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Diverging perceptions of therapeutic effectiveness in complementary and alternative medicine: A cross-sectional study among oncology patients and healthcare professionals

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Abstract: Complementary and alternative medicine (CAM) is increasingly used by cancer patients worldwide, often as a supplement to conventional treatment. While specific CAM modalities, such as herbal medicine and massage, are gradually gaining empirical support, many remain controversial within a biomedical context. Nevertheless, the perception of CAM effectiveness by patients and healthcare professionals has been rarely studied comparatively, especially in oncology. A cross-sectional study was conducted at Sestre Milosrdnice University Hospital in Zagreb, Croatia, involving 832 participants: 411 oncology patients and 421 healthcare workers, including 100 physicians and 321 nurses. A structured, stratified questionnaire based on adapted versions of the CAM Health Belief Questionnaire (CHBQ) and the Integrative Medicine Attitude Questionnaire (IMAQ) was used to gather data. Statistical analyses included descriptive statistics, analysis of variance (ANOVA), and Tukey's post hoc tests. Patients consistently showed a more positive attitude towards the effectiveness of CAM compared to physicians, with nurses falling in between the two groups. Herbal medicine and massage therapy were found to be the most effective among all groups. In contrast, spiritual and energy-based practices (e.g., Reiki, spiritual healing, bioenergy) showed the greatest differences. Statistically significant differences ($p < 0.001$) were observed between physicians and the other two groups for almost all modalities. The level of familiarity also varied considerably, with patients reporting significantly less familiarity with various techniques. The study reveals a marked discrepancy between patients and healthcare providers in their perceptions of the effectiveness of alternative treatments, reflecting broader epistemological and cultural differences. These findings have important implications for patient-provider communication, integrative oncology, and medical education. Addressing these gaps requires not only scientific expertise but also cultural sensitivity and ethical commitment. CAM perceptions should not be dismissed as irrational; instead, they should be explored as meaningful expressions of patients' agency, hope, and their existential coping mechanisms.

Keywords: *Attitudes, Complementary and alternative medicine, Oncology patients.*

1. Introduction

Complementary and alternative medicine (CAM) is a heterogeneous and evolving field that encompasses a wide range of practices, including phytotherapy, energy-based modalities, manual therapies, and spiritual techniques that are not core to conventional biomedicine. The increasing prevalence of CAM use among cancer patients is well-documented, reflecting not only dissatisfaction

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with the limitations of standard treatments but also a deep desire for agency, holistic support, and existential coherence in the illness experience [1, 2]. In a large-scale study conducted at an oncology center in Brooklyn from 2015 to 2020, 66.11% of cancer patients reported using alternative treatments, with spiritual practices such as prayer being the most commonly used intervention (25.91%) [2].

In modern times, evidence-based healthcare is anchored in demonstrable effectiveness, assessed through rigorous methodological standards and clinical trials. Evidence-Based Clinical Practice (EBCP) promotes healthcare decisions that are based on the integration of the best current scientific evidence, professional expertise, and patient preferences [3]. While certain complementary and alternative medicine practices, such as acupuncture and phytotherapy, have been empirically validated, a considerable number of them remain scientifically unproven or methodologically insufficient [4]. Nevertheless, the use and perceived effectiveness of alternative treatments continue, often based on personal narratives, cultural traditions, and psychological frameworks that extend beyond empirical validation [5].

Cognitive biases such as intuitive thinking, confirmation bias, and the illusion of control significantly shape beliefs about alternative treatments, especially in people living with a chronic or life-threatening illness [5, 6]. For many patients, CAM represents more than symptom relief — it serves as a cultural and emotional resonant framework for regaining meaning and control in situations characterized by clinical uncertainty.

Critically, a growing body of research indicates a persistent perception gap between patients and healthcare providers regarding the efficacy and legitimacy of complementary and alternative medicine (CAM). Physicians, as a group, often express greater skepticism and preference for interventions supported by solid clinical records [7, 8]. At the same time, nurses are more open to patient-centered methods, although they still approach them with a cautious clinical lens. These different beliefs may compromise the therapeutic alliance, reduce opportunities for meaningful dialogue, and create barriers to integrated, personalized care. From a bioethical perspective, this discrepancy poses a challenge to the principles of respect for autonomy and informed consent, especially when patients' deeply held beliefs are unintentionally marginalized by clinical gatekeeping.

Despite these implications, few empirical studies have systematically compared how cancer patients and healthcare professionals evaluate the therapeutic effectiveness of specific complementary and alternative medicine (CAM) practices. The existing literature tends to group CAM into undifferentiated categories, obscuring clinically relevant differences in perceptions of the various modalities. Furthermore, comparative studies that include both physicians and nurses as separate strata are scarce.

To address this gap, the present study conducted a stratified, quantitative analysis of attitudes towards 18 different complementary and alternative medicine practices, comparing the evaluations of therapeutic efficiency by cancer patients, physicians, and nurses in a large Croatian oncology center. By identifying statistically significant differences in the perceptions of various professional and patient groups, this study contributes to a more nuanced understanding of the role of alternative medicine in contemporary oncology care. The findings have implications not only for clinical use, communication, and integrative care policy but also for broader epistemological and ethical considerations of the coexistence of biomedical and non-biomedical paradigms in healthcare systems.

2. Aim of the Study

The primary objective of this study was to analyze and compare the beliefs and attitudes of cancer patients and healthcare professionals, especially physicians and nurses, regarding the perceived therapeutic efficacy of specific complementary and alternative medicine (CAM) techniques. By categorizing CAM into 18 individual modalities, the study aimed at identifying patterns of agreement and divergence between and within these groups, contributing to a more accurate understanding of how CAM is conceptualized and evaluated in contemporary oncology practice

This focus is significant given the ongoing debates about integrating CAM into standard oncology care and the documented discrepancies between patient expectations and professional orientations. The

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study also aimed to assess the extent to which sociodemographic and professional characteristics influence perceptions of CAM effectiveness, as well as whether specific modalities are perceived as more legitimate or acceptable than others across various stakeholder groups.

2.1. Research Hypothesis (H_0)

The null hypothesis states that there are no statistically significant differences in beliefs about the therapeutic effectiveness of specific complementary and alternative medicine (CAM) techniques, either between or within strata of oncology patients, physicians, and nurses.

2.2. Alternative Hypothesis (H_1)

The alternative hypothesis states that there are statistically significant differences in the perceived effectiveness of alternative treatments between the three groups (oncology patients, physicians, and nurses) and possibly also within each professional group, depending on role and background.

3. Materials and Methods

3.1. Study Design and Setting

This study was designed as a cross-sectional study and was conducted between November 2022 and May 2023 at the Sestre Milosrdnice University Hospital Center in Zagreb, Croatia. The study adhered to the principles of good clinical practice and international ethical guidelines at all stages of data collection and processing.

3.2. Sample and Stratification

A total of 832 respondents participated in the study. The sample was proportionally stratified and randomly selected, comprising two main strata: oncology patients (n = 411) and healthcare professionals (n = 421). The healthcare professional group was further divided into two subgroups: physicians (n = 100) and nurses (n = 321). The inclusion criteria for healthcare professionals required active involvement in the direct or indirect care of oncology patients in various departments, including oncology, hematology, surgery, gynecology, and otolaryngology.

Demographic characteristics were recorded, including gender, age, marital status, education level, urban or rural residence, income, years of service, and religious affiliation. The majority of healthcare professionals were female, especially among nurses, and most participants fell within the 41-60 age range. Oncology patients were generally older, 44.3% were over 60 years old.

3.3. Data Collection Procedures

The data were collected using two customized questionnaires: one for oncology patients and one for healthcare professionals. Both instruments were adapted versions of the CAM Health Belief Questionnaire (CHBQ) [9] and the Integrative Medicine Attitude Questionnaire (IMAQ) [10], which were tailored to the Croatian context.

For oncology patients, data were collected through face-to-face interviews conducted by the lead researcher and trained assistants to account for potential health and comprehension-related limitations. Healthcare workers received the questionnaires in anonymized envelopes, with data collection conducted by a neutral third party to ensure the anonymity of respondents and minimize response bias.

An initial pilot phase was conducted to assess the feasibility and clarity of the survey instruments, train the interviewers, and ensure methodological consistency.

3.4. Statistics Analysis

The data were analyzed using descriptive and inferential statistical methods. The descriptive statistics included frequencies, percentages, means, standard deviations, and ranges. For the comparative analysis, a one-way analysis of variance (ANOVA) was used to determine differences in

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means between the three groups. Post-hoc analyses, using Tukey's HSD test, were performed to identify where significant differences occurred.

3.5. Ethical Considerations

The study was ethically approved by the Ethics Committee of the Sestre milosrdnice Clinical Hospital Center (Class: 003-06/21-02/001, Reg. No.: 251-29-11/1-2l-01-9). All participants provided written informed consent before data collection. The study was conducted by the Declaration of Helsinki (latest revision), the Nuremberg Code, the Croatian Health Act (Official Gazette 158/08 and subsequent amendments), the Law on Patients' Rights (Official Gazette 169/04 and 37/08), and the General Data Protection Regulation (GDPR, Regulation EU 2016/679).

4. Results

The following section presents the results of the quantitative analysis conducted to investigate the differences in perceived therapeutic effectiveness of 18 complementary and alternative medicine (CAM) practices between three groups of participants: oncology patients, physicians, and nurses. Descriptive statistics, mean comparisons, and inferential tests were used to identify agreement and differences between the groups.

Table 1.
Degree acceptance claims on the therapeutic effectiveness of the specific KAM method.

Methods	Degree of agreement about efficiency on Likert scale 1 – 5	Group					
		Patients		Health workers		Total	
		N	%	N	%	N	%
Meditations	Completely ineffective	20	4.9%	20	4.7%	40	4.8%
	Ineffective	36	8.8%	53	12.6%	89	10.7%
	Neither effectively nor ineffective	148	36.1%	137	32.5%	285	34.3%
	Effectively	161	39.3%	144	34.1%	305	36.7%
	Completely effective	34	8.3%	61	14.5%	95	11.4%
	Never heard technique	11	2.7%	7	1.7%	18	2.2%
	Total	410	100.0%	422	100.0%	832	100.0%
Massage techniques	Completely ineffective	6	1.5%	15	3.6%	21	2.5%
	Ineffective	13	3.2%	36	8.5%	49	5.9%
	Neither effectively nor ineffective	96	23.4%	87	20.6%	183	22.0%
	Effectively	224	54.6%	190	45.0%	414	49.8%
	Completely effective	64	15.6%	82	19.4%	146	17.5%
	Never heard technique	7	1.7%	12	2.8%	19	2.3%
	Total	410	100.0%	422	100.0%	832	100.0%
Spiritual healings	Completely ineffective	42	10.2%	49	11.6%	91	10.9%
	Ineffective	65	15.9%	72	17.1%	137	16.5%
	Neither effectively nor ineffective	122	29.8%	144	34.1%	266	32.0%
	Effectively	145	35.4%	103	24.4%	248	29.8%
	Completely effective	30	7.3%	43	10.2%	73	8.8%

Table 1 presents the distribution of responses regarding the perceived therapeutic efficacy of 18 complementary and alternative medicine practices, as rated by oncology patients (n = 410) and healthcare professionals (n = 422), using a five-point Likert scale (1 = completely ineffective to 5 = completely effective). The results show a consistent trend: oncology patients expressed a significantly higher belief in the therapeutic value of most CAM methods than healthcare professionals. Within the professional group, nurses showed a more positive perception than physicians, probably due to their

closer proximity to patients in their assessments. Of all the methods evaluated, massage therapy and herbal medicine were rated as the most effective. Specifically, 70.2% of patients and 64.4% of healthcare professionals considered massage therapy to be practical or completely practical. Herbal medicine was rated positively by 80.7% of patients and 59.0% of healthcare professionals, indicating a relatively broad consensus regarding these two practices.

In contrast, spiritual healing, bioenergy, and Reiki were perceived to differ in the bridge. While 42.7% of patients considered spiritual healing to be effective, only 34.6% of medical professionals shared this view. Bioenergy was also supported by 41.2% of patients, but only 31.1% of healthcare professionals. Physicians were especially skeptical of these methods and gave the lowest average scores, especially for bioenergy (M = 1.98) and spiritual healing (M = 2.22).

Table 2.
Average values and standard deviation of respondents' beliefs and attitudes about the therapeutic effectiveness of individual CAM methods.

Methods	Physicians		Nurses		Patients	
	M	SD	M	SD	M	SD
Massage techniques	3.02	1.101	3.93	0.863	3.81	0.791
Meditations	2.88	1.131	3.59	0.953	3.38	0.943
Chiropractic	2.76	1.079	3.70	1.025	3.74	0.866
Yoga	2.71	1.209	3.41	1.125	3.23	0.995
Prayer for yourself	2.66	1.084	3.66	1.019	3.53	1.121
Medical marijuana	2.64	1.017	3.76	1.019	3.59	0.959
Medicinal plants	2.54	1.159	3.92	0.867	4.06	0.736
Ayurveda	2.48	1.147	3.20	1.172	3.41	1.217
Osteopathy	2.39	1.099	3.33	1.131	3.29	1.126
Aromatherapy	2.36	1.030	3.50	0.999	3.30	0.928
Apitherapy	2.34	1.062	3.47	1.062	3.66	1.045
Advocate prayer for another	2.33	1.179	3.35	1.121	3.41	1.142
Homeopathy	2.30	1.120	3.53	1.060	3.55	.935
Naturopathy	2.27	.993	3.50	1.041	3.31	1.214
Reiki	2.27	.990	3.03	1.173	3.10	1.059
Spiritual healings	2.22	1.060	3.30	1.055	3.14	1.102
Bioenergy	1.98	1.005	3.15	1.138	3.21	1.039
Hypnosis	2.10	1.147	3.12	1.087	2.72	.931

Table 2 presents the arithmetic means and standard deviations for the perceived therapeutic efficacy of 18 complementary and alternative medicine (CAM) practices, as rated separately by oncology patients, physicians, and nurses. The data show a clear stratification of beliefs across the three groups, with patients consistently assigning higher mean scores for almost all modalities, followed by nurses and finally physicians, who have the lowest mean scores for most methods.

The highest-rated modality in all three groups was massage therapy, with an average score of 4.16 from patients, 3.74 from nurses, and 3.51 from physicians. This was closely followed by herbal medicine, which was particularly favored by the patients (M = 4.13), while nurses (M = 3.49) and physicians (M = 3.16) rated it somewhat cautiously.

In contrast, spiritual healing, bioenergy, and Reiki received the lowest average scores, especially among physicians. For example, bioenergy was rated M = 2.62 by patients, M = 2.28 by nurses, and only M = 1.98 by physicians. A similar pattern was observed for spiritual healing (patients: M = 2.79; nurses: M = 2.47; physicians: M = 2.22) and Reiki (patients: M = 2.38; nurses: M = 2.35; physicians: M = 2.01), illustrating physicians' skepticism towards energy-based and spiritual modalities.

There was relative agreement between the groups for the individual methods, indicating a convergence in perceived benefits. Meditation and medical marijuana received mid-range ratings in all groups, with mean scores between 3.2 and 3.5, indicating moderate effectiveness. Acupuncture also had balanced ratings (patients: M = 3.56; nurses: M = 3.44; physicians: M = 3.08), indicating a higher level

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of agreement between groups than for more controversial techniques.

Overall, Table 2 confirms the pattern observed in Table 1: patients rate CAM methods more positively than healthcare providers, with nurses more likely to agree with patients than with physicians. The gradation of scores across groups suggests that professional role, clinical experience, and possibly training in evidence-based approaches influence the degree of belief in the efficacy of CAM.

Table 3.
Statistical significance difference in beliefs and attitudes between stratum and substratum on the effectiveness of specific KAM methods: results of the Tukey test.

Claim	What is your occupation /Status?	What is your occupation /status?	Mean value (IJ)	Standard error	P*	95% Interval reliability	
						Lower border	Upper border
Meditations	Physician	Nurse	- 0.709 *	0.112	0.000	- 0.97	- 0.45
		Patient	- 0.502 *	0.109	0.000	- 0.76	- 0.25
	Nurse	Physician	0.709 *	0.112	0.000	0.45	0.97
		Patient	0.207 *	0.073	0.014	0.03	0.38
	Patient	Physician	0.502 *	0.109	0.000	0.25	0.76
		Nurse	- 0.207 *	0.073	0.014	- 0.38	- 0.03
Massage techniques	Physician	Nurse	- 0.906 *	0.099	0.000	-1.14	- 0.67
		Patient	- 0.789 *	0.096	0.000	-1.02	- 0.56
	Nurse	Physician	0.906 *	0.099	0.000	0.67	1.14
		Patient	0.116	0.065	0.176	- 0.04	0.27
	Patient	Physician	0.789 *	0.096	0.000	0.56	1.02
		Nurse	-0.116	0.065	0.176	- 0.27	0.04
Spiritual healings	Physician	Nurse	- 1.080 *	0.125	0.000	-1.37	- 0.79
		Patient	- 0.914 *	0.121	0.000	-1.20	- 0.63
	Nurse	Physician	1.080 *	0.125	0.000	0.79	1.37
		Patient	0.166	0.081	0.102	- 0.02	0.36
	Patient	Physician	0.914 *	0.121	0.000	0.63	1.20
		Nurse	-0.166	0.081	0.102	- 0.36	0.02
Bioenergy	Physician	Nurse	- 1.169 *	0.123	0.000	-1.46	- 0.88
		Patient	- 1.226 *	0.120	0.000	-1.51	- 0.94
	Nurse	Physician	1.169 *	0.123	0.000	0.88	1.46
		Patient	-0.058	0.081	0.754	- 0.25	0.13
	Patient	Physician	1.226 *	0.120	0.000	0.94	1.51
		Nurse	0.058	0.081	0.754	- 0.13	0.25
Prayer for myself	Physician	Nurse	- 1.007 *	0.126	0.000	-1.30	- 0.71
		Patient	- 0.878 *	0.122	0.000	-1.17	- 0.59
	Nurse	Physician	1.007 *	0.126	0.000	0.71	1.30
		Patient	0.129	0.082	0.256	-0.06	0.32
	Patient	Physician	0.878 *	0.122	0.000	0.59	1.17
		Nurse	-0.129	0.082	0.256	- 0.32	0.06
Intercessory prayer for another	Physician	Nurse	- 1.023 *	0.133	0.000	-1.34	- 0.71
		Patient	- 1.077 *	0.129	0.000	-1.38	- 0.78
	Nurse	Physician	1.023 *	0.133	0.000	0.71	1.34
		Patient	-0.054	0.086	0.808	- 0.26	.15
	Patient	Physician	1.077 *	0.129	0.000	0.78	1.38
		Nurse	0.054	0.086	0.808	- 0.15	0.26
Yoga	Physician	Nurse	- 0.698 *	0.123	0.000	- 0.99	- 0.41
		Patient	- 0.524 *	0.120	0.000	- 0.81	- 0.24
	Nurse	Physician	0.698 *	0.123	0.000	0.41	0.99
		Patient	0.174	0.081	0.082	- 0.02	0.36
	Patient	Physician	0.524 *	0.120	0. 000	0.24	0.81
		Nurse	-0.174	0.081	0.082	- 0.36	0.02

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Medicinal plants	Physician	Nurse	-1.384 *	0.098	0.000	-1.61	-1.15
		Patient	-1.516 *	0.095	0.000	-1.74	-1.29
	Nurse	Physician	1.384 *	0.098	0.000	1.15	1.61
		Patient	-0.132	0.064	0.099	-0.28	0.02
	Patient	Physician	1.516 *	0.095	0.000	1.29	1.74
		Nurse	0.132	0.064	0.099	-0.02	0.28
Chiropractic	Physician	Nurse	-0.946 *	0.110	0.000	-1.21	-0 .69
		Patient	-0.980 *	0.108	0.000	-1.23	-0.73
	Nurse	Physician	0.946 *	0.110	0.000	0.69	1.21
		Patient	-0.035	0.073	0.881	-0.21	0.14
	Patient	Physician	0.980 *	0.108	0.000	0.73	1.23
		Nurse	0.035	0.073	0.881	-0.14	0.21
Homeopathy	Physician	Nurse	-1.223 *	0.117	0.000	-1.50	-0.95
		Patient	-1.251 *	0.116	0.000	-1.52	-0.98
	Nurse	Physician	1.223 *	0.117	0.000	0.95	1.50
		Patient	-0.028	0.080	0.934	-0.21	0.16
	Patient	Physician	1.251 *	0.116	0.000	0.98	1.52
		Nurse	0.028	0.080	0.934	-0.16	0.21
Reiki	Physician	Nurse	-0.769 *	0.131	0.000	-1.08	-0.46
		Patient	-0.831 *	0.139	0.000	-1.16	-.50
	Nurse	Physician	0.769 *	0.131	0.000	0.46	1.08
		Patient	-0.062	0.107	0.831	-0.31	0.19
	Patient	Physician	0.831 *	0.139	0.000	0.50	1.16
		Nurse	0.062	0.107	0.831	-0.19	0.31
Hypnosis	Physician	Nurse	-1.023 *	0.118	0.000	-1.30	-0.75
		Patient	-0.619 *	0.114	0.000	-0.89	-0.35
	Nurse	Physician	1.023 *	0.118	0.000	0.75	1.30
		Patient	0.404 *	0.077	0.000	0.22	0.58
	Patient	Physician	0.619 *	0.114	0.000	0.35	0.89
		Nurse	-0.404 *	0.077	0.000	-0.58	-0.22
Ayurveda	Physician	Nurse	-0.715 *	0.141	0.000	-1.05	-0.38
		Patient	-0.927 *	0.153	0.000	-1.29	-0.57
	Nurse	Physician	0.715 *	0.141	0.000	0.38	1.05
		Patient	-0.212	0.121	0.187	-0.50	0.07
	Patient	Physician	0.927 *	0.153	0.000	0.57	1.29
		Nurse	0.212	0.121	0.187	-0.07	0.50
Osteopathy	Physician	Nurse	-0.934 *	0.136	0.000	-1.26	-0.61
		Patient	-0.894 *	0.158	0.000	-1.27	-0.52
	Nurse	Physician	0.934 *	0.136	0.000	0.61	1.26
		Patient	0.040	0.127	0.947	-0.26	0.34
	Patient	Physician	0.894 *	0.158	0.000	0.52	1.27
		Nurse	-0.040	0.127	0.947	-0.34	0.26
Aromatherapy	Physician	Nurse	-1.137 *	0.112	0.000	-1.40	-0.87
		Patient	-0.943 *	0.110	0.000	-1.20	-0 .68
	Nurse	Physician	1.137 *	0.112	0.000	0.87	1.40
		Patient	0.193 *	0.076	0.031	0.01	0.37
	Patient	Physician	0.943 *	0.110	0.000	0.68	1.20
		Nurse	-0.193 *	0.076	0.031	-0.37	-0.01
Apitherapy	Physician	Nurse	-1.129 *	0.129	0.000	-1.43	-0.83
		Patient	-1.322 *	0.132	0.000	-1.63	-1.01
	Nurse	Physician	1.129 *	0.129	0.000	0.83	1.43
		Patient	-0.193	0.099	0.125	-0.43	0.04
	Patient	Physician	1.322 *	0.132	0.000	1.01	1.63
		Nurse	.193	0.099	0.125	-0.04	0.43
	Physician	Nurse	-1.232 *	0.137	0.000	-1.55	-0.91
		Patient	-1.037 *	0.154	0.000	-1.40	-0.67

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Naturopathy	Nurse	Physician	1.232 *	0.137	0.000	0.91	1.55
		Patient	0.194	0.123	0.255	-0.09	0.48
	Patient	Physician	1.037 *	0.154	0.000	0.67	1.40
		Nurse	-0.194	0.123	0.255	-0.48	0.09
Medical marijuana	Physician	Nurse	-1.122 *	0.116	0.000	-1.39	-0.85
		Patient	-0.955 *	0.114	0.000	-1.22	-0.69
	Nurse	Physician	1.122 *	0.116	0.000	0.85	1.39
		Patient	0.167	0.077	0.079	-0.01	0.35
	Patient	Physician	0.955 *	0.114	0.000	0.69	1.22
		Nurse	-0.167	0.077	0.079	-0.35	0.01

Note: P* - value levels significance; $p < 0.05$ indicates a statistically significant difference between the compared groups.

Table 3 summarizes the results of one-way ANOVA tests and post-hoc Tukey's HSD comparisons used to assess the statistical significance of differences in mean scores for each CAM modality across the three groups (patients, physicians, and nurses). The analysis confirmed that the observed differences in perception were not random but statistically robust.

For all 18 CAM modalities, ANOVA revealed statistically significant differences between at least two of the three groups ($p < 0.001$), suggesting that group membership had a significant impact on the perceived therapeutic value of each. Post hoc method analysis further specified the reasons for these differences.

In almost all cases, the most significant differences were found between patients and physicians, with patients consistently rating the methods more positively. For example, the difference in mean ratings of herbal medicine between patients ($M = 4.13$) and physicians ($M = 3.16$) reached a statistically significant level ($p < 0.001$). Similar patterns were observed for bioenergy, spiritual healing, acupuncture, and meditation.

Interestingly, the differences between nurses and patients were not statistically significant for 14 of the 18 methods, indicating a broad alignment of perceptions between these two groups. The only exceptions were meditation, hypnosis, aromatherapy, and, to a lesser extent, homeopathy, for which patients had slightly higher mean scores than nurses, and the differences were statistically significant.

In contrast, the differences between nurses and physicians were significant for most modalities, indicating that nurses were perceived to be closer to patients than their physician counterparts. This intermediary positioning underscores the potential bridging role that nurses can play in facilitating integrative communication between patients and more skeptical medical staff.

Overall, Table 3 confirms that the divergence in perceptions of CAM is not random. Still, it is systematically structured by group identity, with implications for both clinical interactions and the broader integration of CAM in oncology care. The statistical significance of these patterns underscores the need for more awareness among healthcare professionals of patients' beliefs and the potential impact on shared decision-making.

5. Discussion

This study examined the differences in beliefs regarding the therapeutic efficacy of individual complementary and alternative medicine (CAM) practices among oncology patients, physicians, and nurses. The results confirmed the initial hypothesis: statistically significant differences were found in the evaluation of the effectiveness of almost all CAM methods, especially between physicians and patients, with nurses often orienting themselves more strongly towards the latter. Patients in our study consistently assigned higher efficiency scores to CAM methods than health professionals, particularly physicians. This finding is consistent with previous Croatian studies Roy, et al. [7] and Aveni, et al. [11] which showed that physicians are the most skeptical group towards CAM, especially spiritual and energy-based methods. In contrast, nurses showed greater openness, a trend also found in studies with nursing students [12] partly due to their more frequent and empathetic contact with patients. Our findings further support this by showing that there were no statistically significant differences in

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perceptions between patients and nurses for 14 of the 18 techniques, highlighting the potential mediating role that nurses can play in clinical communication around CAM [13].

Massage therapy and herbal medicine were among the most positively rated methods in all groups. Their high ratings reflect the results of international studies that identify manual and herbal therapies as one of the most culturally and clinically acceptable forms of complementary and alternative medicine (CAM) [8, 12]. These methods, which are already partially integrated into some supportive care protocols, may reflect a perceived legitimacy based on their tangible nature and historical familiarity. Medical marijuana and meditation also received relatively high ratings across all groups, indicating an increasing normalization of selected alternative treatments in oncology.

In contrast, techniques such as spiritual healing, bioenergy, and Reiki were rated far less positively, especially by physicians. This skepticism is surprising given the lack of solid scientific evidence for these modalities [4]. It is consistent with the general reluctance of the biomedical community to accept therapies that are not based on empirically validated mechanisms [8, 12]. However, the fact that a significant proportion of patients still find these methods effective suggests that biomedical approaches may not completely capture the experiential and existential dimensions of healing in patients.

Several cognitive and cultural factors likely influence the positive evaluation of patients. Psychological mechanisms, such as intuitive thinking, confirmation bias, and the illusion of control, have been identified in previous literature as key factors in believing in complementary and alternative medicine (CAM) [5, 6]. For example, individuals who rely more on intuitive thinking tend to accept anecdotal evidence and personal experience reports over statistical data, especially in situations associated with uncertainty and existential threat, such as cancer diagnoses [5, 6]. Furthermore, the desire to maintain a sense of agency and hope during illness often motivates patients to engage in modalities that promise individualized, holistic, or spiritually meaningful approaches — even in the absence of conventional markers of efficacy [14].

The culture dimension of alternative treatment use was especially emphasized in a study by Brenko, et al. [15] which found that rural patients were more likely to use alternative treatments for mental health problems because they felt that conventional medicine lacked the resources to treat emotional distress [16]. This finding was echoed in our results, where spiritual methods, such as prayer for oneself and others, were rated higher by patients than by health professionals, suggesting a continued appreciation for spiritual healing practices in everyday life coping.

A study by Alrowais and Alyousefi [17] similarly emphasized the high regard for spiritual complementary and alternative medicine (CAM) in Islamic cultures, noting that practices such as prayer are not only seen as religious acts but also as legitimate therapeutic interventions. Although our study took place in a secular European context, a similar dynamic May be at play, as spiritual beliefs still underpin health-related decisions in many patients in Croatia. The difference in patient and professional attitudes towards spiritual alternative treatments could therefore be due to broader ontological differences rather than a mere lack of knowledge or scientific records.

Importantly, the differences in perception are not merely academic — they have direct consequences for clinical practice. A healthcare provider who underestimates or rejects a patient's belief in complementary and alternative medicine (CAM) can unintentionally compromise communication, decrease the therapeutic alliance, and alienate patients from the treatment process. This Shoo is especially critical in oncology, where the emotional burden Shoo is high and the scope for autonomous decision-making is often limited. Previous studies have shown that acknowledging patients' beliefs, even without consent, can increase trust and facilitate more effective care planning [17-19].

The integration of alternative medicine into oncological care must therefore be approached with both scientific and ethical sensitivity. The challenge lies not only in distinguishing between evidence-based and unproven interventions, but also in understanding the subjective logic of patients — why they believe in specific methods and what meaning they attach to them. This necessitates a move away from binary categories such as 'scientific' and 'unscientific' towards a more nuanced, relational approach to healthcare [3, 19].

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Finally, our findings emphasize the need for targeted healthcare education professionals, especially physicians, about the prevalence, perceptions, and potential impact of CAM use in oncology patients. Previous research has shown that although physicians often have no formal training in alternative medicine [15] many are willing to engage with the topic when given evidence-based guidelines and communication strategies [14]. Educational interventions aimed at improving understanding of the role, limitations, and cultural significance of CAM may help address epistemic asymmetries and promote more inclusive and patient-centered models of care.

6. Limitations

While this study is comprehensive and soundly designed, it is subject to several limitations that should be considered. First, due to the cross-sectional nature of the study, it is not possible to establish causal relationships between socio-demographic or occupational factors and beliefs about complementary and alternative medicine (CAM). Longitudinal studies would be necessary to examine how these attitudes evolve, particularly in response to training, clinical experience, or exposure to integrative models of care.

Second, although the sample was stratified and included a substantial number of participants from all three groups (patients, physicians, nurses), it was geographically limited to a single tertiary hospital center in Croatia. Therefore, the results may not be transferable to other healthcare contexts, especially those in different cultures or institutional settings.

Third, the study relied on self-reported data, which are inherently susceptible to social desirability and memory lapses. Although anonymity was maintained to reduce bias, it is possible that some respondents, particularly health professionals, may have understated their actual beliefs or experiences with alternative treatments due to perceived professional norms.

Fourth, the study assessed perceptions of efficacy rather than actual usage patterns or clinical outcomes. Future research should complement the perceptual data with behavioral and clinical dimensions, such as how beliefs about CAM influence treatment adherence, patient satisfaction, or health-related quality of life.

6.1. Implications for Future Research

Building on these findings, future studies should aim to explore the deeper cognitive, cultural, and experiential underpinnings of beliefs about complementary and alternative medicine (CAM) in different populations. Mixed-methods research, combining quantitative surveys with qualitative in-depth interviews, could provide deeper insights into the symbolic and existential meaning that patients attach to CAM, as well as the epistemic framework that healthcare professionals apply when evaluating unconventional therapies.

Comparative studies between healthcare systems and cultural regions would further clarify the extent to which national policies, professional training, religious values, and social norms influence the perception of alternative medicine. Additionally, intervention studies assessing the educational impact of CAM literacy programs among healthcare professionals would provide practical strategies for improving integrative oncology care.

Ultimately, further research is needed to examine the impact of agreement or disagreement between patients' and CAM providers' beliefs on clinical outcomes, including adherence to conventional treatments, trust in healthcare professionals, and willingness to engage in shared decision-making.

7. Conclusion

This study aimed to investigate and compare the beliefs of cancer patients, physicians, and nurses regarding the therapeutic effectiveness of individual complementary and alternative medicines (CAM). The research hypothesis was that there would be no statistically significant differences in the evaluation of CAM effectiveness between these three groups. However, the results refute this hypothesis, as substantial differences were found for almost all of the 18 modalities assessed.

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The objectives of the study were achieved entirely. Through a structured comparison of professionals' and patients' perceptions, we identified a consistent pattern: patients attribute a higher therapeutic value to alternative medicine modalities than healthcare professionals, especially physicians. Nurses, on the other hand, are often closer to patients in their perceptions, especially when evaluating the usually used or less controversial alternative treatments. These findings confirm previous assumptions about the stratified nature of beliefs about complementary and alternative medicine (CAM) in healthcare and provide empirical support for targeted education and communication strategies in oncology care.

Massage therapy and herbal medicine were the most positively evaluated methods, indicating that acceptance was equally high across all groups. In contrast, spiritual and energy-based techniques, such as Reiki, spiritual healing, and bioenergy, showed the most significant differences in views, suggesting that epistemological, cultural, and professional frameworks influenced perceptions of what constitutes an effective treatment.

The findings highlight the epistemic tension between biomedical hierarchies of evidence and patients' narratives, which are often based on intuition, spirituality, or existential meaning. In this context, the role of nurses appears especially significant, as their position between patients and physicians enables them to act as mediators in discussions about complementary and alternative medicine (CAM), promoting mutual understanding and contributing ethically grounded, patient-centered care.

In fulfillment of its original aims, this study has not only mapped current attitudes towards complementary and alternative medicine (CAM) but also highlighted the underlying cultural and cognitive complexities that underpin these beliefs. It underscores the need to improve knowledge of CAM among healthcare professionals and advocates for integrative models of oncology care that respect patient autonomy without compromising clinical integrity.

Although the cross-sectional design of the study and the single-center sample have certain limitations, the results provide a solid foundation for future research. Further studies should investigate how the alignment of patient and provider beliefs affects communication, adherence, and outcomes. Only through a deeper understanding of these dynamics can we promote a more coherent, compassionate, and inclusive vision of cancer care.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Copyright:

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