



Complementary medicine in radiation oncology

German health care professionals' current qualifications and therapeutic methods

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Abstract

Introduction Recently, complementary and alternative medicine (CAM) has moved more into the focus, and cancer societies such as the German Cancer Society (*Deutsche Krebsgesellschaft*, DKG) have established working groups to develop a guideline for CAM. The present work aims to evaluate the acceptance of CAM in the whole radiation oncology community.

Methods We conducted an online survey on CAM and sent the modified questionnaire that was successfully distributed to all members of the Research Group on Gynecological Oncology (*Arbeitsgemeinschaft Gynakologische Onkologie*, AGO) of the DKG in 2014 to the members of the German Society of Radiation Oncology (*Deutsche Gesellschaft für Radioonkologie und Strahlentherapie*, DEGRO). The survey consisted of 17 questions regarding personal information and current CAM guidelines within the workplace/clinic.

Results A total of 143 members participated. Of these, 12% had some CAM qualification. For hematological cancer in 35% and in up to 76% for breast cancer, CAM treatment is offered in German radiation oncology facilities, mainly due to fatigue symptoms. CAM is part of routine treatment in 32.2%, 22.0% are planning to incorporate it. Most physicians advise patients to partake in sports activities and recommend dietary supplements and nutritional counseling. The cost of CAM treatment is fully covered in 9.8% of all participating facilities.

Conclusion Today, CAM is integrated into cancer care; however, skepticism regarding its effect still exists. Evidence-based results must be generated to convince physicians of the effectiveness of CAM methods. CAM qualifications must be included in physicians' training to improve their understanding and counseling regarding CAM options in cancer care.

Keywords Quality of life · Neoplasms · Integrative medicine · Fatigue · Surveys and questionnaires

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Komplementärmedizin in der Radioonkologie

Aktuelle Qualifikationen und Therapiemethoden deutscher medizinischer Fachkräfte

Zusammenfassung

Hintergrund Die Komplementär- und Alternativmedizin (CAM) rückt als begleitende Krebstherapie immer stärker in den Fokus und Gesellschaften wie die Deutsche Krebsgesellschaft (DKG) gründeten Arbeitsgruppen, um eine Leitlinie zu CAM zu entwickeln. Die vorliegende Arbeit zielt darauf ab, die Akzeptanz von CAM im gesamten Bereich der Radioonkologie zu bewerten.

Methoden Wir führten eine Online-Befragung zum Thema CAM durch und schickten den im Jahr 2014 erfolgreich verteilten Fragebogen der Arbeitsgemeinschaft Gynäkologische Onkologie (AGO) an die Mitglieder der Gesellschaft für Radioonkologie und Strahlentherapie (DEGRO). Die Umfrage umfasste 17 Fragen zu persönlichen Informationen und aktuellen Richtlinien in der Klinik und Praxis bezüglich CAM.

Ergebnisse Insgesamt nahmen 143 Mitglieder teil. Von allen hatten 12 % eine CAM-Zusatzqualifikation. In deutschen onkologischen Strahlenkliniken wird eine CAM-Behandlung in 35 % bei hämatologischen Krebserkrankungen und in bis zu 76 % bei Mammakarzinomen – hauptsächlich aufgrund einer Fatigue-Symptomatik – angeboten. In 32,2 % ist CAM Teil der Routinebehandlung; 22,0 % planen CAM zu integrieren. Die meisten Ärzte raten den Patienten selbst zu Sport, Nahrungsergänzungsmitteln und Ernährungsberatung. Die CAM-Behandlung ist in 9,8 % aller teilnehmenden Einrichtungen kostendeckend.

Schlussfolgerung CAM ist bereits in die Krebsbehandlung integriert; dennoch gibt es Skeptiker bezüglich ihrer Wirkung. Evidenzbasierte Ergebnisse müssen generiert werden, um Onkologen von CAM-Methoden zu überzeugen. CAM-Zusatzqualifikation müssen bereits in der Ausbildung der Ärzte gefördert werden, um ihr Verständnis und ihre Beratung bezüglich CAM-Optionen in der Krebsbehandlung zu verbessern.

Schlüsselwörter Lebensqualität · Neoplasien · Integrative Medizin · Fatigue · Umfragen und Fragebögen

There is much controversy regarding the use of complementary and alternative medicine (CAM), particularly in oncological patients. CAM methods consist of many items, some of which are more controversial than others [1–3]. Since the available methods are heterogeneous, data remain scarce. However, specific applications such as acupuncture, traditional Chinese medicine (TCM), or sports activities have proven to be effective [4–6].

After oncological diagnosis, many patients undergoing treatment seek additional methods to alleviate symptoms, enhance quality of life (QOL), or support curative approaches. In radiation oncology, typical side effects including fatigue occur, which may be alleviated by CAM [7]. Many authors have evaluated the acceptance of CAM in different patient populations: Depending on the underlying diagnosis and various sociodemographic factors, many patients are in favor of CAM, with significant differences between tumor types, gender, age, or region/country of origin. While patients often ask for CAM, many physicians and other caregivers are hesitant to apply any CAM method, especially in the curative oncological setting. Only recently has CAM moved more into focus, and cancer societies have established working groups on CAM. The German Cancer Society (*Deutsche Krebsgesellschaft*, DKG) is developing a guideline for CAM that includes all medical professions.

Previously, the German Group on Integrative Medicine (AG IMed) developed a questionnaire evaluating the degree

of acceptance, usage, and implementation of CAM. It was successfully distributed in 2014 to all members of the Research Group on Gynecological Oncology (*Arbeitsgemeinschaft Gynäkologische Onkologie*, AGO) of the DKG [8]. Since it has been shown by several published studies that gynecological patients, especially breast cancer patients, are in favor of CAM, the idea to evaluate the provision of CAM by caregivers was of high interest. The authors could show that 93% of all caregivers offered CAM to breast cancer patients, followed next by patients with ovarian cancer. The most commonly applied methods included exercise, nutritional therapy, dietary supplements, herbal medicine, and acupuncture.

We previously evaluated the use of CAM in patients treated at a university-based comprehensive cancer center and showed that in this setting, 15.2% of patients analyzed used CAM parallel to their standard oncology treatment [9]. Moreover, 32.7% of all patients had used CAM in the past. The most frequent use of CAM in that study was observed for neuro-oncology and uro-oncology. Within a further evaluation, we could demonstrate in the Department of Radiation Oncology at Technical University of Munich (TUM) that 26.4% of patients use a CAM method parallel to radiotherapy (RT) [10]. Before RT, 39.3% had participated in some CAM treatment. The most frequently applied methods were vitamins/minerals, food supplements, physiotherapy/manual medicine, and homeopathy.

The present work aims to evaluate the acceptance of CAM in the whole radiation oncology community.

Methods

In November 2017, we conducted an online survey about complementary medicine and distributed the slightly modified AGO questionnaire [8] to the members of the German Society of Radiation Oncology (*Deutsche Gesellschaft für Radioonkologie und Strahlentherapie*, DEGRO). We changed the questions to fit in a radiation oncology context but kept the possible answers identical to allow comparison between both societies.

The survey consisted of 17 questions (Supplementary file 1) regarding personal information such as age, gender, academic title, and qualifications, but also concerning current guidelines within the workplace/clinic regarding CAM. These questions focus on the following CAM aspects: Which patients are offered CAM? Which symptoms need to be present? Which methods are used? Who counsels patients regarding CAM? Is CAM used in daily routine and is it cost-covering?

We distributed the online survey (Survio s.r.o., Czech Republic) via email to all DEGRO members listed ($n = 1527$). This group represents the majority of German-speaking healthcare professionals (HCP) in radiation oncology working in (university) hospitals and private practice. The survey was conducted anonymously and voluntarily for 4 weeks; all members were reminded to participate after the first 2 weeks. The survey displayed one question per page. Questions were designed to be multiple choice forced entry format with single or multiple answers. The online platform ensured data protection via 2048-bit SSL security, ISO/IEC 270001 standards, and daily backups, and determined unique visitors via cookies. Multiple answers by the same person were prevented by a cookie-based restriction using the same browser.

Statistical calculations were performed using SPSS Statistics v24 (IBM Corp, Armonk, NY, USA) in a primarily descriptive way. For testing the influence of age, gender, personal qualifications, and CAM referral, we used the chi-squared test. A significance level <0.05 was considered significant.

Results

A total of 143 HCPs participated (female: 51.7%; male: 48.3%) with a median age of 50 years (range: 29–69 years). The online platform registered 361 unique visitors, with 218 users never submitting their answers. The completion rate was 39.6% (143/361); the return rate was 9.4% (143/1527).

Table 1 Participations' characteristics

Characteristic	<i>n</i> (%)
<i>Gender</i>	
Female	74 (51.7)
Male	69 (48.3)
<i>Academic level</i>	
Professor	20 (14.0)
Assistant professor	13 (9.1)
Doctoral degree	89 (62.2)
No academic title	21 (14.7)
<i>Workplace is a certified oncology center?</i>	
Yes	125 (87.4)
No	9 (6.3)
Unknown	9 (6.3)
<i>Additional qualifications</i>	
Integrative and complementary medicine	17 (11.9)
Homeopathy	2 (1.4)
Acupuncture	6 (4.2)
Naturopathy	3 (2.1)
Other	6 (4.2)
Palliative care	16 (11.2)
Psychology, psycho-oncology, psychosomatics	3 (2.1)

For participants' characteristics see Table 1. The majority (87.4%) worked at a certified oncology center. Of all participants, 9.8% (14/143) had an additional CAM qualification.

The two most frequently named tumor entities for which CAM treatments are offered were breast cancer (75.5%) and head and neck cancer (66.4%; Fig. 1). In palliative situations, CAM is used in 79.0%. All participants stated that they use CAM treatments in their institution if patients suffer from fatigue (65.7%), loss of appetite (61.5%), and nausea/vomiting (59.4%; Fig. 2). Sport (72.7%), nutritional counseling (66.4%), and dietary supplements (50.3%) were the most frequently recommended CAM treatment methods (Fig. 3). The disease phase during which CAM treatments are most commonly offered were palliative care (76.9%) and follow-up (55.2%; Fig. 4). Regarding the therapy phase, radiotherapy (80.4%) and chemotherapy (51.7%) were named most often.

Further, we asked all participants about who was informing patients about CAM treatments in their institution. Counseling was performed in most cases by physicians (85.3%), nutritionists (62.2%), and collaborating CAM specialists (55.2%). Their additional qualifications are in line with their professions (Table 2). Counselors were trained mainly in nutritional counseling (53.1%) and naturopathy (28.0%).

In asking all participants about their recommendations to patients who ask for CAM treatment at the facility,

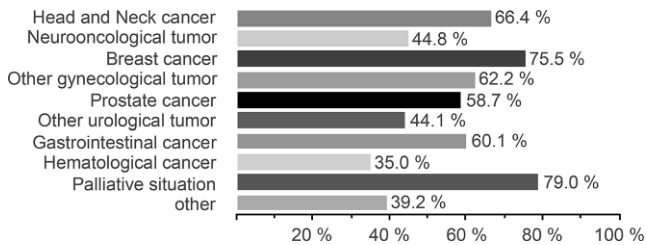


Fig. 1 Tumor entities for which complementary and alternative medicine treatments were offered (multiple answers possible, $n = 143$)

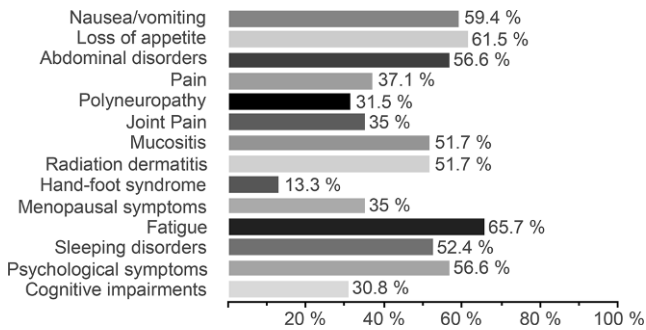


Fig. 2 Symptoms for which complementary and alternative medicine treatments are offered (multiple answers possible, $n = 143$)

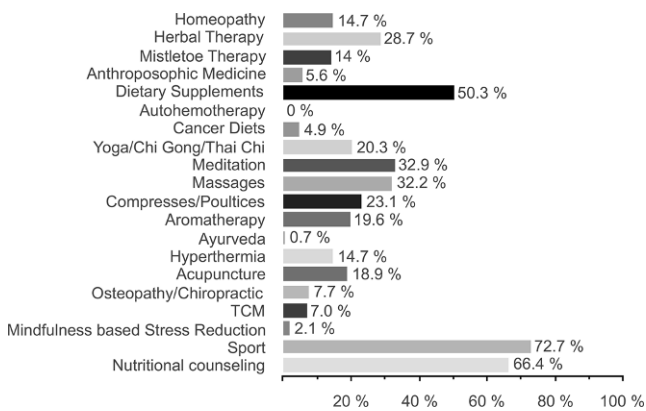


Fig. 3 Complementary and alternative medicine treatments offered to cancer patients (multiple answers possible, $n = 143$)

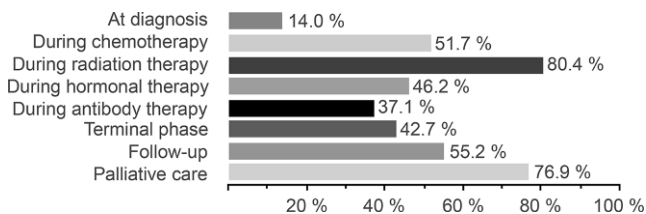


Fig. 4 Timepoint of complementary and alternative medicine treatments ($n = 143$)

Table 2 Personnel counselling patients about complementary and alternative medicine, their profession and qualifications

Characteristic	n (%)
<i>Profession</i>	
Physician	122 (85.3)
Study nurse	29 (20.3)
Sport scientist	23 (16.1)
Nutritionist	89 (62.2)
Mind-body therapist	8 (5.6)
Collaborating CAM specialists	79 (55.2)
<i>Additional qualifications</i>	
Nutritional counseling	76 (53.1)
Acupuncture	29 (20.3)
Osteopathy/chiropractic	27 (18.9)
Homeopathy	22 (15.4)
Naturopathy	40 (28.0)
Herbal therapy	22 (15.4)
Anthroposophic medicine	11 (7.7)
Neural therapy	9 (6.3)
Traditional Chinese medicine	18 (12.6)

Table 3 Statistical testing of the influence of age, gender, and personal qualifications on CAM referral according to the chi-squared test

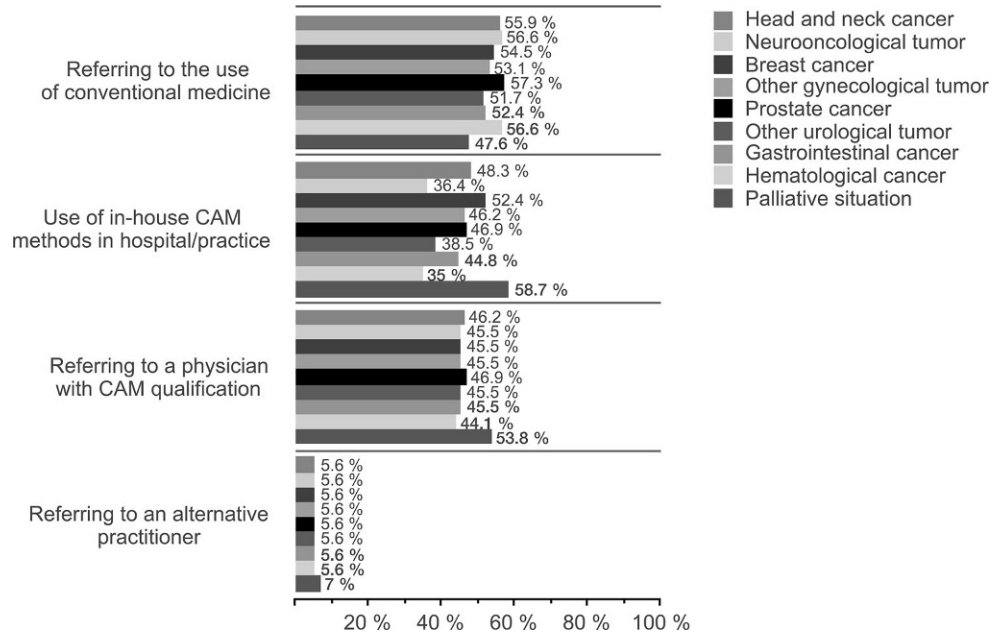
	CAM qualification P	CAM referral P
Gender (male vs. female)	0.006	0.2
Age (≤ 50 vs. > 50 years)	0.9	0.1
CAM qualification (yes vs. no)	–	0.5

CAM complementary and alternative medicine

about 50% refer to conventional medicine but also to CAM methods (multiple answers possible); 10.5% (15/143) refer solely to conventional medicine. Only small differences regarding tumor entity were observed (Fig. 5). At least 35% of participants use some CAM method offered in their facility, in most cases for breast cancer patients (52.4%) and in palliative situations (58.7%). While 45% of all questioned participants refer patients to physicians/colleagues with CAM qualifications, only 6% refer to non-medical alternative practitioners. In both cases, no differences regarding tumor entity were observed.

CAM treatment is cost-covering in 9.8% of all participating facilities (not cost-effective: 37.8%, unknown: 52.4%) and part of routine treatment concepts in 32.2% (not part: 57.3%, unknown: 10.5%). The free response answers to why CAM is not integrated into the cancer treatment were mainly the missing evidence, the missing resources in terms personal and financing, the missing qualifications, and the additional costs that are not covered by the health insurance and need to be paid by patients themselves. However,

Fig. 5 Personal recommendations to patients who ask for complementary and alternative medicine (CAM) treatment possibilities according to treated tumor entities (multiple answers possible, $n = 143$)



22.0% are planning to establish CAM into their treatment concepts (not planning: 46.3%, unknown: 18.2%).

We tested whether there are influences of age, gender, and personal qualifications on CAM referral. No significant influence was seen (Table 3).

Discussion

We evaluated the acceptance of CAM in the radiation oncology community via an online questionnaire inquiring about current qualifications, therapy methods at the facility, and their personal referring strategies regarding CAM treatment. The data were collected within the DEGRO community.

For hematological cancer in 35% and in up to 76% for breast cancer, CAM treatment is offered in German radiation oncology (university) hospitals and practices, mainly due to fatigue symptoms. It is part of the routine treatment in 32.2%. Most physicians advise patients to partake in sports activities, and recommend dietary supplements and nutritional counseling.

In radiation oncology, alleviation of treatment-related side effects is a crucial topic. This can be achieved by modern techniques sparing healthy tissue, but also through complementary and supportive care. Exemplarily, symptoms such as fatigue, mucositis, or reduction in QOL are common side effects that can be potentially reduced by specific CAM methods. The DKG has recently set up a guideline commission for CAM, and radiation oncology is a key player in this context. Therefore, knowledge about the current use of CAM, the openness of radiation oncologists and

their patients towards CAM, as well as the level of physician education in CAM were addressed in this paper.

A similar questionnaire was distributed within the AGO group. Questions were focused on gynecologic oncologists and their attitude and use of CAM. In this study, 104 participants answered the questionnaire, of whom 15.4% stated that they are using CAM and 93% reported that CAM was offered to breast cancer patients in particular [8]. Previously, the affinity of breast cancer patients for CAM and, correspondingly, the higher rate of gynecologists offering CAM has been shown by several groups [9, 11]. Regarding the use of CAM, our results correspond well with the data from the AGO group published by Klein et al. [8]. The high interest of gynecological oncologists in CAM treatments could also be seen in our results. Most CAM methods are used for breast cancer patients (76%). Also, the three most commonly recommended CAM methods were identical. We found fatigue, loss of appetite, nausea, and depression, to be the most frequently named symptoms for which physicians recommend CAM treatment. The AGO analysis was similar, with fatigue, nausea, depression, and menopausal symptoms. Hence, regardless of the specific cancer type, for the typical side effects of chemo-, hormonal, and radiation therapy, the same methods are prescribed. Counseling was performed in 93 and 85% by the physicians themselves in the AGO and DEGRO groups, respectively. Again, their additional qualifications were similar in both groups, with qualifications mainly in naturopathy (AGO: 49%, DEGRO: 28%), nutritional counseling (AGO: 31%, DEGRO: 53%), and acupuncture (AGO: 29%, DEGRO: 20%). Both groups use CAM in routine treatment in about one third of their cases. Whereas 65% of the AGO oncologists plan to inte-

grate CAM in the future, in the radiation oncology community, this was much lower with 22%.

Today, CAM is an accepted supportive treatment option for cancer patients. In our recent patient survey at our oncology center, we could demonstrate their acceptance of CAM methods (about 40% use CAM during RT treatment [10]). Regarding the oncologist's perspective of CAM, we experienced a period of upheaval and rising open-mindedness, while training and qualifications are still lacking. Only 9.8% of our questioned radiation oncologists had additional CAM qualifications. In our view, this highlights the necessity of educating radiation oncologists in CAM in order to utilize these methods for their patient population. However, the prerequisite would be to firstly specify CAM methods in official treatment guidelines to base the need for training physicians on uniform and generally accepted recommendations. On the other hand, most physicians counsel their patients regarding CAM treatment options themselves, do not, however, apply the treatment, and instead refer to specialists who only offer CAM. Two studies regarding general physicians in Germany [12] and the USA [13] showed the same trend and recommend increasing CAM training and education in undergraduate medical programs. Of all participants, only 10.5% refer to conventional medicine only; hence, 89.5% refer to CAM methods. The missing correlation between CAM referral and CAM qualification is due to the low number of CAM-qualified participants ($n=14$). However, those with a qualification refer to CAM. In radiation oncology, the most considerable effect of CAM may be the combination of high-end high-precision methods with low rates of side effects and additionally selected CAM treatments to further decrease of toxicity and enhancement of QOL [7].

The patient's wish and psychosocial condition have increasing importance in cancer treatment and with that also QOL and the reduction of side effects. This, in turn, can be improved and supported by adding CAM to standard cancer treatment, as shown by several studies. In general medical oncology, a large quantity of studies exist showing that, e. g., pain, nausea, fatigue, and depression are improved using CAM treatments such as acupuncture, sports, and dietary supplements [6, 14–20]. However, in our cohort of surveyed radiation oncologists, we found that more evidence of CAM effectiveness and safety is still needed before CAM would be recommended without hesitation [3, 21, 22]. This is the main reason named by skeptics for refusing to recommend CAM. Since radiotherapy can be associated with dedicated side effects, methods of alleviation are of high importance, and CAM methods can be an effective pillar in multimodal symptom management. In the field of radiation oncology, large randomized trials are still lacking and need to be conducted to ultimately convince the radio-oncology community to integrate CAM into can-

cer care and entity-specific treatments. These will urge all cancer societies to determine official guidelines and recommendations for the use of complementary medicine.

Limitations

The study has some limitations. With 9.4%, the response rate is relatively low and allows no overarching conclusion based on all members, particularly physicians, of the DEGRO society. The list of $n=1527$ members could not be filtered for physicians only. Hence, the real response rate of how many physicians of the DEGRO society participated is challenging to calculate. However, 143 physicians responded, which, considering radiation oncology to be a small oncological specialty, is a representative number of German radiation oncologists. Bias exists in the sense that mainly physicians with a positive attitude towards CAM answered the survey. However, this is a problem of all surveys conducted in this manner, i.e., answers are only received from people who have a specific or critical view on the topic. On the other hand, the results give a good overview of the acceptance and criticism regarding CAM within the DEGRO community, since all members dealing with or having to address CAM in their daily clinical practice are likely to have answered the questionnaire.

Conclusion

Today, CAM is integrated into cancer care. Some controversy remains and calls for further prospective studies. As soon as evidence-based results with randomized clinical trials confirm the beneficial results of CAM methods, they will most likely be included in official treatment guidelines. When official guidelines exist, CAM teaching and training must be promoted in physicians' education to improve their understanding and counseling regarding CAM options in cancer care.

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Conflict of interest K.A. Kessel, E. Klein, C.C. Hack, and S.E. Combs declare that they have no competing interests.

References

1. PDQ Integrative, Alternative, and Complementary Therapies Editorial Board (2002) Topics in integrative, alternative, and complementary therapies (PDQ®): health professional version. National Cancer Institute (US), Bethesda (MD)
2. Aguilar BA (2017) The efficacy of art therapy in pediatric oncology patients: an integrative literature review. *J Pediatr Nurs* 36:173–178. <https://doi.org/10.1016/j.pedn.2017.06.015>

3. Stub T, Quandt SA, Arcury TA et al (2018) Attitudes and knowledge about direct and indirect risks among conventional and complementary health care providers in cancer care. *Bmc Complement Altern Med* 18:44. <https://doi.org/10.1186/s12906-018-2106-z>
4. Sertel S, Herrmann S, Greten HJ et al (2009) Additional use of acupuncture to NSAID effectively reduces post-tonsillectomy pain. *Eur Arch Otorhinolaryngol* 266:919–925. <https://doi.org/10.1007/s00405-008-0851-1>
5. Fuller JT, Hartland MC, Maloney LT, Davison K (2018) Therapeutic effects of aerobic and resistance exercises for cancer survivors: a systematic review of meta-analyses of clinical trials. *Br J Sports Med*. <https://doi.org/10.1136/bjsports-2017-098285>
6. Agarwal RP, Maroko-Afek A (2018) Yoga into cancer care: a review of the evidence-based research. *Int J Yoga* 11:3–29. https://doi.org/10.4103/ijoy.IJOY_42_17
7. Kessel KA, Fischer H, Oechsner M et al (2017) High-precision radiotherapy for meningiomas: long-term results and patient-reported outcome (PRO). *Strahlenther Onkol* 29:197. <https://doi.org/10.1007/s00066-017-1156-3>
8. Klein E, Beckmann MW, Bader W et al (2017) Gynecologic oncologists' attitudes and practices relating to integrative medicine: results of a nationwide AGO survey. *Arch Gynecol Obstet* 296:295–301. <https://doi.org/10.1007/s00404-017-4420-y>
9. Kessel KA, Lettner S, Kessel C et al (2016) Use of Complementary and Alternative Medicine (CAM) as part of the oncological treatment: survey about patients' attitude towards CAM in a university-based oncology center in Germany. *PLoS ONE* 11:e165801. <https://doi.org/10.1371/journal.pone.0165801>
10. Lettner S, Kessel KA, Combs SE (2017) Complementary and alternative medicine in radiation oncology: survey of patients' attitudes. *Strahlenther Onkol* 16:655. <https://doi.org/10.1007/s00066-017-1101-5>
11. Akpunar D, Bebis H, Yavan T (2015) Use of Complementary and Alternative Medicine in patients with gynecologic cancer: a systematic review. *Asian Pac J Cancer Prev* 16:7847–7852. <https://doi.org/10.7314/APJCP.2015.16.17.7847>
12. Joos S, Musselmann B, Miksch A et al (2008) The role of Complementary and Alternative Medicine (CAM) in Germany—a focus group study of GPs. *Bmc Health Serv Res* 8:127. <https://doi.org/10.1186/1472-6963-8-127>
13. Patel SJ, Kemper KJ, Kitzmiller JP (2017) Physician perspectives on education, training, and implementation of complementary and alternative medicine. *Adv Med Educ Pract* 8:499–503. <https://doi.org/10.2147/AMEP.S138572>
14. Endres HG, Zenz M, Schaub C et al (2004) German Acupuncture Trials (gerac) address problems of methodology associated with acupuncture studies. *Schmerz* 19:201–213. <https://doi.org/10.1007/s00482-004-0345-z>
15. Enblom A, Johnsson A, Hammar M et al (2012) Acupuncture compared with placebo acupuncture in radiotherapy-induced nausea—a randomized controlled study. *Ann Oncol* 23:1353–1361. <https://doi.org/10.1093/annonc/mdr402>
16. Simcock R, Fallowfield L, Monson K et al (2013) ARIX: A randomised trial of acupuncture v oral care sessions in patients with chronic xerostomia following treatment of head and neck cancer. *Ann Oncol* 24:776–783. <https://doi.org/10.1093/annonc/mds515>
17. Montazeri A, Sajadian A, Ebrahimi M, Akbari ME (2004) Depression and the use of complementary medicine among breast cancer patients. *Support Care Cancer* 13:339–342. <https://doi.org/10.1007/s00520-004-0709-z>
18. Mannel M, Kuhn U, Schmidt U et al (2010) St. John's wort extract LI160 for the treatment of depression with atypical features—a double-blind, randomized, and placebo-controlled trial. *J Psychiatr Res* 44:760–767. <https://doi.org/10.1016/j.jpsychires.2010.01.010>
19. Pan Y, Yang K, Wang Y et al (2017) Could yoga practice improve treatment-related side effects and quality of life for women with breast cancer? A systematic review and meta-analysis. *Asia-Pacific. J Clin Oncol* 13:e79–e95. <https://doi.org/10.1111/ajco.12329>
20. Asadpour R, Kessel KA, Bruckner T et al (2017) Randomized study exploring the combination of radiotherapy with two types of acupuncture treatment (ROSETTA): study protocol for a randomized controlled trial. *Trials* 18:398. <https://doi.org/10.1186/s13063-017-2139-5>
21. Jansen E (2017) The role of complementary and alternative medicine in the Healthcare system: a German paradox. *Complement Med Res* 24:290–294. <https://doi.org/10.1159/000475549>
22. Huebner J, Muenstedt K, Muecke R et al (2013) Counseling cancer patients on complementary and alternative medicine. Background, theory, and implementation of nationwide counseling facilities. *Strahlenther Onkol* 189:613–617. <https://doi.org/10.1007/s00066-013-0392-4>