

Article Title: The Provision of Complementary, Alternative, and Integrative Medicine Information and Services: a Review of World Leading Oncology Hospital Websites

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Abstract

Background: Many cancer patients use complementary, alternative, and integrative medicine (CAIM) to improve their psychological and functional health. However, there is little known about the extent of CAIM information and services provided on oncology hospital websites.

Methods: This study reviewed public-facing websites to determine the degree of CAIM information provided and services offered by the world's leading cancer hospitals in 2021; this ranking was informed by a large survey of medical professionals led by Newsweek and Statista. Nine authors extracted data from hospital websites individually and in triplicate, prior to meeting to revise data extractions. Data analysis was then performed by two authors to determine how many hospitals provided CAIM descriptions and offered CAIM services, and the extent of CAIM information provided.

Results: A total of 131 hospitals were included in this study. Of the eligible hospitals, 50.38% (n = 66) provided a theoretical description of CAIM; 48.09% (n = 63) provided a description of one or more CAIM therapies; 63.36% (n = 83) offered one or more CAIM therapies to cancer patients. The most common therapies described were the same as the most common therapies offered. These therapies are massage, special foods and diets, acupuncture, meditation, yoga, and creative outlets. While CAIM therapies were commonly offered, information surrounding the benefits and side effects associated with these therapies varied.

Conclusions: Due to the lack of CAIM standardization worldwide, there is a need for increased CAIM information provision on hospital websites to better inform and empower patients to make well-informed decisions about their health.

Background

The rapid increase in incidence and mortality rates of cancer places a tremendous burden on global health systems [1]. Cancer remains a leading health concern worldwide, accounting for nearly 10 million deaths and an estimated 19.3 million new cases in 2020 [1]. This disease not only places physical and emotional burdens on individuals, families, and communities, but also exerts a financial strain on social systems [2].

Due to the complexity of this disease, numerous approaches to prevent, diagnose, and treat cancer exist [3]. While conventional treatments such as chemotherapy, radiation therapy, and surgery [4] are undoubtedly effective and improve survival rates, they do not always alleviate and often exacerbate symptoms [5]. Pain, fatigue, nausea, depression, and anxiety are symptoms often experienced by patients who undergo conventional cancer treatment [5, 6, 7, 8]. Due to the high prevalence of adverse effects and exacerbated symptoms while undergoing conventional cancer treatment, patients look to utilize non-conventional measures to improve psychological and functional health [9, 10]. Complementary, alternative, and integrative medicine (CAIM) therapies have been used by cancer patients for many years to help them relax, reduce feelings of stress, relieve pain, increase feelings of control, and help them stay positive and partake in social activities [10].

The National Center for Complementary and Integrative Health (NCCIH) and the National Cancer Institute (NCI) define “complementary medicine” as a non-mainstream approach used together with standard medicine; “alternative medicine” as a non-mainstream approach to medicine used in place of standardized medicine; and “integrative medicine” as an approach that thereby combines contemporary and alternative medicine with standard medicine for which there is high-quality evidence of safety and effectiveness [11, 12]. Integrative medicine

attempts to address the mental, physical, and spiritual health of the individual [12]. Witt et al. recognized a common group of therapies used in the context of cancer care as integrative oncology, defining it as “a patient-centered, evidence-informed field of cancer care that utilizes mind and body practices, natural products, and/or lifestyle modifications from different traditions alongside conventional cancer treatments” [13]. For the purpose of our study, all aforementioned terms will be collectively referred to as CAIM, as they are frequently used interchangeably when referring to unconventional cancer treatment approaches [14].

CAIM may be used to alleviate treatment-related side effects such as adverse reactions to chemo-radiotherapy; manage symptoms such as pain and fatigue; enhance emotional and physical health by improving anxiety and depressive states; and improve the efficacy of conventional cancer treatments [7, 15, 16•]. CAIM is a multifaceted patient care and well-being regimen [15]. NCI recognizes five (5) CAIM categories: mind–body therapies, biologically based practices, manipulative and body-based practices, biofield therapy, and whole medical systems [11]. Evidence from multi-national studies indicates that an average of 40% of cancer patients reported current or previous use of CAIM therapies, with considerable differences between countries [17, 18•]. Notably, such studies demonstrated a worldwide increase in the use of meditation, dietary supplements, botanicals, massage therapy, acupuncture, and naturopathic medicine in combination with conventional treatments such as chemotherapy and radiation [17, 18•]. Specifically, in many European countries, botanical use was most common — tripling following cancer diagnosis [16•]. Despite the high prevalence of use, however, few CAIM therapies have been included in recently published clinical practice guidelines for the treatment/management of a range of cancers and cancer-related pain [19–24].

A review of the extent of CAIM information provided and therapies offered on hospital websites helps to determine whether hospitals are enabling cancer patients to make informed decisions on treatment options and symptom management. Prior to conducting this study, the scope of CAIM information and therapies provided by cancer hospitals in 2021 was unknown. Yun et al. was the first study to assess the presentation of integrative medicine information on cancer center websites and suggested that leading cancer centers in the USA were increasingly providing information on integrative medicine [6••]. However, this study was limited as the authors exclusively evaluated academic cancer centers in the USA while we aim to provide a world-wide overview of leading cancer hospital websites. In addition, Yun et al.'s study was limited in focus as the authors primarily focused on CAIM information provided on the websites while our study looks to assess CAIM information provided as well as services offered. We reviewed how hospital websites recognized CAIM, which CAIM therapies were described and offered, and whether CAIM therapy benefits and side effects were provided by the highest-ranked oncology hospitals around the globe.

Methods

Approach

Through a review of hospital websites, we evaluated information presented to determine CAIM information provided and CAIM therapies offered by the world's leading oncology hospitals. A 2021 ranking of world-leading oncology hospitals was obtained from Newsweek.com [25]. Newsweek partnered with Statista to generate a hospital ranking that was based on global surveys encompassing thousands of medical professionals [25]. Statista includes over 1 million statistics on over 80,000 topics from more than 22,000 sources. It provides access to data from market and opinion research institutions, as well as from business organizations and government institutions. Additional details surrounding ranking

methodology can be found at: <https://www.newsweek.com/worlds-best-specialized-hospitals-2021/oncology>.

Defining Complementary, Alternative, and Integrative Medicine

For the purpose of this study, when we use the term “CAIM,” we refer to its theoretical definition (e.g., integrative medicine, complementary therapy, complementary and alternative medicine, etc.). When we use the term “CAIM therapy,” we refer to specific types of therapies (e.g., meditation, biofeedback, hypnosis, etc.). The term CAIM was defined in accordance with the NCI. As such, CAIM therapies incorporated in our study were limited to those listed on the NCI website [11]. CAIM categories and their respective therapies indicated on the NCI website include the following: mind–body therapies (meditation, biofeedback, hypnosis, yoga, tai chi, imagery, creative outlets); biologically based practices (vitamins and dietary supplements, botanicals, special foods, and diets); manipulative and body-based practices (massage, chiropractic therapy, reflexology); biofield therapy (reiki, therapeutic touch); and whole medical systems (Ayurvedic medicine, traditional Chinese medicine, acupuncture, homeopathy, naturopathic medicine) [11].

Descriptions of CAIM therapies were obtained from NCCIH [26]. Special foods and diets, botanicals, and naturopathic medicine were further defined to ensure consistent interpretation. Special foods and diets were recognized as regimens encompassing foods with particular nutritional compositions that are intended to meet the healthcare needs of patients with a range of medical conditions [27]. Nutritional counselling was not considered part of a special foods and diets therapy. Botanicals were defined as plant-based supplements containing one or more herbs, in contrast to dietary supplements which were defined as vitamins, minerals, and other non-herbal supplements that are ingested by mouth [26]. Naturopathic and

traditional Chinese medicines were defined as whole systems of medicine that include a combination of practices and approaches (e.g., botanicals as part of the system) [26]. Therefore, for naturopathic and traditional Chinese medicine to each be recognized, the website must have explicitly stated such terms. These therapies include a broad range of medicine practices which are provided by a practitioner [26]. For therapies not listed by NCI (e.g., visualization), we consulted the peer-reviewed literature to determine whether it may be considered an NCI-listed therapy. For example, visualization was considered imagery, and sophrology was considered hypnosis.

Eligibility Criteria

Websites that were of incomplete English translation (i.e., large portions of the website were only available in an alternate language and not English), missing an updated SSL Certificate, or not found as the department no longer existed, were all omitted. Eligible websites were required to be accessed in English as we did not have the resources to accurately translate non-English websites. For websites written in another language, in addition to English, we assessed whether treatment and services were provided in English. Websites which were not completely translated in English but provided treatment and services information in English, were included.

Data Extraction

We developed a data extraction form applying NCI's definitions for CAIM and the twenty NCI-listed CAIM therapies. This form encompassed our three focuses: patient information (whether CAIM was described, the terms used to describe CAIM, and the types of CAIM therapies described), patient care (whether CAIM was offered, the clinic(s)/center(s) which

provide CAIM, and the specific types of CAIM therapies offered), and CAIM therapy benefit and side effect information.

Nine authors (PP, MOYL, SGM, KA, MAR, SP, JG, MM, AP) participated in a pilot data extraction. Each author independently conducted website-wide examinations of the top three ranked hospitals using the data extraction form developed. Once completed, the nine authors were divided into three teams of three. Each team met to compare results, formulate a revised data extraction form, and compiled a list of data extraction questions. Upon completion, three revised pilot data extraction forms (one per team) were acquired. Based on team feedback, JYN and MNM met to finalize the data extraction form that was then used for all hospital website data extractions. In addition, items on the data extraction form and methods of completing a data extraction were standardized across the three teams based on questions developed.

Upon completion of the pilot extraction, the remaining hospitals were equally divided among the three teams. Each team examined their third of hospital websites to determine which websites met our study's eligibility criteria. Data from each eligible hospital website was then extracted independently and in triplicate. This study involved a great number of hospital website data extractions; thus, we approached the completion of data extractions in rounds versus completing all data extractions at once. For each round of data extractions, once independent data extractions were completed, each team met to compare results and formulate a single revised data extraction form for that particular subset of hospitals. All revised data extraction forms were agreed upon by all members of each team, collected, and compiled into one data extraction form.

Data Items Collected

The items collected on our final data extraction form are described below by section.

Hospital Information

This section contains information pertaining to each hospital's Newsweek/Statista ranking, name, specific oncology department, and location (country and city). As reflected on Newsweek.com, hospitals which met our eligibility criteria and were among the top 50 hospitals are ranked from 1 to 50. The remaining hospitals included in our study were organized in alphabetical order.

Patient Information

In this section, we sought to extract data on the following items: patient information on CAIM, terms used to describe CAIM, and the types of CAIM therapies described. We were interested in first determining whether the term CAIM was described on oncology hospital websites. Eligible responses were "yes" if CAIM was described, and "no" if CAIM was not described. Information regarding CAIM was considered pertaining to patients unless explicitly dedicated to other groups (e.g., if CAIM information was presented in research areas of the hospital website). If the website provided information on CAIM, the terms used by the hospital to refer to CAIM were reported. Possible CAIM terms included, but were not limited to, complementary medicine, supportive care, and unconventional therapy. The focus for extracting these terms was on the headings of webpages. Terms used throughout the text that provided patients with further information or context to CAIM were not reported. Lastly, we planned to report the specific NCI-listed CAIM therapies described on each hospital's website. If at least one or more sentences of an accompanying description were provided on a given CAIM therapy, it was data extracted. Additionally, CAIM therapies were still data

extracted even in the absence of one or more theoretical definitions of CAIM being provided on the hospital website.

Patient Care

In this section, we sought to extract data on the following items: whether the hospitals provide CAIM to patients, the clinic(s)/center(s) which provide CAIM, and the specific types of CAIM therapies offered. We first looked to determine whether each hospital offered CAIM. Eligible responses were “yes” if CAIM was offered, and “no” if CAIM was not offered on the hospital website. Then, we recorded the names of specific clinic(s)/center(s) affiliated with the hospital that offer such treatment, if applicable. Clinic/center names were recorded verbatim. Lastly, we sought to report the specific NCI-listed CAIM therapies offered to patients by the hospital in question. Therapies explicitly offered by appointment or in group settings were recorded. Services found on general hospital webpages (i.e., not presented on the specific oncology department’s webpage) were included only if these services were available to the oncology department. If no CAIM services were offered to patients by the hospital, we indicated this finding by stating “no” for whether the hospital provided CAIM and omitted all other parts of this section.

Information on CAIM Therapies

In this section, we assessed the type of information provided pertaining to benefits and side effects for each CAIM therapy contained in each CAIM category. Eligible responses for indicating the type of information on benefits and side effects included the following: “yes,” “no,” “unclear,” “not mentioned,” and “not applicable.” “Yes” was recorded if explicit or potential benefits/side effects were mentioned. “No” was recorded if the website explicitly indicated that there are no benefits/side effects. “Unclear” was recorded if the website

indicated that the evidence for potential benefits/side effects are unclear (e.g., instructing to consult a doctor or stating that evidence is mixed). “Not mentioned” was recorded if the therapy was described, but there was no mention of whether there are, or are no, potential benefits/side effects. Lastly, “not applicable” was recorded for therapies not described on the hospital website. Notably, information regarding the benefits and side effects of a specific therapy was required to be provided to cancer patients.

Data Analysis

Once all results were recorded, we calculated the frequencies of responses for each of the items included in the data extraction form. Frequencies of “yes” and “no” responses pertaining to patient information and patient care were calculated using Microsoft Excel. The frequencies of each NCI-listed CAIM therapy recorded under the patient information and patient care sections were also calculated using Microsoft Excel. In a similar fashion, the frequencies of “yes,” “no,” “unclear,” “not mentioned,” and “not applicable” responses, when pertaining to benefits and side effects, were exclusively calculated for each CAIM therapy.

Results

Of the 200 hospitals provided by Newsweek, 69 were excluded for the following reasons: incomplete English translation (n = 66), invalid SSL Certificate (n = 2), and department no longer existed (n = 1). As such, 131 hospitals met our inclusion criteria and were reviewed. The complete data extraction form with raw data extracted from all eligible websites can be found in Supplementary File 1.

Regarding patient information, 66 out of 131 hospitals (50.38%) provided a description of CAIM, while 65 (49.62%) did not provide any information on CAIM. Additionally, 63

(48.09%) hospitals provided a description of one or more CAIM therapies, while 68 (51.91%) did not provide a description of any CAIM therapy.

Shown in Table 1 are the terms extracted from hospital websites that were used to describe CAIM. It should be noted that some hospital websites provided more than one theoretical definition of CAIM. Of the 66 hospitals that provided such a definition, common terms used to refer to CAIM included “integrative medicine” (n = 27), “complementary therapy” (n = 16), and “complementary and alternative medicine” or “complementary alternative therapies” (n = 13). Terms used less common on hospital websites included “complementary medicine” (n = 5), “integrative oncology” (n = 4), “complementary and integrative medicine” (n = 3), “alternative medicine” (n = 2), and “integrative health” (n = 2). Notably, the use of the all-encompassing term, “complementary, alternative, and integrative medicine” only appeared once.

Organized under each CAIM category, the number of hospitals that describe and offer each CAIM therapy is shown in Table 2. We calculated the frequencies of each CAIM therapy described and percentages were calculated by dividing frequencies by the total number of hospitals from which we extracted data (total n = 131). It was found that CAIM therapies described, from most to least common, included the following: massage (n = 53, 40.46%), special foods and diets (n = 49, 37.40%), acupuncture (n = 46, 35.11%), meditation (n = 42, 32.06%), yoga (n = 40, 30.53%), creative outlets (n = 40, 30.53%), vitamins and dietary supplements (n = 34, 25.95%), reflexology (n = 29, 22.14%), reiki (n = 29, 22.14%), imagery (n = 28, 21.37%), tai chi (n = 26, 19.85%), hypnosis (n = 26, 19.85%), biofeedback (n = 25, 19.08%), botanicals (n = 23, 17.56%), chiropractic therapy (n = 17, 12.98%), therapeutic

touch (n = 14, 10.69%), homeopathy (n = 14, 10.69%), traditional Chinese medicine (n = 12, 9.16%), Ayurvedic medicine (n = 11, 8.40%), and naturopathic medicine (n = 7, 5.34%).

Regarding patient care, 83 out of 131 hospitals (63.36%) offered one or more CAIM therapies to cancer patients. CAIM therapies were provided through centers and departments relating to health and wellness, supportive care, integrative cancer care, oncology and hematology, and nutrition.

We then calculated the frequencies of each CAIM therapy offered and percentages were calculated by dividing frequencies by the total number of hospitals from which we extracted data (total n = 131). As shown in Table 2, it was found that CAIM therapies offered, from most to least common, included the following: special foods and diets (n = 63, 48.09%), massage (n = 55, 41.98%), creative outlets (n = 51, 38.93%), acupuncture (n = 48, 36.64%), meditation (n = 47, 35.88%), yoga (n = 46, 35.11%), vitamins and dietary supplements (n = 28, 21.37%), reiki (n = 28, 21.37%), tai chi (n = 27, 20.61%), reflexology (n = 24, 18.32%), biofeedback (n = 20, 15.27%), imagery (n = 20, 15.27%), hypnosis (n = 19, 14.50%), therapeutic touch (n = 12, 9.16%), botanicals (n = 10, 7.63%), chiropractic therapy (n = 10, 7.63%), traditional Chinese medicine (n = 5, 3.82%), Ayurvedic medicine (n = 2, 1.53%), naturopathic medicine (n = 2, 1.53%), and homeopathy (n = 1, 0.76%).

Table 3 shows whether CAIM benefits and side effects were provided in website descriptions. We calculated the sum of each response (“yes,” “no,” “unclear,” “not mentioned”) pertaining to benefits, and each response (“yes,” “no,” “unclear,” “not mentioned”) pertaining to side effects across all CAIM therapies. Percentages for each of the aforementioned responses were calculated relative to the number of hospitals that provided

descriptions of each CAIM therapy. Benefits were provided for the vast majority of CAIM therapies described (e.g., for all descriptions of meditation, yoga, creative outlets, and traditional Chinese medicine), with the exception of homeopathy. In contrast, side effects were generally not mentioned (e.g., meditation, imagery, creative outlets, therapeutic touch). Proportionally, side effects accompanied descriptions of biologically based practices (i.e., vitamins and dietary supplements, botanicals, and special foods and diets) as well as Ayurvedic medicine.

Discussion

In the present review, we found that while 63.36% of hospitals offered CAIM therapies to cancer patients, only 50.38% of hospital websites provided a description of CAIM or recognized these therapies as CAIM. These findings indicate that while oncology hospitals provided CAIM services to patients, there is minimal CAIM information provided online. This variability could exist due to the lack of a standardized operational definition of CAIM as well as its categories and therapies, and due to cultural and geographical differences worldwide [28]. While some studies have attempted to create operational definitions of CAIM, they have not been largely adopted by healthcare practitioners and researchers, thereby resulting in non-uniform information on these websites [28, 29].

Comparative Literature

Prevalence of CAIM in Hospitals

In contrast to previous studies, our study examined a large cohort of cancer center websites internationally. A 2010 study by Brauer et al., evaluating 41 American NCI-designated comprehensive cancer center websites, suggested that information presentation was highly variable across leading cancer centers [30]. The study by Yun et al. assessed the growth of

CAIM-related information between 2009 and 2016 and highlighted the substantial increase in the number of cancer centers which provided information on CAIM, with tremendous increases in information provision surrounding vitamin and dietary supplements, botanicals, acupuncture, massage, meditation, and yoga [6••]. Notably, our findings indicate that massage, special foods and diets, acupuncture, meditation, and yoga were among the top CAIM therapies described by our subset of included hospital websites.

Use of CAIM Therapies by Category

CAIM therapies are commonly used among cancer patients who seek treatments which promote physical, mental, and emotional health [16•]. A 2020 study by Michel-Cherqui et al. found that cancer patients were more aware of CAIM than patients with noncancerous disease [31]. In our study, massage, special foods and diets, acupuncture, meditation, yoga, creative outlets, and vitamins and dietary supplements were the most frequently described CAIM therapies and were also the most common therapies offered by oncology hospitals. These findings coincide with Brauer et al., who found that acupuncture, meditation, yoga, massage therapy, and music therapy were reported as the most common CAIM therapies mentioned on the websites of NCI-listed comprehensive cancer centers [30]. Furthermore, Yun et al. found that the most common CAIM therapies described were dietary supplements, acupuncture, meditation, herbs, yoga, massage, and music therapy, while the most common CAIM therapies offered were dietary supplements, acupuncture, massage, meditation, yoga, and herbs [6••].

Regarding whole medical systems, acupuncture was found to be most commonly offered and described. Garcia et al. analyzed the effects acupuncture treatment had in an inpatient

oncology setting and found that it resulted in significant improvements to pain, sleep disturbance, anxiety, drowsiness, nausea, and fatigue [32].

With respect to manipulative and body-based practices, massage was more commonly offered than reflexology. A study at Memorial Sloan-Kettering Cancer Center in New York, reported that patients experienced immediate, and clinically relevant improvements in pain, fatigue, anxiety, nausea, and depression following massage therapy [33]. A study in Italy indicated that reflexology intervention, provided by a qualified person, can be used in combination with conventional treatment to help improve treatment-related symptoms and help cancer patients cope with their diagnosis [34].

With respect to the biologically based practices CAIM category, special foods and diets and vitamins and dietary supplements were most commonly offered. Gupta et al. investigated the use of diets and dietary supplements among adult cancer patients in a cancer center. Their survey found that 73% of cancer patients used some form of dietary supplements and, notably, 71% of patients who were undergoing chemotherapy had concurrently used dietary supplements [35].

Regarding mind-body therapies, creative outlets, meditation, yoga, and tai chi were most commonly offered. A Swedish study investigated the effect art therapy had on women with breast cancer and indicated that creative intervention, provided by a trained professional in a clinical setting, can provide beneficial support to women undergoing conventional cancer therapy [36]. A Japanese study assessing the effectiveness of mindfulness-based meditation therapy found that meditative interventions may be effective for managing symptoms such as anxiety, depression, and pain [37]. Zhang et al. analyzed the effectiveness of tai chi for

managing chemotherapy-induced fatigue. A randomized trial of tai chi exercise was conducted, and the findings indicated that it is effective for decreasing physical fatigue and promoting good health [38].

Reiki was the most common biofield therapy offered by hospitals. Improvements in common cancer symptoms such as distress and anxiety, restlessness, pain, and loss of appetite have been reported by cancer patients who received reiki intervention within a hospital [39]. Ninety-three percent of patients considered reiki to be a positive experience indicating that it provides a broad range of symptomatic benefits [39].

Although providing insight into the use of CAIM by cancer patients in a hospital setting, the aforementioned studies fall short of describing CAIM use internationally. Moreover, there are many studies describing patient interest in CAIM therapy; however, little is known about the specific services hospitals are offering to cancer patients and how comprehensive descriptions are of CAIM therapy benefits and side effects.

Strengths and Limitations

Our study included hospitals from countries around the world, in contrast to a national cohort, which provides a more internationally representative sample of CAIM information online [30, 40]. We set out to assess top ranking hospitals; use of the hospital list developed by Newsweek and Statista further strengthens our study as this list was informed by surveys of over 40,000 medical experts in 20 countries. Statista is a well-known provider of market and consumer data commonly cited in the peer-reviewed literature [41]; in fact, in 2020, it has been listed as a must-have database for academic and public libraries by the Library Journal [42]. In addition to hospital selection, the completion of a pilot data extraction at the start of

the data extraction process promoted standardization between all the authors when collecting data. All questions were addressed by the first and corresponding author and adjustments were made to the data extraction form which resolved any unclear definitions and ensured improved inter-rater reliability. Furthermore, the pilot and all data extractions were conducted independently and in triplicate. Finally, the completed data extraction form was reviewed upon completion to clarify discrepancies and perform data analysis.

CAIM therapies described in this study were informed by those listed on the NCI website; the NCI provides 20 common CAIM therapies across five categories. While one may argue that a more comprehensive list could have been used, such as the Cochrane Complementary Medicine's operational definition of complementary medicine [42], those listed on NCI's website reflect the most common CAIM therapies. Another limitation to our study is the exclusion of hospital websites due to incomplete English translations. This resulted in the under-representation of regions where English is not widely spoken, due to inadequate translational resources; thus, our findings may not necessarily be extrapolatable to information found on websites of non-English hospitals.

Conclusions

In this study, we reviewed how highly ranked oncology hospital websites recognized CAIM, which CAIM therapies were described and offered, and whether CAIM therapy benefits and side effects were provided in website descriptions. Our study found that hospitals are offering CAIM services to cancer patients, however, while roughly half the eligible hospital websites described CAIM and CAIM therapies, even fewer hospitals provided complete information surrounding the benefits and side effects of such therapies. While there is evidence surrounding the safety and effectiveness of a select number of CAIM therapies, information

reflective of this fact was not provided on many of the world's top ranking oncology hospital websites. Further research on the outcomes of such therapies and the standardization of evidence-informed CAIM information would enable patients of various cultural and social-economic backgrounds to make complete, informed decisions regarding their cancer treatment. The hospitals in our study have the potential to greatly impact the incorporation of CAIM into standard cancer care practice given their rankings.

Data Availability

The authors confirm that the data supporting the findings of this study are available within the article and/or its supplementary materials.

Abbreviations

CAM: Complementary and alternative medicine

CAIM: Complementary, alternative, and integrative medicine

NCCIH: National Centre for Complementary and Integrative Health

NCI: National Cancer Institute

SIO: Society for Integrative Oncology

SSL: Secure Sockets Layer

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Papers of particular interest, published recently, have been highlighted as:

- Of importance
- Of major importance

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systems should implement clear strategies for dealing with this. The authors propose criteria for methodological quality that should be met, as well as reporting standards that should be required, in order to improve the validity and reporting of future surveys.)

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Contributions

MDNM: collected and analyzed data, drafted the manuscript, and gave final approval of the version to be published.

PP: assisted with the collection of data, made critical revisions to the manuscript, and gave final approval of the version to be published.

MOYL: assisted with the collection of data and data analysis and gave final approval of the version to be published.

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AP: assisted with the collection of data and gave final approval of the version to be published.

JYN: designed and conceptualized the study, collected and analyzed data, made critical revisions to the manuscript, and gave final approval of the version to be published.

Ethics Approval and Consent to Participate

This study involved a review of publicly available information online; it did not require ethics approval or consent to participate.

Consent for Publication

All authors consent to this manuscript's publication.

Competing Interests

The authors declare no competing interests.

Table Legend

Table 1: Terms Used to Describe Complementary, Alternative, and Integrative Medicine

Table 2: Complementary, Alternative, and Integrative Medicine Therapy Descriptions and Services Offered on Oncology Hospital Websites

Table 3: Complementary, Alternative, and Integrative Medicine Therapy Benefits and Side Effects Information Provided in Hospital Website Descriptions

Supplementary Files

Supplementary File 1: CAIM in Oncology Hospitals Data Extraction Form

Tables

Table 1: Terms Used to Describe Complementary, Alternative, and Integrative Medicine	
Terms	Frequency n=
Integrative Medicine	27
Complementary Therapy	16
Complementary and Alternative Medicine; Complementary Alternative Therapies	13
Integrative Therapy	7
Complementary Medicine	5
Supportive Treatment/Therapies; Support Care	5
Integrative Oncology	4
Health and Wellbeing Therapies; Healing and Wellness; Wellness Services	4
Complementary and Integrative Medicine	3
Alternative Medicine	2
Integrative Health	2
Complementary, Alternative, and Integrative Medicine	1
Alternative, Complementary, Integrative Oncology	1
Alternative Therapies	1

Complementary Cancer Treatment	1
Complementary Strategies	1
Integrated Medical Care	1
Supplementary Therapies	1
Non-drug Treatments	1
Conventional, Complementary and Alternative Medicine	1
Other Medicines and Treatments	1

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Table 2: Complementary, Alternative, and Integrative Medicine Therapy Descriptions and Services Offered on Oncology Hospital Websites

CAIM Therapy	Described n=, (%)	Offered n=, (%)
Total Number of Hospitals, n=131		
Mind-body Therapies		
Meditation	42, (32.06)	47, (35.88)
Biofeedback	25, (19.08)	20, (15.27)
Hypnosis	26, (19.85)	19, (14.50)
Yoga	40, (30.53)	46, (35.11)
Tai Chi	26, (19.85)	27, (20.61)
Imagery	28, (21.37)	20, (15.27)
Creative Outlets	40, (30.53)	51, (38.93)
Biologically Based Practices		
Vitamins and Dietary Supplements	34, (25.95)	28, (21.37)
Botanicals	23, (17.56)	10, (7.63)
Special Foods and Diets	49, (37.40)	63, (48.09)
Manipulative and Body-based Practices		
Massage	53, (40.46)	55, (41.98)
Chiropractic Therapy	17, (12.98)	10, (7.63)
Reflexology	29, (22.14)	24, (18.32)
Biofield Therapy		
Reiki	29, (22.14)	28, (21.37)

Therapeutic Touch	14, (10.69)	12, (9.16)
Whole Medical Systems		
Ayurvedic Medicine	11, (8.40)	2, (1.53)
Traditional Chinese Medicine	12, (9.16)	5, (3.82)
Acupuncture	46, (35.11)	48, (36.64)
Homeopathy	14, (10.69)	1, (0.76)
Naturopathic Medicine	7, (5.34)	2, (1.53)

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Table 3: Complementary, Alternative, and Integrative Medicine Therapy Benefits and Side Effects Information Provided in Hospital Website

Descriptions

CAIM Therapy	Total Descriptions n=	Benefit Information				Side Effect Information			
		Yes	No	Unclear	Not	Yes	No	Unclear	Not
		n=, (%)	n=, (%)	n=, (%)	Mentioned n=, (%)	n=, (%)	n=, (%)	n=, (%)	Mentioned n=, (%)
Mind-body Therapies									
Meditation	42	42, (100.00)	0, (0.00)	0, (0.00)	0, (0.00)	3, (7.14)	3, (7.14)	2, (4.76)	34, (80.95)
Biofeedback	25	24, (96.00)	0, (0.00)	1, (4.00)	0, (0.00)	4, (16.00)	6, (24.00)	1, (4)	14, (56.00)
Hypnosis	26	25, (96.15)	0, (0.00)	1, (3.85)	0, (0.00)	4, (15.38)	4, (15.38)	3, (11.54)	15, (57.69)
Yoga	40	40, (100.00)	0, (0.00)	0, (0.00)	0, (0.00)	5, (12.5)	3, (7.50)	9, (22.5)	23, (57.50)
Tai Chi	26	25, (96.15)	0, (0.00)	0, (0.00)	1, (3.85)	4, (15.38)	5, (19.23)	1, (3.85)	16, (61.54)
Imagery	28	27, (96.43)	0, (0.00)	0, (0.00)	1, (3.57)	4, (14.29)	1, (3.57)	1, (3.57)	22, (78.57)
Creative Outlets	40	40, (100)	0, (0.00)	0, (0.00)	0, (0.00)	3, (7.50)	5, (12.5)	2, (5.00)	30, (75.00)

Biologically Based Practices									
Vitamins and Dietary Supplements	34	30, (88.24)	1, (2.94)	2, (5.88)	1, (2.94)	28, (82.35)	0, (0.00)	1, (2.94)	5, (14.71)
Botanicals	23	20, (86.96)	0, (0.00)	2, (8.70)	1, (4.35)	20, (86.96)	0, (0.00)	1, (4.35)	2, (8.70)
Special Foods and Diets	49	47, (95.92)	0, (0.00)	0, (0.00)	2, (4.08)	26, (53.06)	1, (2.04)	0, (0)	22, (44.90)
Manipulative and Body-based Practices									
Massage	53	51, (96.23)	0, (0.00)	1, (1.89)	1, (1.89)	16, (30.19)	2, (3.77)	6, (11.32)	29, (54.72)
Chiropractic Therapy	17	16, (94.12)	0, (0.00)	1, (5.88)	0, (0.00)	8, (47.06)	1, (5.88)	1, (5.88)	7, (41.18)
Reflexology	29	25, (86.21)	0, (0.00)	2, (6.90)	2, (6.90)	3, (10.34)	5, (17.24)	1, (3.45)	20, (68.97)
Biofield Therapy									
Reiki	29	26, (89.66)	0, (0.00)	1, (3.45)	2, (6.90)	3, (10.34)	8, (27.59)	1, (3.45)	17, (58.62)
Therapeutic Touch	14	13, (92.86)	0, (0.00)	1, (7.14)	0, (0.00)	2, (14.29)	2, (14.29)	0, (0.00)	10, (71.43)
Whole Medical Systems									
Ayurvedic Medicine	11	9, (81.82)	0, (0.00)	1, (9.09)	1, (9.09)	7, (63.64)	0, (0.00)	0, (0.00)	4, (36.36)

Traditional Chinese Medicine	12	12, (100)	0, (0.00)	0, (0.00)	0, (0.00)	6, (50)	0, (0.00)	0, (0.00)	6, (50.00)
Acupuncture	46	45, (97.83)	0, (0.00)	1, (2.17)	0, (0.00)	18, (39.13)	2, (4.35)	4, (8.70)	22, (47.83)
Homeopathy	14	9, (64.29)	0, (0.00)	3, (21.43)	2, (14.29)	7, (50)	0, (0.00)	3, (21.43)	4, (28.57)
Naturopathic Medicine	7	6, (85.71)	0, (0.00)	1, (14.29)	0, (0.00)	2, (28.57)	0, (0.00)	0, (0.00)	5, (71.43)

Legend:

Yes: Website description states that there are benefits/side effects of CAIM therapy

No: Website description states that there are no benefits/side effects of CAIM therapy

Unclear: Website description states that there is unclear evidence of any benefits/side effects of CAIM therapy

Not Mentioned: There is no mention of potential or absences of benefits/side effects of CAIM therapy