190	0.035
	Disagree	8	12.7	4.2		31	26.2	16.3			
	Strongly agree	16	9.7	8.4		14	20.2	7.3			
	Partially agree	31	31	16.3		64	64	33.6			
I have chosen or would choose CAM	Strongly disagree	5	18.2	2.7		50	36.7	27.1		184	0.001
	Disagree	17	14.9	9.2		28	30	15.2			
	Strongly agree	13	6.9	7		8	14	4.3			
	Partially agree	25	20.5	13.5		37	41.4	20.1			
I would use alternative therapies if I had no more viable conventional medicine options	Strongly disagree	3	10.6	1.5		32	24.3	16.1		198	0.0023
	Disagree	7	10	3.5		26	23	13.1			
	Strongly agree	30	22.7	15.1		45	52.2	22.7			
	Partially agree	20	16.6	10.1		35	38.3	17.6			

feedback was obtained: 83.9% of respondents reported that the session was very useful and 71.5% declared that after the session the topics were clearer.

Patients who attended the information session, compared to those who did not, did not show different characteristics or degrees of agreement with the items of the basal questionnaire, except for an increased use of CAM (48 observed versus 28 expected, $P = 0.0042$).

Patients who attended the information session and declared they had used CAM showed a statistically significative change in opinion for the following items: "I clearly know the difference between alternative and complementary treatment" ($P = 0.0064$), "Even if they do not work as traditional therapies, CAM can help quality of life" ($P = 0.0145$), "Even if the alternative therapies are probably ineffective, they are unharmful" ($P = 0.0130$), "The use of alternative therapies can hinder a correct therapeutic path" ($P = 0.0079$), and "I have chosen or would choose to use CAM" ($P = 0.028$).

Discussion

The present study has provided real-world data about the use of complementary and alternative medicines among Italian cancer patients.

The results of our study are in line with the existing literature and confirm sex, age and education as predictive factors of CAM use (Molassiotis et al. 2005; Gansler et al. 2008; Saghatchian et al. 2014).

At Q1, only 27.3% of patients declared to be interested in CAM and nearly 70% declared their family doctor as a source of information. These data are of strong interest. First, they indicate the prominent role of general practitioners in providing advice that may influence patients' choices. Second, these results underline the fact that, despite the spread and abuse of technology, most patients maintained their physician as the main source of health news. Nonetheless, the internet was frequently used to acquire information about CAM (42.5% of cases), followed by family and friends/acquaintances.

This knowledge about the main sources could be particularly useful to put in place improvements in the quality of information.

About one-third of patients declared the use of some form of CAM. This figure is apparently smaller than that reported in other countries and in Italy (Molassiotis et al. 2005; Bonacchi et al. 2014; Berretta et al. 2017). The most used alternative treatments were Pantellini's and Artemisia's methods, with a considerably high degree of satisfaction. Furthermore, the most used complementary therapies were homeopathy and herbal remedies, also with a high degree of satisfaction.

On the other hand, a high number of patients reported a very high level of satisfaction regarding communication with oncologists about the diagnosis, prognosis and purpose of treatment. This finding made it impossible to highlight any association between satisfaction level on communication and the use of CAM. Paradoxically, however, nearly 8% of patients were not sure of, or did not know, the purpose of the treatment prescribed.

More than half the patients attended the information session: significant opinion changes were observed in all participants and also among patients who had reported a previous use of CAM. These results suggest that the more skeptical patients also need to be correctly informed to enhance their perception of CAM. The positive impact of the sessions on patients' opinion corroborates the great need to properly inform cancer patients to give them the opportunity to raise their awareness.

The peculiar features of this study include patient anonymity, and the information sessions; however, the questionnaire's structure and the complete freedom to fill in it allowed many fields to be left uncompleted. Consequently, some issues were difficult to interpret, although the pattern of missing answers could be informative in itself.

Although the survey was not able to quantify the economic burden of CAM, the problem of the cost of these treatments is particularly relevant. A topic dear to those who propose CAM is the alleged conspiracy of pharmaceuticals companies that would gain from conventional therapies and from vaccines; however, the costs of vitamin supplements or ineffective drugs paradoxically have a greater impact on health public spending.

An open issue that still needs a clarification is the ambiguity of the definition of CAM, distinguishing and recognizing the value of complementary therapies that can satisfy, or already satisfy, the criteria of scientific validation.

Conclusions

Educational sessions about CAM are welcome for patients and should be included in regular cancer care to fill the gap of information not always satisfied by health care providers.

When evidence-based informative sessions on CAM are conducted by trained oncologists, patients are more willing to share their opinion with physicians and seem to be open to discuss this issue.

General practitioners, as principal source of information for patients, have a crucial role in promoting appropriate use of CAM (i.e., evidence-based complementary medicine) and may help to discourage inappropriate use of alternative medicine. They should be reached by tailored educational campaigns.

Our study demonstrates that patient's educational campaigns are feasible to conduce, well accepted by patients and have a sustainable cost–benefit ratio.

Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

Appendix 1: Q1 questionnaire

Definition of CAM: Non-conventional medicine alternative or complementary to "official medicine"

The purpose of these questionnaires is to assess your knowledge of alternative and complementary therapies and what is your opinion on these treatments.

Thank you for letting us know which alternative and complementary therapies you have already heard of and the reasons why you chose to undergo/not to undergo CAM treatments.

All information provided will be treated confidentially.

Age _____

Sex

- Male
- Female

Educational level

- Primary
- Junior high school
- Senior high school

- Bachelor degree
- Master degree
- PhD

Profession

- Employee
- Self employed
- Manager
- Health professional

- Student
- Unemployed
- Retired
- Housewife

Marital status

- Married
- Separated /Divorced
- Widowed

- Cohabitant
- Engaged
- Single

Do you have any children?

- Yes

- No

If yes, are they underage or dependent?

- Yes
- No

What is your monthly mean household economic income?

- < 1000 €
- 1000-2000 €
- 2000-3500   €
- 3500-6000 €

- 6000-10000 €
- >10000 €
- I don't know
- No fixed income

Are you currently undergoing/have you undergone cancer therapy?

- Yes, currently

- Yes, but I have now finished treatment t

When were you diagnosed? (month and year)

_____

_____

- I don't remember

Where did the tumor originate?

- Breast
- Gastrointestinal (e.g. bowel, stomach, pancreas, esophagus, biliary tract)
- Genitourinary (e.g. kidney, bladder, ureter, prostate, testicle, ovary, uterus, vagina)

- Lung
- Skin
- Nervous system (e.g. cerebral)
- I don't know
- Other origin (specify) _____

Did you undergo surgery for this tumor?

- Yes

- No

Has the tumor recurred?

- Yes
- No
- I don't know

If yes, where? (it is possible to choose more answers)

- Local (in the same organ where the first tumor had originated)
- Lung
- Lymph nodes
- Bone

- Liver
- Pleura or Peritoneum
- Brain
- Skin
- I don't know

Which of these treatments were /are you currently prescribed?

Chemotherapy
- yes, currently
- yes, in past

- no, never   • yes, in past   • yes, currently

Hormonal therapy   • no, never   • yes, in past

- yes, currently   Biological drugs   • no, never

Do you know the purpose of this therapy?

- Yes   • No   • I am not sure

If yes, what is its purpose in your opinion?

- The purpose of this therapy is to avoid the cancer to come back
- Therapy keep the disease under control but it cannot fight cancer
- Therapy helps me control symptoms

Have you ever participated in clinical trials?

- Yes, at present   • Yes, in the past   • No, never

Please rate   the quality of the information received from by your oncologist on: (e.g. 0 very bad-10 excellent)

Diagnosis

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Prognosis

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Purpose of your treatment

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Have you ever been interested in alternative and complementary therapies before?

- Yes
- No

What are your sources of information about health? (it is possible to choose more answers)

- The Internet
- Family doctor
- Television
- Chemists
- Radio

- Herbalists
- Friends or acquaintances
- Family
- Other
  _____
  _____

Which of these alternative therapies do you know or have heard about?

(it is possible to choose more answers)

- Di Bella Multi-therapy
- Pantellini method (ascorbate of potassium)
- Simoncini method (bicarbonate)
- Bonifacio serum
- Laetrile
- High doses of vitamin C
- Shark's cartilage
- Escozul

- Gerson method
- Stamina method
- Essiac
- Mistletoe
- Hamer method
- Artemisia
- Other_____
  _____
  _____

Have you ever undergone one of these therapies, at present or in the past?

- Yes
- No

If yes, which ones?

1.   _____

2.   _____

3.   _____

4.   _____

5.   _____

6.
        • Yes
        • No

If yes, which one/s?

1.   _____   2.

3.   _____   4.
        _____

5.   _____   6.
        _____

7.   _____   8.
        _____

If yes, please rate your level of satisfaction with the therapy (from 0, very poorly satisfied -to10, totally satisfied)

0   1   2   3   4   5   6   7   8   9   10

What is the total amount you spend on CAM monthly?

Euro_____

Please rate the following statements on alternative and complementary therapies:

1.   I clearly know the difference between alternative and complementary treatment

•   Strongly disagree   •   Disagree   •   Partially agree •   Strongly agree

2.   Alternative therapies are a valid alternative to conventional medicine

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

3.   Alternative therapies do not need to be scientifically validated

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

8.   Alternative therapies can be dangerous and the collateral effects are not well known yet

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

9.   The use of alternative therapies can hinder a correct therapeutic pathway

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

10.   Complementary therapies can reduce the collateral effects of conventional medicine

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

11.   CAM fill the need for more humane and personalized treatments

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

12.   I have chosen or would choose to use CAM therapy

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

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13.   If I used CAM therapies, I would inform my doctor

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

14.   I would use alternative therapies if I had no more viable options from conventional medicine

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

Appendix 2: Q2 questionnaire

After attending this information session, please rate again the following statements on alternative and complementary therapies:

1.   I clearly know the difference between alternative and complementary treatment

•   Strongly disagree   •   Disagree   •   Partially agree •
6.   Chemotherapy is extremely harmful and causes many side effects that negatively affect patients' quality of life

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

7.   I believe that even if alternative therapies are probably ineffective, they are unharmful

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

8.   Alternative therapies can be dangerous and the collateral effects are not well known yet

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

9.   The use of alternative therapies can hinder a correct therapeutic pathway

•   Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

10.   Complementary therapies can reduce the collateral effects of conventional medicine

- Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

11.   CAM fill the need for more humane and personalized treatments

- Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

12.   I have chosen or would choose to use CAM therapy

- Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

13.   If I used CAM therapies, I would inform my doctor

- Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

14.   I would use alternative therapies if I had no more viable options from conventional medicine

- Strongly disagree   • Disagree   •   Partially agree •   Strongly agree

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