

Complementary and Alternative Medicine among Singapore Cancer Patients[†]

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Abstract

Introduction: This study evaluates determinants, expectations, association with quality of life (QOL) and doctor's awareness of Complementary and Alternative Medicine (CAM) use in Singapore cancer patients. **Material and Methods:** We interviewed 316 patients visiting the Cancer Centre of the National University Hospital on behaviour, attitudes and expectations towards CAM and assessed QOL via Euroqol Questionnaire (EQ-5D). Medical information was obtained from oncologists. **Results:** One hundred and seventy-three patients (55%) reported CAM use after cancer diagnosis. Chinese ethnicity, tertiary education, age <65 years and previous CAM use were independent predictors of CAM use. Fifty-one per cent of CAM users informed their doctors about their use and 15% of doctors reported to be aware of CAM use in these patients. Thirty-seven per cent believed CAM to be equally or more effective than conventional cancer therapies and 78% expected at least basic knowledge about CAM from their oncologists. Twenty-five per cent of patients reported concurrent use of oral CAM and chemotherapy, of which oncologists were unaware in 86% of cases. CAM users had higher EuroQol utility scores than non-CAM users (0.79 versus 0.73, respectively, $P=0.03$), in particularly those aged ≥ 65 years and those with stage IV disease. **Conclusion:** Singapore cancer patients show high prevalence of CAM use, high expectations regarding its effectiveness and doctors' knowledge on CAM and many use it concurrently with chemotherapy or radiotherapy. Since oncologists are generally unaware of CAM use in their patients, doctor-patient communication on CAM use needs to be improved. The association of CAM use and higher QOL scores in some subgroups deserves further exploration.

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Introduction

Worldwide, the use of Complementary and Alternative Medicine (CAM) by cancer patients is highly prevalent.¹⁻⁹ For cancer specialists, knowledge on CAM use in their patients is particularly important as there can be potentially hazardous drug interactions between some forms of oral CAM and chemotherapy or radiotherapy.^{7,10-12} In addition, due to the increasing trends in CAM use among cancer patients,¹³ doctors need to be increasingly able to address patient expectations and behaviour in this area.

Until now, however, there is still little understanding regarding the expectations of cancer patients regarding the effectiveness of CAM and their expectations towards their oncologists. In addition, there is no data on the concurrent use of oral CAM and cancer treatment. Furthermore, the association between CAM use and quality of life in cancer

patients has not been studied extensively.

This study evaluates the prevalence and determinants of CAM use in Singapore cancer patients, their expectations and the oncologists' awareness, as well as the association of CAM use and quality of life.

Material and Methods

Study Design and Patient Selection

For the current study, we adopted Eisenberg's definition of CAM as "medical interventions and therapies not taught widely in medical schools or generally available in hospitals".¹⁴ This includes Traditional Chinese Medicine (TCM), which although available in most restructured hospitals in Singapore, is not widely available in most hospitals worldwide. Prayers and spiritual healing were not considered as CAM.

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[†] Results of this study have been presented at the 18th WONCA World Conference, July 2007 in Singapore.

Using a cross-sectional study design, we included all consecutive cancer patients who attended medical oncology consultation at the Cancer Centre of the National University Hospital in Singapore, between 15 January 2007 and 23 January 2007. A total of 18 doctors were involved in the study, all of whom were senior consultants, consultants and associate consultants in medical oncology, haematology and gynaeco-oncology.

We excluded patients who were newly diagnosed and patients who were unaware of their cancer diagnosis, as cancer diagnosis could not have influenced the use of CAM in these patients. All the patients included in the survey were patients who had known their diagnosis for some time.

We also excluded patients visiting the Cancer Centre only to receive treatment, for they were not seen by the doctors, hence the doctors were unable to fill in the questionnaire. Patients below 18 years of age and patients with whom it was impossible to communicate were excluded as well.

We used a standardised, interviewer-administered questionnaire to collect information on socio-demographic characteristics, use of CAM before and after cancer diagnosis, reasons for CAM use, type(s) of CAM used, concurrent use of CAM and conventional cancer therapies and expectations and beliefs regarding CAM. We assessed the quality of life by means of the EuroQol (EQ-5D).^{15,16} The EuroQol questionnaire consists of 2 components, the Utility score (Objective score) and the Health State Score (Subjective score). The Utility score is assessed via the following 5 aspects: mobility, pain/discomfort, anxiety/depression, daily activities of living and self-care. The Health State score is assessed by asking a patient to mark on a scale from 0 to 100 to describe his current health status with 0 being the worst imaginable health state and 100 being the best possible imaginable health state. The questionnaire was translated into both Chinese and Malay and subsequently back translated.

A list of CAM types commonly used in Singapore was provided for respondents who were unclear about the definitions. We divided the list of CAM modalities into “oral CAM” and “non-oral CAM”. Under “oral CAM”, we included Traditional Chinese Medicine, Traditional Malay Medicine, Traditional Indian Medicine and Health supplements. “Non-oral CAM” included were acupuncture, moxibustion, reflexology, Taiji/ Qi Gong, Yoga/Meditation and Ayurvedic massage. However, in both categories, we included the option for the participant to list any other CAM which they are taking but was not listed in our choices.

Each patient’s respective oncologist provided information on the patient’s cancer site and current stage, intention and type of treatment administered and general health status (good, fair or poor, based on the patients’ ability to get on with activities of daily living). In addition, the oncologists

provided information on their awareness of use of CAM in the patient and whether they recommended CAM to the patient. There was no attempt to find out about the history of CAM usage from the out-patient notes, for the questionnaire filled by oncologists required them to look through previous entries briefly to determine if they are aware of their patient’s CAM usage before the survey. It was also noted that there are existing cancer information leaflets at the outpatient clinic, but none of them include questions on CAM. The study was approved by the Institutional Review Board of National University of Singapore, and informed consent was obtained from the patients prior to the interview.

Statistical Analysis

We compared demographic and clinical characteristics between CAM users and non-users. Differences in proportions were tested using chi-square test, and means were compared by means of Student’s *t*-test. Using multivariate logistic regression analysis, we identified which characteristics were independently and significantly associated with CAM use.

Mean EuroQol Utility and Visual Analogue Scores were compared and stratified with covariates we identified, using the unpaired *t*-test. Subsequently, using multivariate linear regression analysis, we identified which variables were independently and significantly associated with EuroQol scores. Analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 15.0. (Chicago, IL).

Results

A total of 410 eligible patients visited the Cancer Centre for consultation during the study period. Of them, 316 (77%) participated in the study.

The mean age of the patients was 55 years (range, 18 to 99), 69% of patients were female and the ethnic breakdown reflected the Singapore population (80% Chinese, 14% Malays, 4% Indians and 2% other minorities) (Table 1). In univariate analysis, CAM users were more often younger than 65 years, of Chinese origin, and Christians compared to non-CAM users (Table 1). CAM users were more often tertiary educated, affluent, residing in private properties and white-collar workers. Prevalence of CAM use was similar across gender and there were no significant differences in stage and site distribution between CAM users and non-users (Table 2). Compared to non-users, CAM users were less often treated with chemotherapy and more likely to have used some form of CAM before their cancer diagnosis.

In multivariate analysis, age below 65 years, Chinese ethnicity, higher level of education and previous use of CAM prior to cancer diagnosis were significantly and positively associated with use of CAM after cancer diagnosis (Table 3).

CAM users had higher overall EuroQol utility scores than

Table 1. Demographic Characteristics of Cancer Patients Visiting Cancer Centre of National University Hospital, Singapore

	All patients (n = 316)	CAM users (n = 173)	Non-CAM users (n = 143)	chi-square test
Age (based on quartiles)				
<47	74 (24%)	43 (26%)	31 (22%)	<i>P</i> = 0.017
47-56	86 (28%)	52 (31%)	34 (24%)	
57-64	69 (23%)	42 (25%)	27 (19%)	
>64	77 (25%)	30 (18%)	47 (34%)	
Unknown/missing	10	6	4	
Gender				
Male	97 (31%)	50 (29%)	47 (33%)	<i>P</i> = 0.442
Female	217 (69%)	122 (71%)	95 (67%)	
Unknown/missing	2	1	1	
Ethnicity				
Chinese	253 (80%)	150 (87%)	103 (72%)	<i>P</i> <0.001
Malay	43 (14%)	14 (8%)	29 (20%)	
Indian	13 (4%)	3 (2%)	10 (7%)	
Others	7 (2%)	6 (3%)	1 (1%)	
No. of years of formal education*				
0 (Did not attend school)	48 (15%)	16 (9%)	32 (22%)	<i>P</i> <0.001
<=6 (Primary level)	85 (27%)	46 (27%)	39 (27%)	
7-10 (Secondary level)	124 (39%)	66 (38%)	58 (41%)	
>10 (Tertiary level)	59 (19%)	45 (26%)	14 (10%)	
Religion				
Christian	72 (23%)	49(28%)	23 (16%)	<i>P</i> <0.010
Buddhist/Taoist	138 (44%)	81(47%)	57 (40%)	
Free thinker/others	9 (3%)	2 (1%)	7 (5%)	
Muslim	49 (16%)	25 (14%)	24 (17%)	
Hindu	47 (15%)	16 (9%)	31 (22%)	
Unknown/missing	1	-	1	
Monthly income (SGD)				
<\$3000	197 (70%)	96 (62%)	101 (79%)	<i>P</i> = 0.020
\$3000-6999	64 (23%)	42 (27%)	22 (17%)	
>\$7000	21 (7%)	16 (10%)	5 (4%)	
Unknown/missing	34	19	15	
Housing				
1-4 room government subsidised housing	192 (61%)	93 (54%)	99 (70%)	<i>P</i> = 0.050
5 room government subsidised housing	83 (26%)	50 (29%)	33 (23%)	
Private housing	40 (13%)	30 (17%)	10 (7%)	
Unknown/missing	1	-	1	
Occupation				
Unemployed/retiree	162 (63%)	73 (54%)	89 (73%)	<i>P</i> <0.010
Blue-collared worker	31 (12%)	16 (12%)	15 (12%)	
Self-employed	21 (8%)	14 (10%)	7 (6%)	
White-collared worker	36 (14%)	26 (19%)	10 (8%)	
Others	6 (2%)	5 (4%)	1 (1%)	
Unknown/missing	60	39	21	

*This is defined based on Singapore's education system which includes primary, secondary and tertiary levels of education.

Table 2. Clinical Characteristics of Cancer Patients Using Complementary or Alternative Medicine (CAM) vs Those Who Did Not, National University Hospital, Singapore

	All patients (n = 316)	CAM users (n = 173)	Non-CAM users (n = 143)	Chi-square test
Stage [#]				
0	7 (3%)	6 (4%)	1 (1%)	<i>P</i> = 0.126
I	44 (16%)	28 (18%)	16 (13%)	
II	57 (21%)	25 (16%)	32 (26%)	
III	58 (21%)	34 (22%)	24 (20%)	
IV	109 (40%)	59 (39%)	50 (41%)	
Not applicable	41	21	20	
Cancer site				
Breast	100 (32%)	56 (32%)	44 (31%)	<i>P</i> = 0.564
Colorectal	43 (14%)	23 (13%)	20 (14%)	
Leukaemia/Lymphoma	48 (15%)	22 (13%)	26 (18%)	
Lung	25 (8%)	12 (7%)	13 (9%)	
Others	100 (32%)	60 (35%)	40 (28%)	
General health status				
Good	230 (75%)	131 (79%)	99 (71%)	<i>P</i> = 0.16
Fair	70 (23%)	34 (21%)	36 (26%)	
Poor	2 (2%)	1 (1%)	4 (3%)	
Unknown/missing	11	7	4	
Radiotherapy				
Yes	219 (71%)	119 (72%)	100 (71%)	<i>P</i> = 0.88
No	88 (29%)	47 (28%)	41 (29%)	
Unknown/missing	9	7	2	
Chemotherapy				
Yes	200 (65%)	100 (60%)	100 (71%)	<i>P</i> = 0.050
No	107 (35%)	66 (40%)	41 (29%)	
Unknown/missing	9	7	2	
Prior CAM use				
Yes	189 (60%)	119 (69%)	70 (49%)	<i>P</i> < 0.001
No	127 (40%)	54 (31%)	73 (51%)	

[#]Based on AJCC staging. Leukaemias were not included.

non-CAM users (Table 4). This difference was especially marked among stage IV patients and those aged 65 years and above. However, there was no significant difference in Health State Score. After multivariate linear regression analysis, CAM use was no longer significantly associated with EuroQol Utility or Health State Score. Utility score was significantly and positively associated with the education level and significantly and negatively associated to current stage of disease (Table 5).

Sixteen (5%) of all cancer patients felt that CAM is more effective for treating cancer as compared to conventional medicine, 101 (32%) felt CAM and conventional medicine were equally effective, while 145 (46%) of all patients felt that conventional treatment is superior to CAM in treating cancer (Fig. 1).

Eighty-three per cent of CAM users and 72% of non-CAM users (*P* = 0.03) expected their doctors to have at least basic knowledge of CAM. Among the 173 CAM users, 88 (51%) reported their CAM use to their oncologist. Eighty-five per cent of the doctors of these CAM users were found to be unaware of the CAM use in their patients. Only 6 patients (2%) had doctors who recommended CAM to them.

Within the group of patients treated with chemotherapy (*n* = 200), 49 (25%) had been using some form of oral CAM concurrently with chemotherapy. The oncologists of 42 (86%) of these patients were not aware of this concurrent use. Twenty-six (12%) patients treated with radiotherapy (*n* = 219) had been using oral CAM concurrently with radiotherapy. Similarly, the oncologists of 20 (77%) of these patients who used CAM concurrently with radiotherapy

Table 3. Significant and Independent Predictors of Use of CAM

Determinants		Odds ratio (OR)	95% confidence interval	
			Lower	Upper
Age (y)	65 and above	1.0 (ref)	-	-
	Below 65	1.84	1.0	3.4
Ethnicity	Chinese	1.0 (ref)	-	-
	Malays	0.36	0.2	0.7
	Indians	0.14	0.0	0.7
	Others	2.01	0.2	18.9
Education	Did not attend school	1.0 (ref)	-	-
	Primary Level	1.91	0.9	4.3
	Secondary Level	2.06	0.9	4.6
	Tertiary Level	3.76	1.4	10.0
Prior CAM use	No	1.0 (ref)	-	-
	Yes	2.2	1.3	3.7

were not aware of the concurrent use.

We also looked at the different CAM modalities which the patients used before and after diagnosis.

Traditional Chinese Medicine (TCM) was the most widely used form of CAM before diagnosis, followed by health supplements, and acupuncture and moxibustion. After diagnosis, TCM remained the most popular, followed by health supplements. Taiji replaced acupuncture as the third most popular form of CAM used after diagnosis.

Discussion

This study shows that the prevalence of CAM use among cancer patients in Singapore is high, as are the cancer patients' expectations regarding its effectiveness. This is hardly surprising, given the high prevalence of CAM usage in the local population. In addition, the far majority of cancer patients (CAM users and non-users) feel that oncologists should possess at least basic knowledge of CAM. All these allude to an increasing emphasis with which patients are placing on CAM.

Use of CAM is more prevalent in the Chinese, the tertiary-educated and patients younger than 65 years of age. This is in accordance with previous studies, which showed a higher use of CAM in cancer patients who were younger and better-educated.^{1-3,5-7} Several studies showed women to be more likely to use CAM than men,^{1,5,6,7} but in our population, prevalence of CAM use did not differ by gender. Cultural differences may constitute this finding – use of CAM such as traditional Chinese medicine may be more acceptable across genders in Singapore, compared to European countries.

Our study indicates that cancer patients have high expectations regarding CAM use. Less than 50% of the cancer patients believed that conventional therapies are superior for the treatment of cancer as compared to CAM, while 37% believed that CAM was more or equally effective in treating cancer. Also, most patients expect their oncologists to have at least a basic knowledge of CAM, regardless of whether they were using CAM themselves. These high expectations can be addressed through regular

Table 4. Association Between the Stratified Covariates and Euroqol Scores (Utility Score and Visual Analogue Score)

	Utility Score (SE)			Health State Score (SE)		
	CAM users	Non-users	<i>P t-test</i>	CAM users	Non-users	<i>P t-test</i>
Overall	0.79 (0.02)	0.73 (0.03)	0.003	0.68 (0.01)	0.68 (0.02)	1.00
Age group (y)						
<65	0.81 (0.03)	0.75 (0.01)	0.085	0.70 (0.02)	0.69 (0.02)	0.85
≥65	0.73 (0.04)	0.67 (0.05)	0.041	0.60 (0.04)	0.64 (0.03)	0.38
Gender						
Males	0.81 (0.02)	0.72 (0.04)	0.069	0.68 (0.02)	0.62 (0.03)	0.14
Females	0.79 (0.02)	0.74 (0.03)	0.047	0.67 (0.02)	0.71 (0.02)	0.25
CAM use before cancer diagnosis						
Yes	0.81 (0.02)	0.73 (0.04)	0.047	0.70 (0.02)	0.66 (0.02)	0.14
No	0.75 (0.03)	0.72 (0.04)	0.52	0.63 (0.03)	0.70 (0.02)	0.076
Stage						
0/I/CR	0.82 (0.03)	0.86 (0.04)	0.57	0.71 (0.03)	0.74 (0.04)	0.58
III/III	0.80 (0.02)	0.80 (0.03)	0.99	0.68 (0.02)	0.70 (0.04)	0.54
IV	0.77 (0.02)	0.56 (0.06)	0.01	0.64 (0.03)	0.59 (0.03)	0.18

CR: complete remission

Table 5. Multivariate Linear Regression Analysis for the Association between Covariates and EuroQol Scores (Utility Score and Visual Analogue Score)

Covariates	Estimate	Standard error	P value
EuroQol: Utility Score			
CAM use after cancer diagnosis	-1.297	2.363	.257
Age	-.122	.095	.554
Ethnicity	-.638	1.750	.425
Highest education level	.498	1.386	.050
CAM use before cancer	1.700	2.359	.219
Current stage	-1.877	.966	.015
General health status	-9.754	2.541	.000
EuroQol: Visual Analogue score			
CAM use after cancer diagnosis	-1.297	2.363	.584
Age	-.122	.095	.202
Ethnicity	-.638	1.750	.716
Highest education level	.498	1.386	.720
CAM use before cancer	1.700	2.359	.472
Current stage	-1.877	.966	.053
General health status	-9.754	2.541	.000

and frequent doctor-patient communication on CAM, the incorporation of CAM into doctors' medical education, and rigorous scientific methods of research evaluating the effectiveness of the more commonly used modalities of CAM.

Singapore cancer patients are quite willing to report their use of CAM to their oncologists. Fifty-one per cent of CAM users reported their use to their doctors. This proportion is substantially higher than the 26% to 30% reported by others.^{17,18} Surprisingly, however, oncologists are unaware of CAM use in their patients 85% of the time. This could be due to the question not being asked routinely or patients did not wish to volunteer the information previously.

Table 6. Types of CAM Used Before and After Cancer Diagnosis

Types of CAM	Percentage of CAM users before diagnosis (n = 189)	Percentage of CAM users after diagnosis (n = 173)
Traditional Chinese medicine	75.7%	68.8%
Health supplements	44.4%	52.6%
Acupuncture/Moxibustion	21.2%	3.5%
Reflexology	14.3%	6.4%
Taiji/Qi Gong	9.5%	12.1%
Other oral CAM (e.g. Traditional Malay medicine, Traditional Indian medicine)	10.1%	5.8%
Other non-oral CAM (e.g. Yoga, Meditation, Ayurvedic Massage, Medicated Oil, Body Massage)	11.6%	2.9%

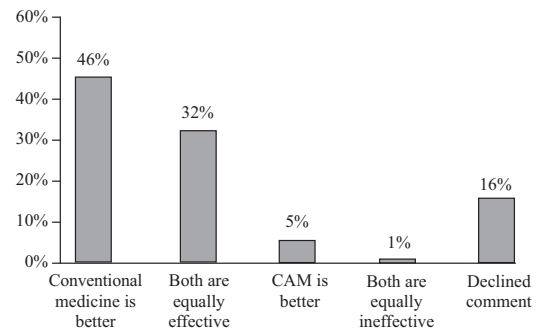


Fig. 1. Opinions on effectiveness of CAM as compared to conventional medicine for treatment of cancer.

Our study also illustrates the need for more effective communication on CAM use between cancer specialists and cancer patients during the time of their cancer treatment: 12% to 25% of patients reported to have used oral CAM concurrently with chemotherapy or radiotherapy and the far majority of oncologists were unaware of this. Certain forms of oral CAM may result in drug-drug interactions with chemotherapy and radiotherapy.^{7,10-12} A previous study had actually shown that up to 27% of patients taking oral CAM during chemotherapy use potentially hazardous combinations.¹² The potentially detrimental effects of concurrent therapy and the high prevalence of concurrent use illustrate the need for clinical guidelines to ensure that the use of CAM in patients undergoing radiotherapy and chemotherapy is known to their doctors.

CAM was associated with higher EuroQol utility scores, especially in Stage IV and older patients. However, they did not report a self-perceived improvement. Multivariate analysis eliminated the significant association between CAM use and EuroQol scores. This could be due to our relatively small sample size. Also, due to the cross-sectional nature of our study, we cannot confirm a causal positive relation between CAM use and quality of life. Indeed, the opposite could have taken place as well, only patients with good EuroQol Utility scores, feel well enough to go out and visit CAM practitioners. Nevertheless, we feel

that these findings urge future studies to investigate the impact of CAM on quality of life, especially in patients with advanced stage cancer.

Other than the presence of potentially hazardous drug interactions between oral CAM and chemotherapy or radiotherapy,^{7,10-12} use of CAM has been associated with treatment delay.¹⁹ Therefore patients should be encouraged to discuss their CAM use openly with doctors. Doctors should also contribute by playing an active role in eliciting information about CAM usage from the patients. Only with effective communication can potentially hazardous interactions between CAM use and cancer therapy be kept to a minimum.

We recognise that our study suffers from several shortcomings. It was a single-institutional hospital-based interviewer-administered study and therefore our patient population may not be a true reflection of the cancer population in Singapore. We have been over-sampling women, breast cancer and leukaemia patients, while other cancer sites, such as prostate cancer, have been under-sampled. This is due to the fact that such cancers were seen more at sub-specialty centres, such as the Urological Centres, while more gynaecological and breast cancer patients follow-up at the Cancer Centre. As a few of our study participants were involved in clinical trials, and therefore may have been strictly advised against using CAM, we may have underestimated the prevalence of CAM use in the Singapore cancer population. However, a recent study reported a high prevalence of CAM use also among cancer patients who participated in phase I cancer trials.²⁰

Conclusion

The prevalence of CAM use among cancer patients in Singapore is high, as are the expectations regarding the effectiveness and knowledge of oncologists. Nevertheless, less than 0.1% of funding in medical sciences is going into CAM research²¹ and most current medical curricula do not include a module on CAM.²² At present, the local existing undergraduate curriculum includes only one introductory lecture on the different modalities of CAM under the Community, Occupational and Family Medicine module; under the Pharmacological module, students are taught some of the more common drug interactions with herbs such as St John's Wort. Other than a 2-hour Combined Teaching Session (CTS) on "Traditional Medical Practices" organised for Year 4 and Year 5 medical students, the practical aspects of CAM usage, possible usefulness of CAM, and more importantly, how to advice and manage a patient who is using CAM together with commonly prescribed medications are barely touched on.

Given these high patient expectations and the potentially hazardous effect of concurrent use of CAM with conventional cancer treatment, doctor-patient communication on CAM

needs to be urgently improved. The association of CAM use and higher QOL scores in some subgroups deserves further exploration.

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