

The Changes of Cancer Patients' Perception, Attitude and Clinical Practice in Complementary and Alternative Medicine during COVID-19: A multicenter before-after cross-sectional study

Yichao Wang (✉ wangyc128@aliyun.com)

Yueyang Hospital of Integrated Traditional Chinese and Western Medicine, Shanghai University of Traditional Chinese Medicine

Geliang Yang

Shanghai Clinical Research Center

Zhan Gu

Shanghai Pulmonary Hospital, Tongji University

Chengyan Wang

Yueyang Hospital of Integrated Traditional Chinese and Western Medicine, Shanghai University of Traditional Chinese Medicine

Huiqing Zhang

Changhai Hospital, Naval Medical University

Ling Xu

Yueyang Hospital of Integrated Traditional Chinese and Western Medicine, Shanghai University of Traditional Chinese Medicine

Research Article

Keywords: Complementary and alternative medicine, Cancer, COVID-19, survey, medical pattern

Posted Date: September 30th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-832424/v2>

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Abstract

Background

With the rapid spread of COVID-19 worldwide, the clinical practice in cancer treatment of complementary and alternative medicine (CAM) becomes significantly different. This study was designed to explore the changes of China's cancer patients' perception, attitude and clinical practice in CAM after the pandemic of COVID-19.

Methods

A multicenter before-after cross-sectional study was conducted, including 448 cancer patients by a survey.

Results

For perception, half of the cancer patients (51.2%) reported they had received adequate information in CAM cancer treatment and had a great expectation in medical appointment pattern (40.2%). For attitudes, most of the cancer patients (79.4%) had full of confidence in CAM cancer treatment and showed a strong desire to learn more about CAM (70.2%). Nearly half of the cancer patients (44.0%) presented their oncology clinics had been greatly affected by COVID-19, however, most (82.8%) refused to the online medical service pattern. For clinical practice, Chinese herbal medicine was widely used before (89.5%) / after (90.3%) the epidemic of COVID-19 and the main purpose of receiving CAM therapy was to improve immune system (71.8%). The frequency of patients' visiting the clinic decreased significantly ($P < 0.001$), and most (90.0%) didn't change their follow-up pattern. The majority of the cancer patients (83.3%) were identified as CAM users and the only predictive factor was national health insurance in the multivariable logistic regression model.

Conclusion

China's cancer patients show more interest and confidence in treating cancer by CAM, and the new medical pattern such as medical appointment, has been gradually accepted during the COVID-19 pandemic. However, the cancer patients' perception in CAM and online medical service pattern still need to be improved.

Background

According to the Report on Global Cancer Statistics 2020, a total of 19.3 million new cancer cases and almost 10.0 million deaths occurred worldwide in 185 countries [1]. The usage of complementary and

alternative medicine (CAM) in cancer treatment has grown rapidly in the past decade, 33.3% of cancer patients had received CAM therapy in the United States while 40.0–83.0% in China [2–5].

Since the rapid spread of novel coronavirus disease (COVID-19) in 2020 worldwide, it has been a huge challenge to the clinical practice of cancer patients and oncologists, especially for CAM [6], which contains lots of close-contact therapies such as acupuncture and massage. During the epidemic of COVID-19, cancer itself along with its treatment makes cancer patients more susceptible to pneumonias, due to weakened immune response to respiratory bacteria and virus, meanwhile, the COVID-19 forces most hospitals in the epidemic areas to reduce non-emergency admissions and services, which led to the difficulties in visiting inpatients, outpatients and follow-up [7]. In addition, CAM, mainly included traditional Chinese medicine (TCM) and Chinese patented medicine, was directly applied against COVID-19 in China [8–11].

The COVID-19 might significantly change the clinical practice in cancer treatment of CAM. It was estimated that the drop-out rate of clinical trials during the COVID-19 pandemic was about 70–80%, and Yang, et al predicted that the next five years might witness a sharp fall in the number of the clinical trials of integrative cancer therapies [12]. Whether and how the cancer patients' view and use CAM during the epidemic of COVID-19 in China remain unclear. The purpose of this study was to explore the changes of China's cancer patients' perception, attitude and clinical practice in CAM after the epidemic of COVID-19.

Methods

Participants

The multicenter cross-sectional study was conducted at five large-scale centers in Shanghai, China from July 2020 to December 2020. The qualified outpatients who were 18 years and older, speaking Chinese and with clear cancer diagnosis signed an informed consent and were required to finish the survey. The inclusion and exclusion of the cancer patients were analyzed and showed as the flowcharts. The study was approved by Ethics Committee of Yueyang Hospital, Shanghai University of Traditional Chinese Medicine (2020-073).

Surveys

The online survey was designed through a comprehensive review of the literature and discussions with experienced medical oncologists and CAM physicians. The survey was repeatedly modified and divided into three sections according to feedback of the consultants. In the first section, the participants were required to provide demographic information: age, gender, education background, health insurance, annual household income, type of cancer, Eastern Cooperation Oncology Group - performance status (ECOG-PS) score, time of first diagnosis and clinical stage. Then the patients would be asked whether they had ever used CAM to treat cancer? If patients chose "No", the survey would be terminated, and the patients would be required to give reasons, including (1) do not believe CAM, (2) do not know CAM, (3)

not interested in CAM, (4) too expensive, (5) CAM is ineffective in treating cancer, and (6) other reasons. CAM is defined as a group of diverse medical and health care interventions, practices, products, or disciplines according to the National Center for Complementary and Integrative Health (NCCIH), and it is mainly consisted of Chinese herbal medicine/Chinese patent medicine, diet therapy, acupuncture, Massage, Taichi, Qigong in this survey [3]. If patients chose “Yes”, they would enter the second section, focused on the perceptions and clinical practice of the cancer patients toward CAM before and after the epidemic of COVID-19. Questions in this section mainly concerned on changes in cancer treatments (conventional medicine and CAM therapies, aim of using CAM, CAM oncologist/therapist, frequency of visits and cost of CAM therapy) and medical pattern of CAM (online medical service, medical appointment, home visit and hospital visit). The final section dealt with the attitudes of the cancer patients towards CAM treatments and medical pattern by using a Likert scale. The Likert scale was dichotomized to be able to compare the responses; strongly agree and agree were grouped as yes while a neutral response, disagree, and strongly disagree were grouped as a no.

Statistical Analysis

Descriptive statistics (frequency distribution, mean \pm standard deviation [SD]) were used to summarize patients' baseline characteristics. Differences between the cancer patients (CAM users vs non-CAM users and before COVID-19 vs after the epidemic of COVID-19) were assessed by Student's t test, chi-square test, and Mann-Whitney U test. Univariate and multivariable analysis were used to determine the associations of baseline characteristics and other relevant factors. Multivariate logistic regression model began with all variables having a P -values < 0.25 from the univariate analysis. Age and sex were kept in the model regardless of their significance. All the difference was considered to be significant when $P < 0.05$. All analyses were processed by SPSS version 25.0 (SPSS Inc., Chicago, IL, USA).

Results

Baseline Demographic Information

A total of 510 questionnaires were sent to the cancer patients, and 448 questionnaires were valid for final analysis, others were excluded due to the incompleteness filling. The majority of cancer patients (373/448, 83.3%) had used CAM at least one time, and the others (75/448, 16.7%) were non-CAM users.

All of the demographic and diagnosis information is presented in Table 1. For the CAM users, the average age was 63.7 years (SD, 9.5), with more woman (59.8%) participated. Most of the patients (68.4%) completed high school, and 20.6% graduated from college or university. The mean disease duration time was 41.4 months (SD, 25.8). More than half of the CAM users were at clinical stage I (55.5%) and ECOG-PS score 1 (59.8%). Lung cancer (74.5%) was the most common cancer, followed by colorectal (10.5%) and stomach (5.6%).

Table 1 Characteristics of Cancer Patients (N = 448).

Variable	CAM Users (n = 373)	Non-CAM Users (n = 75)	P-value
Age, years, mean ± SD	63.7 ± 9.5	58.9 ± 11.4	0.006
Sex, n (%)			0.857
Male	150 (40.2)	31 (41.3)	
Female	223 (59.8)	44 (58.7)	
Education, n (%)			0.003
Primary school	41 (11.0)	13 (17.3)	
High school	255 (68.4)	57 (76.0)	
College or university	77 (20.6)	5 (6.7)	
Annual household income, \$, n (%)			0.109
< 12 000	60 (16.1)	17 (22.7)	
12 000 - 18 000	202 (54.2)	40 (53.3)	
18 000 - 30 000	81 (21.7)	16 (21.3)	
30 000 - 45 000	21 (5.6)	2 (2.7)	
45 000 - 15 000	6 (1.6)	0 (0.0)	
>150 000	3 (0.8)	0 (0.0)	
Health insurance, n (%)			< 0.001
National medical card	305 (81.8)	39 (52.0)	
Non-national medical card	68 (18.2)	36 (48.0)	
Disease duration, months, mean ± SD	41.4 ± 25.8	34.2 ± 15.6	0.015
Cancer stage, n (%)			0.455
Stage I	207 (55.5)	33 (44.0)	
Stage II	56 (15.0)	22 (29.3)	
Stage III	51 (13.7)	14 (18.7)	
Stage IV	59 (15.8)	6 (8.0)	

Table 1 (continued).

Variable	CAM Users (n = 373)	Non-CAM Users (n = 75)	P-value
ECOG - PS score			0.072
0	118 (31.6)	33 (44.0)	
1	223 (59.8)	36 (48.0)	
2	30 (8.0)	4 (5.3)	
3	2 (0.5)	2 (2.7)	
Cancer type, n (%)			0.469
Lung	278 (74.5)	60 (16.1)	
Colorectal	39 (10.5)	5 (1.3)	
Stomach	21 (5.6)	1 (0.3)	
Liver	14 (3.8)	4 (1.1)	
Breast	11 (2.9)	3 (0.8)	
Ovary	9 (2.4)	1 (0.3)	
Cervix	5 (1.3)	1 (0.3)	
Kidney	5 (1.3)	0 (0)	
Esophagus	3 (0.8)	1 (0.3)	
Pancreas	3 (0.8)	0 (0.0)	
Bladder	3 (0.8)	0 (0.0)	
Prostate	2 (0.5)	0 (0.0)	
Other	6 (1.6)	3 (0.8)	

Abbreviations: CAM: complementary and alternative medicine; ECOG: Eastern Cooperative Oncology Group; PS: performance status; SD: Standard deviation.

Among the non-CAM users, four did not believe in CAM, 39 did not know enough about CAM, 14 had no interest, seven were concerned about the cost, seven reported CAM was declined by their oncologists and 16 felt very difficult to take CAM therapies. More than half of the non-CAM users (68.0%) reported would like to try CAM therapy in the future.

By multivariable logistic regression analyses, CAM users were predicted only by national health insurance (odds ratio [OR] = 3.47, 95% CI = 2.00 - 5.99), which is provided in Table 2.

Table 2 Multivariable Analysis of Factors Predictive of Patients' CAM Use (N = 448).

Predictor	Received CAM Treatment		
	Odds Ratio	95% CI	P-value
Age (≥ 65 vs < 65 years)	1.61	0.94 - 2.76	0.082
Sex (female vs male)	1.22	0.71 - 2.10	0.469
Education (primary and high school vs college and university)	2.64	0.96 - 7.30	0.061
Annual household income (≥ 30000 vs < 30000)	1.65	0.34 - 8.11	0.539
Health insurance (national medical card vs non-national medical card)	3.47	2.00 - 5.99	< 0.001
Disease duration (≥ 40 vs < 40 months)	1.38	0.79 - 2.43	0.264
ECOG - PS score (0 - 1 vs 2 - 3)	1.28	0.49 - 3.38	0.612

Abbreviations: CAM: complementary and alternative medicine; CI: confidence interval; ECOG: Eastern Cooperative Oncology Group; PS: performance status.

Perception

Cancer patients' perception in CAM treatments and medical pattern is presented in Table 3. Half of the cancer patients (51.2%) presented that they had received adequate information in CAM cancer treatments. Sixty-eight patients (18.2%) thought CAM would cause negative effects and 33 patients (8.8%) had once experienced any side effects. Among those patients, the most frequent side effect events were stomachache (30.3%) and abnormal liver function (30.3%), followed by lack of appetite (12.1%) and diarrhea (12.1%). For medical pattern, most of patients believed medical appointment (40.2%) and online medical service (27.6%) might be widely implemented in the future. However, most of the patients could not predict when CAM oncology clinic recover.

Table 3 Perceptions of the cancer patients who used CAM (N = 373).

Questions	N (%)
1. Have you received adequate information in CAM cancer treatment?	
Yes	191 (51.2)
No	182 (48.8)
1. Do you think CAM therapies would cause negative effects?	
Yes	68 (18.2)
No	305 (81.8)
1. Do you experience any negative effects from CAM?	
Yes	33 (8.8)
No	340 (91.2)
1. Which of the following negative effect/effects caused by CAM have you ever experienced?	
Abnormal liver function	10 (30.3)
Stomachache	10 (30.3)
Lack of appetite	4 (12.1)
Diarrhea	4 (12.1)
Myelosuppression	3 (9.1)
Fatigue	3 (9.1)

Table 3 (continued).

Questions	N (%)
1. Which of the following negative effect/effects caused by CAM have you ever experienced? (continued).	
Nausea/vomiting	1 (3.0)
Constipation	1 (3.0)
Cardiac arrhythmias	1 (3.0)
Other	2 (6.1)
1. After the epidemic of COVID-19, do you think there will be any changes in the pattern of CAM oncology clinic in future?	
Medical appointment	150 (40.2)
Online medical service	103 (27.6)
Home visit	49 (13.1)
No change	82 (22.0)
I don't know	102 (27.3)
Other	1 (0.3)
1. Once the COVID-19 is under control, how long do you predict the CAM oncology clinic will recover to normal?	
Regard the current pattern as normal during the COVID-19 pandemic	109 (29.2)
1-3 months	23 (6.2)
4-6 months	8 (2.1)
7-8 months	1 (0.3)
9-12 months	14 (3.8)
More than 12 months	47 (12.6)
No longer back to normal	22 (5.9)

Abbreviations: CAM: complementary and alternative medicine; COVID-19: coronavirus disease 2019.

Attitudes

A Likert scale is used to present the attitudes of cancer patients towards CAM and medical pattern after the epidemic of COVID-19 (Fig. 1). After witnessed the better efficacy of CAM in treating COVID-19 [13], 296 cancer patients (79.4%) had full of confidence in CAM which would be also effective in treating cancer and 262 cancer patients (70.2%) showed a strong desire to learn more about CAM in the future. For medical pattern, nearly half of the cancer patients (44.0%) thought their oncology clinics had been greatly affected due to the COVID-19. However, when they faced to the online medical service pattern, strongly promoted by the government and hospitals to provide convenient medical services, most of the cancer patients (82.8%) refused. Nevertheless, the same as online service, online appointment seemed to receive more favor (55.0%) and might have broad application prospect in the future.

Clinical practice

All the questions listed in Table 4 are about the clinical practice of the cancer patients in CAM. Chinese herbal medicine was widely used in cancer patients before (89.5%) / after (90.3%) the epidemic of COVID-19, followed by proprietary Chinese medicine before (20.4%) / after (21.2%) the epidemic of COVID-19. The utilization rate of acupuncture and moxibustion therapy was slightly declined from 3.2% to 2.4%. The main purpose of receiving CAM therapy was to improve immune system (71.8%) and prevent recurrence and metastasis after surgery (61.1%). Comparing to the time before the epidemic of COVID-19, the frequency of patients' visiting the clinic decreased significantly. Despite the challenges of COVID-19, most patients didn't change their CAM oncologists/therapists (74.0%) or follow-up pattern (90.0%).

Table 4 Clinical practice of the cancer patients who used CAM (N = 373).

Questions	Before COVID-19, N(%)	Since COVID-19, N(%)	P value
1. Which kinds of CAM cancer treatment did you use?			0.668
Chinese herbal medicine	334 (89.5)	337 (90.3)	
Proprietary Chinese medicine	76 (20.4)	79 (21.2)	
Acupuncture and moxibustion therapy	12 (3.2)	9 (2.4)	
Diet-based therapy	8 (2.1)	8 (2.1)	
Chi gong	6 (1.6)	9 (2.4)	
Massage therapy	0 (0.0)	0 (0.0)	
Tai chi	3 (0.8)	4 (1.1)	
Other	1 (0.3)	1 (0.3)	
1. What was your purpose of using CAM?			0.732
Prevent recurrence and metastasis after surgery	231 (61.9)	228 (61.1)	
Improve immune system	260 (69.7)	268 (71.8)	
Manage symptoms	100 (26.8)	108 (29.0)	
Increase the effect of conventional treatment	52 (13.9)	58 (15.5)	
Improve quality of life	42 (11.3)	46 (12.3)	
Not clear	6 (1.6)	2 (0.5)	
1. How often did you come to the CAM oncology clinic?			< 0.001
Once a week	2 (0.5)	2 (0.5)	
Twice a week	250 (67.0)	192 (51.5)	
Thrice a week	18 (4.8)	27 (7.2)	

Table 4 (continued).

Questions	Before COVID-19, N(%)	Since COVID-19, N(%)	P-value
3. How often did you come to the CAM oncology clinic? (continued).			
Once a month	85 (22.8)	123 (33.0)	
Twice a month	7 (1.9)	17 (4.6)	
Thrice a month	4 (1.1)	4 (1.1)	
Once half a year	7 (1.9)	8 (2.1)	
1. Since the epidemic of COVID-19, have you ever changed your CAM oncologist/therapist?*			-
No, I have never changed	-	276 (74.0)	
Basically, but I have once changed	-	37 (9.9)	
Yes, I have changed	-	44 (11.8)	
I haven't a specified oncologist/therapist	-	15 (4.0)	
Other	-	1 (0.3)	
		52 (13.9)	
1. Since the epidemic of COVID-19, how about the cost of the CAM cancer treatment?*			
Increased	-	15 (4.0)	
Decreased	-	151 (40.5)	
No change	-	155 (41.6)	
I don't know	-		
1. Since the epidemic of COVID-19, have you changed the follow-up pattern?*			-
Yes	-	34 (9.1)	
No	-	339 (90.9)	

Table 4 (continued).

Questions	Before COVID-19, N(%)	Since COVID-19, N(%)	P-value
1. How did you contact your physician? #			< 0.001
Hospital	34 (100.0)	32 (94.1)	
Wechat	5 (14.7)	24 (70.6)	
Telephone/message	0 (0.0)	12 (35.3)	
Online medical service	2 (5.9)	9 (26.5)	
E-mail	0 (0.0)	0 (0.0)	
Other	0 (0.0)	0 (0.0)	

Abbreviations: CAM: complementary and alternative medicine; COVID-19: coronavirus disease 2019.

* Only available for the time after the epidemic of COVID-19.

Only available for those who chose YES in question 6.

Discussion

This study was the first study to evaluate the changes of cancer patients' perception, attitude and clinical practice in CAM during COVID-19. The study revealed that cancer patients showed more interest in CAM and gradually accepted the new medical pattern since the epidemic of COVID-19.

In this study, the usage of CAM by cancer patients (83.3%) was similar to previous studies in China (77.6% - 83.0%) [4, 5], but was much higher than usage in other western countries, including the United States (33.3%), Sweden (26%) [2, 14, 15]. This is not a surprising finding that CAM is intricately intertwined with the history, culture, and politics of China, which is greatly promoted by the Chinese people. As to the type of cancer, the percentage of lung cancer (75.4%) was significantly higher than prior studies (7.9% - 33.2%). The difference might be related to the fact that the department of integrative oncology in the centers are so famous for lung cancer treatment in China, and has a good reputation, which attracts more lung cancer patients. We found statistically significant relationships between CAM use and being older, higher educated, larger income, longer duration, lower ECOG-PS score and having national health insurance, part of which were in line with other surveys [5, 14, 16]. However, from the results of the multivariate analyses, CAM use was predicted only by national health insurance. The differences might be due to the mobility restrictions during the COVID-19 [17], which prevented nonlocal cancer patients from visiting the clinic as usual, so the majority of participants were natives with national health insurance.

The most common therapies used in this study were Chinese herbal medicine before (89.5%) / after (90.3%) the epidemic of COVID-19, which was similar to other studies [18]. However, in stark contrast, most common CAM researches in western countries tend to focus on acupuncture, while few cancer patients use acupuncture in China. As to this study, the usage of acupuncture was very low (3.2%) and even declined during the COVID-19 (2.4%). Studies have already shown acupuncture to be a useful adjunct in relieving cancer and treatment-related symptoms [19, 20], so oncologists should be encouraged to recommend it to their patients. For the expectations of CAM use, a prior study showed 85.0% of the cancer patients reported using CAM as an “immune booster” [21]. In this study, the majority of participants reported the same purpose before (69.7%) / after (71.8%) the epidemic of COVID-19, as immune system has a close interaction with COVID-19 infection and cancer progression [22, 23]. CAM was quite famous for its regulating immune system effect in cancer patients and fighting against COVID-19 [24, 25], and cancer patients seemed to show more interest (70.2%) and confidence (79.4%) in CAM treatment during the COVID-19 though their frequency of CAM clinic visit dropped significantly.

With the ongoing COVID-19, the governments and hospitals across the world scrambled to find new medical pattern for outpatient and inpatient visits of cancer patients, ensuring both **curative effect** and safety. Online medical service pattern was then rising to the forefront [26], and the application in CAM might be a new attempt. A prior study enhanced on telehealth integrative oncology consultations reported telehealth could lower patients’ symptom management concerns and provided more herb information, which seemed to be widely accepted [27]. However, in the current study, more than three quarters of the cancer patients did not accept online medical service. Most of them expressed concerns about the accuracy of online diagnosis and treatment with no pulse-taking and discolored image of tongue. As facing the fact that the end to COVID-19 is still not in sight, we find a trend that more patients attempted to accept the advent of online era.

This study has some limitations to be acknowledged. First, the results may not represent all the cancer patients in China, for it was only conducted at five centers in a large metropolis. Besides, more lung cancer patients were observed in the study. Second, COVID-19 prevented many cancer patients from visiting the clinic as usual, especially nonlocal patients and advanced cancer patients, which led to selective bias. Thirdly, 62 invalid questionnaires were excluded for the incompleteness or incorrect filling, which might affect the sample size. Moreover, the survey was mainly focused on the perceptions and attitudes of China’s cancer patients on CAM, which of the oncologists still remain unclear.

Conclusion

China’s cancer patients show more interest and confidence in treating cancer by CAM, and the new medical pattern such as medical appointment, has been gradually accepted during the COVID-19 pandemic. However, the cancer patients’ perception in CAM and online medical service pattern still need to be improved.

Abbreviations

CAM: Complementary and alternative medicine; COVID-19: Coronavirus disease 2019; TCM: Traditional Chinese medicine; NCCIH: National Center for Complementary and Integrative Health; ECOG-PS: Eastern Cooperation Oncology Group - performance status; SD: Standard deviation; OR: Odds ratio.

Declarations

Acknowledgements

We would like to thank all participants in the study and all the investigators for data collection.

Authors' contributions

LX, HQZ, YCW and GLY conceived of the survey; ZG and CYW collected the data and conducted the data analysis. YCW and ZG wrote the paper; LX, HQZ and GLY reviewed the manuscript. All authors had read and approved the final manuscript.

Funding

Not applicable.

Availability of data and materials

The data used and/or analyzed during the study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study was approved by Ethics Committee of Yueyang Hospital, Shanghai University of Traditional Chinese Medicine (2020-073).

Consent for publication

All the authors listed have approved the manuscript and agreed with the submission.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Oncology, Yueyang Hospital of Integrated Traditional Chinese and Western Medicine, Shanghai University of Traditional Chinese Medicine, Shanghai, China. ²Department of Medicine, Shanghai Clinical Research Center, Shanghai, China. ³Department of Traditional Chinese and Western Medicine, Shanghai Pulmonary Hospital, Tongji University, Shanghai, China. ⁴Department of Traditional Chinese Medicine, Changhai Hospital, Naval Medical University, Shanghai, China.

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Figures

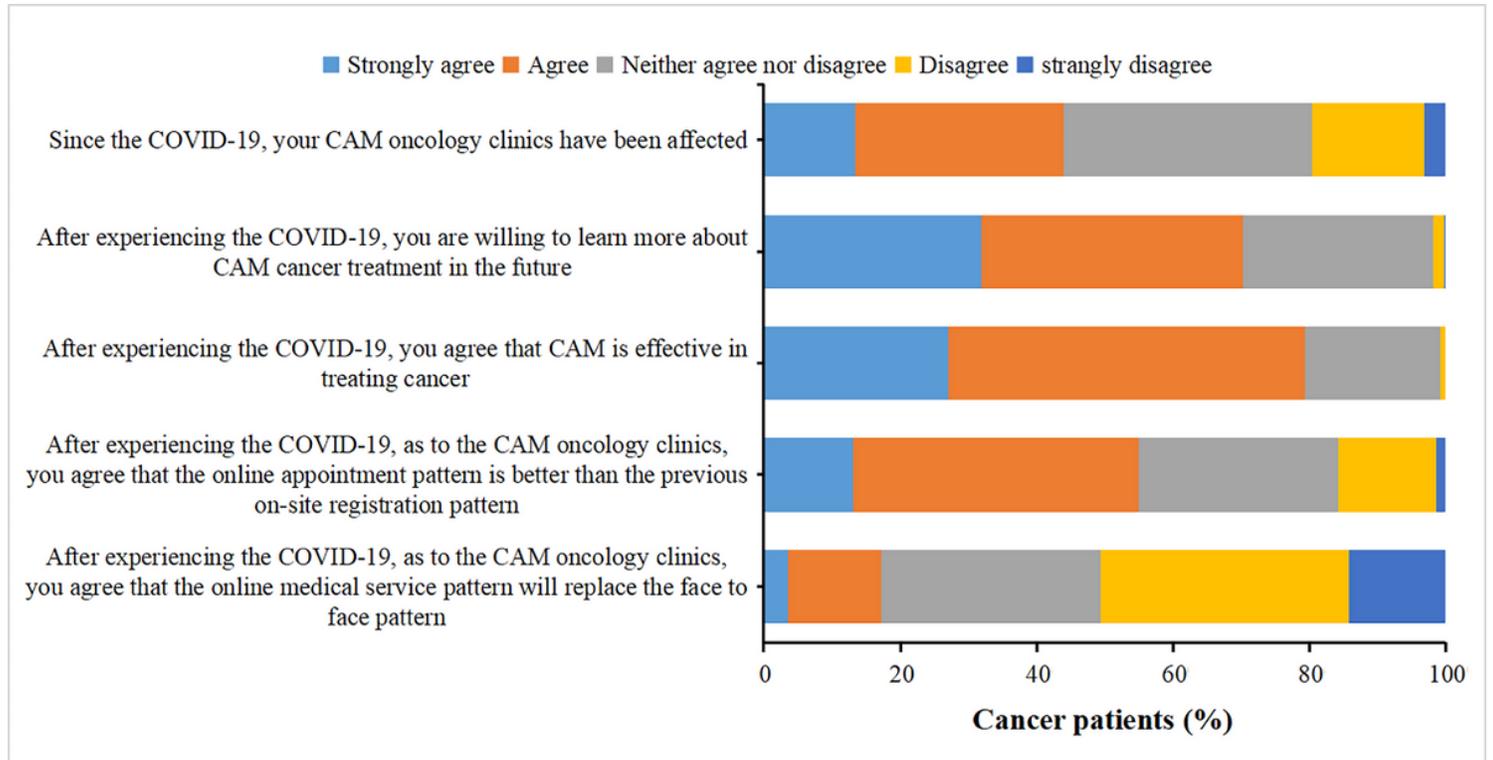


Figure 1

Attitudes of the cancer patients toward complementary and alternative medicine and medical pattern