



Original Research Article (Clinical)

Use of complementary and alternative medicine among patients with cancer in a sub-Himalayan state in India: An exploratory study



Laxman Pandey ^{a,1}, Rajesh Pasricha ^{a,1,*}, Deepa Joseph ^a, Rachit Ahuja ^a, Yanpothung Yanthan ^a, Pankaj Kumar Garg ^b, Manoj Gupta ^a

^a Department of Radiation Oncology, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, 249203, India

^b Department of Surgical Oncology, All India Institute of Medical Sciences, Rishikesh, Uttarakhand, 249203, India

ARTICLE INFO

Article history:

Received 22 April 2020

Received in revised form

21 August 2020

Accepted 5 January 2021

Available online 23 February 2021

Keywords:

CAM

Ayurveda

Yoga

Cancer

Uttarakhand

Sub-Himalayan

ABSTRACT

Background: The use of complementary and alternative medicine (CAM) is widespread among cancer patients in India.

Objective: The present study elucidated usage patterns of CAM and the factors responsible for its adoption among the patients with cancer, and the therapeutic impact of CAM.

Materials and methods: This was a questionnaire-based study, conducted among patients with cancer in a tertiary care hospital in a sub-Himalayan city. Data were analyzed using statistical methods.

Results: A total of 2614 patients with cancer were included. Almost half of the patients (n = 1208, 46.2%) reported to have been treated with CAM. Breast cancer (n = 274, 23.0%) was most prevalent with majority at advanced stages. Ayurveda (n = 428, 35.9%) Yoga/Naturopathy (n = 381, 32.0%) Homeopathy (n = 143, 12.0%) and Unani (n = 71, 5.9%) were used commonly. Among CAM users, 85.0% (n = 1012) of patients used CAM as the sole method of treatment, while 58.9% (n = 702) patients reported initial symptomatic benefit.

Conclusion: Using CAM benefitted a significant number of patients with cancer. However, there is an urgent need to integrate CAM with modern system of medicine.

© 2021 The Authors. Published by Elsevier B.V. on behalf of Institute of Transdisciplinary Health Sciences and Technology and World Ayurveda Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Complementary and alternative medicine (CAM) refers to a group of diverse medical and health care interventions, practices, products, or disciplines that are not generally considered as a part of conventional medicine (also called Western or allopathic or modern medicine) [1]. Such intervention products, practices, or disciplines when used in place of conventional medicine are defined as ‘alternative,’ and when they are used together with conventional medicine, they are termed as ‘complementary’ [2].

CAM has often been the dominant method of treatment for health problems in many countries for centuries, and in some cases, it continues to dominate health care beliefs and practices. In India,

the traditional systems of medicine such as Ayurveda, Siddha, and Unani, are more than 5000 years old, and these (particularly Ayurveda) are widely practiced in the rural Indian population [3]. AYUSH (Ayurveda, Yoga, Unani, Siddha, and Homoeopathy) was established in March 1995 as a separate department to promote indigenous systems for Indian Systems of Medicine and Homeopathy (ISM and H) [4].

The use of CAM still holds its ground in today’s era despite the advent and advances made by modern evidence-based medicine. Nowadays, readily available internet access, technology, economic, cultural as well as social trends are the major contributing factors, which have led to an increase in the interest and growth of CAM in cancer patients.

In developed countries, a significant number of cancer patients use CAM to improve their quality of life [5]. However, this situation in remote parts of the less developed countries, such as India, is quite different. The patients may have limited access to modern medical services, and many are compelled to try CAM.

* Corresponding author.

E-mail: drrajesh_pasricha@yahoo.com

Peer review under responsibility of Transdisciplinary University, Bangalore.

¹ Both the authors have equal contribution to the study.

The state of Uttarakhand is located in hilly regions of North India and, due to its agro-climatic conditions, is home to the extensive natural medicinal plants. Thus, making this state a significant contributor in research and development of India's indigenous medicine system that is Ayurveda. Moreover, due to difficult hilly terrain, modern cancer treatment facilities are few and difficult to access. It often results in the inclination of the local people to opt for traditional medicine for the prevention and treatment of cancer [6].

Western literature suggests the use of CAM in women with cancers to fortify the immune system, lower the detrimental effects of modern oncology treatment, and reduce cancer-related fatigue and psychological stress [7]. Although scientific literature reveals the usage of individual Ayurvedic medicines, there is a paucity of data regarding the prevalence and the reasons for the usage of CAM among the cancer patients of this region of India. Hence, this study was planned to look into the pattern of CAM by cancer patients of an underserved hilly state of India and the factors which contribute to its adaption by the cancer patients coming to the outpatient department (OPD) for treatment.

2. Materials and methods

2.1. Patients and settings

The study was conducted from January 2018 to December 2018 to explore the prevalence and usage patterns of CAM among patients with cancer attending the oncology clinic of a tertiary care teaching hospital in a sub-Himalayan city in northern India. All the patients with cancer were requested to participate in the study. Patients were included if they had met the following inclusion criteria; adult patients (age more than 18 years) of either gender with a diagnosis of cancer, having full awareness of their diagnosis, able to comprehend the questions, and willingness to participate in the study. All the patients having severe pain or agitated were excluded from the study.

The present study was a hospital-based questionnaire-based survey that was done using a pre-tested semi-structured interviewer-based questionnaire (Survey questionnaire as a supplementary file). The questionnaire was anonymous, and the patients were only interviewed after they received information about the study, agreed to participate, and signed the consent form. The patients were interviewed for 15–30 min while they were waiting for their appointment with the oncologist. All the participants were offered modern cancer treatment in the form of surgery, chemotherapy, and radiation as per standard guidelines, irrespective of CAM usage.

2.2. The questionnaire

There were 30 items in the questionnaire. These included demographic data (age, gender, occupation, education, household income, and marital status), clinical data (site of primary cancer, standard treatments received previously, and current standard treatment) and questions about CAM use. For our study, the type of CAM used was divided into Ayurveda, Yoga/Naturopathy, Homeopathy, Unani, and others.

2.3. Data analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) program (21.0). Descriptive statistics were tabulated, and results were presented with appropriate charts and diagrams. To summarize the data, study variables were presented in proportion and percentage.

3. Results

A total of 2614 patients with cancer attending oncology OPD were included in the study. Almost half of the patients (n = 1208, 46.2%) reported the usage of CAM. The questionnaire was applied to 1190 patients who agreed to participate further in the study. Out of these, 657 (54.5%) patients were women while remaining were men. The mean age of the patients was 52.3 ± 10.4 years. Half of the patients (n = 562, 53.9%) were aged more than 50 years. Majority of the patients were married (n = 1071, 90.0%). Cancers prevalent in patients using CAM were breast (n = 274, 23.0%), prostate (n = 238, 20.0%), head and neck (n = 190, 15.9%), and urinary bladder (n = 95, 7.9%) cancers. The majority of the patients using CAM were having either advanced cancers (16.9%) or metastatic/recurrent disease (75.9%); only 7.1% of the patients had early-stage disease. CAM usage was common in patients who were uneducated or poor. Table 1 displays the various demographic characteristics of the patients using CAM.

Common forms of CAM usages were Ayurveda (n = 428, 35.9%) followed by Yoga/Naturopathy (n = 381, 32.0%) Homeopathy (n = 143, 12.0%), Unani (n = 71, 5.9%) and others (n = 167, 14.0%) (Fig. 1). As reported by the patients, the reasons for using CAM were (a) traditional faith in CAM (n = 488, 41.0%), (b) unawareness about modern system of medicine (n = 298, 25.0%), (c) inaccessibility to modern system of medicine (n = 285, 23.9%), (d) long waiting period and financial burden to obtain modern oncological treatment (e) fear of toxicity with modern system of medicine (n = 119, 10.0%).

It was reported that most of the patients (n = 809, 67.9%) were suggested CAM by their family members and friends, while other sources of information were the prior experience of CAM usage for benign diseases (n = 250, 21.0%) and advertisements (n = 131, 11.0%). Among all CAM users, 85% (n = 1012) of patients admitted

Table 1
Demographics of CAM users.

Variables	Total CAM users (N = 1190)
Gender	
Male	649 (54.5)
Female	541 (45.5)
Age, years	
<50	538 (45.2)
>50	652 (54.8)
Marital status	
Unmarried	119 (10.0)
Married	1071 (90.0)
Education level	
None	607 (51.0)
Up to Secondary	440 (36.9)
University	143 (12.0)
Monthly Income (INR)	
<10,000	809 (67.9)
>10,000	381 (32.0)
Religion	
Hindu	859 (72.2)
Others	331 (27.8)
Type of cancer	
Breast	274 (23.0)
Prostate	238 (20.0)
Head and Neck	190 (15.9)
Urinary Bladder	95 (7.9)
Others	393 (33.0)
Stage	
Early	84 (7.1)
Advanced	202 (16.9)
Metastatic/recurrent	904 (75.9)

Data is presented as n%. CAM, complementary and alternative medicine.

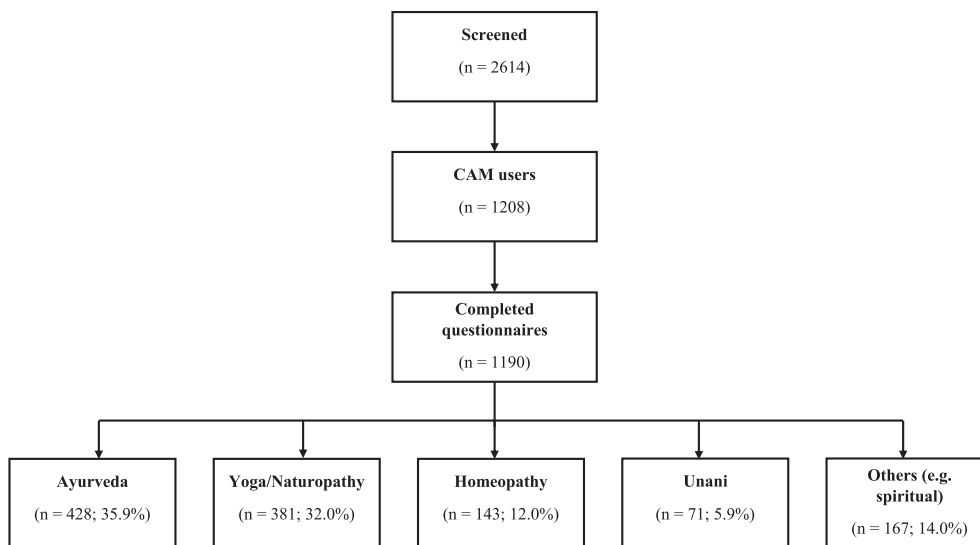


Fig. 1. Schematic diagram showing common forms of CAM usages among cancer patients of sub-Himalayan state in India.

the use of CAM as the sole method of treatment for their cancer; only 14.9% (n = 178) patients were using it along with the modern system of medicine.

A sizeable number of patients (58.9%, n = 702) reported initial benefit in symptoms with CAM therapy; however, the benefit

Table 2
Pattern of CAM usage.

Variables	Total (N = 1190)
Type of Alternative treatments	
Ayurveda	428 (35.9)
Yoga/Naturopathy	381 (32.0)
Homeopathy	143 (12.0)
Unani	71 (5.9)
Others (e.g. spiritual)	167 (14.0)
Reason for using CAM	
Trust in CAM	488 (41.0)
Lack of awareness	298 (25.0)
Distrust on modern medicines	250 (21.0)
Fear of conventional treatment	119 (10.0)
Lack of access	35 (3)
Awareness of CAM	
Friends and Family	809 (67.9)
Self-awareness from previous experience	250 (21.0)
Media and Others	131 (11.0)
Delay in conventional treatment	
<6 months	393 (33.0)
>6 months	797 (66.9)
Use of CAM as	
Alternative medicine	1012 (85.0)
Complementary medicine	178 (14.9)
Frequency of CAM use	
Daily/regularly	1083 (91.0)
Occasionally	83 (6.9)
Once	24 (2.0)
Initial benefit form CAM	
Benefitted	702 (58.9)
Not benefitted	488 (41.0)
Cessation of CAM	
Progression of symptom	762 (64.0)
Side effects	107 (8.9)
Cost	35 (2.9)
Others	286 (24.0)

Data is presented as n%.

waned off gradually as the disease progressed and compelled them to seek treatment from the modern system of medicine.

Two-thirds of the patients (n = 393, 33.0%) delayed seeking treatment from a modern system of medicine by more than six months of the onset of symptoms. The most common reasons for stopping CAM and seeking a modern system of medicine therapy were progressive disease (64.0%, n = 762), side effects of CAM therapy (8.9%, n = 107), cost of CAM therapy (2.9%, n = 35). 24.0% (n = 286) patients listed no specific reason for seeking a modern system of medicine therapy (Table 2).

4. Discussion

In the present study, a total of 2614 consecutive patients attending radiotherapy OPD during one year were screened for CAM usage, and 46.2% incidence of CAM usage was found; although, 93.0% of patients were aware of the CAM system. The patient populations predominantly revealed women with breast cancers, above 50 years of age, and belonging to poor socioeconomic status. Patients were initially satisfied with CAM therapy; however, they later had to discontinue the treatment due to the progression of the disease. A systematic review conducted to evaluate the benefits of CAM in oncology reported that manipulative CAM therapy might be useful in symptomatic management in these patients [8].

The literature has reported the prevalence of CAM usage among patients with cancer to be ranging between 12.5 and 73.0% [9–12]. This enormous variability can be explained by the inconsistent definition of CAM, as some authors include only Ayurveda or herbal medications, while many others also consider unorthodox medical practices such as spiritual therapy, Yoga, acupuncture, and massage. Indian Council of Medical Research conducted a study in 2007, including 45,000 people, and reported that 18.0% of people used CAM system for common problems; whereas, 33.0% used it for serious problems [13]. However, limited data is available regarding the use of an alternate form of treatment in cancer patients, although estimates have suggested that CAM usage maybe around 38% [14]. In this study, a higher incidence of CAM treatment may be attributed to the fact that the state of Uttarakhand is a historical hub and home to various forms of CAM systems including Ayurveda, Yoga and spiritual healing leading to easy availability and

influence of these modalities in peripheral areas of our institute. This study also looked into the prevalence of CAM awareness among cancer patients which turned out to be very high (93.0%) as compared to modern treatments (75.0%), and this was in accordance with the results of a similar study reported by Kumar D et al. [15].

In the present study, among CAM users, 54.5% were women, whereas only 45.5% were men. Chaturvedi et al. surveyed 550 cancer patients in Delhi hospital, and they also reported that women were much more likely to use alternative medicines than men (83% vs. 17%). According to western literature, CAM usage is more common in women with higher income, those having obesity, chronic physical or mental conditions such as depression leading to avoidance of healthcare services in general, as well as in patients with cancer [16–19]. Apart from this study, women's predisposition regarding CAM usage was also noted in other Indian studies [20,21]; nevertheless, no specific reason in literature was available for the same as in some western studies [16–18]. The reasons may be similar to other socioeconomic causes of gender bias towards the women in India like illiteracy, economic dependency, and patriarchal attitudes of society towards women.

CAM usage is more common in advanced (16.9%) and metastatic cancer patients (75.9%) than early-stage cases (7.1%) with the most common diagnosis being breast cancer (23.0%), followed by prostate (20.0%), head and neck (15.9%) and urinary bladder (7.9%) malignancy. A similar association of CAM use with advanced-stage disease has also been noted in other studies [22]. Many Indian studies also reported that the prevalence of CAM usage varied with stage and diagnosis, and showed that its use is most common in breast cancer, followed by head and neck malignancy [15], whereas in western literature, Bahall et al. reported prostate (44.4%) as the most common diagnosis followed by breast (39.6%), colon (38.7%) and ovarian (37.0%) malignancy [23]. Others like Molassiotis et al. reported the highest prevalence rate of CAM use in European patients with pancreatic, liver, bone/spinal and brain metastatic cancer, followed by breast, stomach, gynecological and genitourinary cancers [24]. The difference in the incidence of CAM use in various cancers and its variation with stages of cancer reflects the demographic variability of malignancy diagnosis in the study population. As breast cancer is the most common cancer among Indian women [25] and most of these present at advanced stages, it was observed that metastatic and advanced breast cancer was the most common group using CAM in hilly regions of North India (93.0%).

The present study also showed that the use of CAM is higher among uneducated and illiterate patients. Similarly, the use was also higher in patients from low socioeconomic strata, which indicates their bias against the use of conventional treatments. Ganasegeran et al. also found a significantly higher rate of CAM use among unemployed occupants, those with lower income, and those who were educated up to tertiary level [26]. The reasons for these observations have been taken into considerations and found that perceived higher cost and fear of modern cancer treatments like chemotherapy and radiotherapy, leading to a stronger belief in the traditional medicine system. On the other hand, this study excluded aspects such as lack of awareness among the patients regarding government schemes to support cancer treatments; hence, they prefer cheaper and readily available treatment methods such as CAM.

Ayurveda was the most commonly sought alternative treatment modality, with 36% of patients reporting its use, followed by Yoga/Naturopathy, Homeopathy, and Unani medicine. Different types of CAMs used in different geographic locations such as Kampo medicine in Japan [27,28], folk herbs in Arabic countries [1], Chinese herbal medicine (*Ganoderma lucidum*, *Fructus zizyphi*, *Panax*

quinquefolius) in China [29] while, relaxation techniques, chiropractic, and massage were the CAM therapies used in USA [30,31]. Many studies have reported that Ayurvedic treatment is one of the most commonly used treatments in patients with cancer in North India [15,32]. The reason for differences in the type of CAM usage among different countries and locations may be local availability and long-standing tradition of that therapy in that region, which leads to strong belief and trust in these therapies. This higher incidence of use of Ayurvedic treatment is attributed to the fact that the state of Uttarakhand has been a historical hub for the research and development of Ayurveda, thus attributing to easy availability and awareness of these modalities.

The sources of information regarding the CAM therapies among its users were majorly the family members or friends (68%) followed by self-awareness and previous experience (21%). Similar results have been reported by other Indian studies [19]. In contrast, the western study showed that the media is the primary source of information followed by family and friends [33]. However, a National Health Interview Survey conducted in 23,393 patients with cancer reported prevalence of CAM usage was credited to the healthcare provider [34].

This study revealed that 77% of patients delayed their conventional treatment by more than 6 months as the majority of these were found to be using CAM as the only treatment regularly (85% and 91%, respectively).

Finally, the level of satisfaction from CAM usage and the reasons for its discontinuation were evaluated that showcased 59% of the patients to be unsatisfied with CAM therapy. It might be due to the treatment failure in more than 70% of cases; thus, shattering the myth about the therapeutic effectiveness of CAM treatments like Ayurveda or any perceived satisfaction by patients due to its placebo effect. This also led to the discontinuation of CAM treatment. Another surprising observation with regards to discontinuation was the side effect of CAMs; since the fear of side effects from conventional treatments is one of the major factors facilitating CAM use [35].

Ignorance, lack of treatment facilities, poor finances, has increased the CAM usage among the patients with cancer-causing delays in presentation and disease progression, severely compromising their conventional treatment; thus, decreasing their chances of cure and increase mortality [36,37]. We have not looked into the effect of CAM usage on the outcome of cancer patients, as the study focused mainly on the pattern of CAM usage. This study will promote other researchers to study and compare the trends in CAM usage in similarly underdeveloped and underserved regions of developing economies of the world and determine its effects on cancer treatment. Such studies will provide insight into improving oncology treatments.

5. Conclusion

To conclude, there is a high prevalence of CAM usage, especially among women belonging to poor socioeconomic status, who reported therapy benefits initially with subsequent disease progression. Education, awareness programs, modern treatment facilities, and easy availability of economical conventional treatment need to be planned and implemented. There is a need to integrate CAM with the modern system of medicine to harness its potential benefits.

Source(s) of funding

None.

Conflict of interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jaim.2021.01.001>.

References

- [1] Naja F, Alameddine M, Itani L, Shoaib H, Hariri D, Talhouk S. The use of complementary and alternative medicine among Lebanese adults: results from a national survey. *Evid Based Complement Altern Med* 2015;2015: 682397.
- [2] Definition of complementary and alternative medicine (CAM) according to the national center for complementary and integrative health. Available at: <https://nccih.nih.gov/health/integrative-health>. [Accessed 30 January 2020].
- [3] Subhose V, Srinivas P, Narayana A. Basic principles of pharmaceutical science in Ayurveda. *Bull Indian Inst Hist Med* 2005;35:83–92.
- [4] Samal J. Situational analysis and future directions of AYUSH: an assessment through 5-year plans of India. *J Intercult Ethnopharmacol* 2015;4:348–54.
- [5] Vickers A, Cassileth B. Unconventional therapies for cancer and cancer-related symptoms. *Lancet Oncol* 2001;2:226–32.
- [6] Arora R, Malhotra P, Chawla R, Gupta D, Sharma R, Baliga M. Indian herbal medicine for cancer therapy and prevention. *Bioact Food Extr* 2010;34: 519–43.
- [7] Akpunar D, Bebis H, Yavan T. Use of complementary and alternative medicine in patients with gynecologic cancer: a systematic review. *Asian Pac J Cancer Prev* 2015;16:7847–52.
- [8] Calcagni N, Gana K, Quintard B. A systematic review of complementary and alternative medicine in oncology: psychological and physical effects of manipulative and body-based practices. *PLoS One* 2019;14:e0223564.
- [9] Maggiore R, Gross C, Togawa K, Tew W, Mohile S, Owusu C, et al. Use of complementary medications among older adults with cancer. *Cancer* 2012;118:4815–23.
- [10] Lichtman S, Boparai M. Geriatric medication management: evaluation of pharmacist interventions and potentially inappropriate medication (PIM) use in older (>65 years) cancer patients. *J Clin Oncol* 2009;27(suppl 9507).
- [11] Sokol K, Knudsen J, Li M. Polypharmacy in older oncology patients and the need for an interdisciplinary approach to side-effect management. *J Clin Pharm Therapeut* 2007;32:169–75.
- [12] Wyatt G, Friedman L, Given C, Given B, Beckrow KC. Complementary therapy use among older cancer patients. *Cancer Pract* 1999;7:136–44.
- [13] Singh P, Yadav J, Pandey A. Utilization of indigenous systems of medicine and homoeopathy in India. *Indian J Med Res* 2005;122:137–42.
- [14] Shukla Y, Pal S. Complementary and alternative cancer therapies: past, present and the future scenario. *Asian Pac J Cancer Prev* 2004;5:3–14.
- [15] Kumar D, Goel N, Pandey A, Sarpal S. Complementary and alternative medicine use among the cancer patients in Northern India. *South Asian J Cancer* 2016;5:8–11.
- [16] Alwhaibi M, Sambamoorthi U. Sex differences in the use of complementary and alternative medicine among adults with multiple chronic conditions. *Evid Based Complement Alternat Med* 2016;2016:2067095.
- [17] Drury C, Louis M. Exploring the association between body weight, stigma of obesity, and health care avoidance. *J Am Acad Nurse Pract* 2002;14: 554–61.
- [18] Woodward A, Bullard K, Taylor R, Chatters L, Baser R, Perron B, et al. Complementary and alternative medicine for mental disorders among African Americans, black Caribbeans, and whites. *Psychiatr Serv* 2009;60: 1342–9.
- [19] Keene M, Heslop I, Sabesan S, Glass B. Complementary and alternative medicine use in cancer: a systematic review. *Compl Ther Clin Pract* 2019;35: 33–47.
- [20] Roy V, Gupta M, Ghosh R. Perception, attitude and usage of complementary and alternative medicine among doctors and patients in a tertiary care hospital in India. *Indian J Pharmacol* 2015;47:137–42.
- [21] Chaturvedi P, Chaturvedi U, Sanyal B. Alternative medicine and cancer patients in less developed countries. *Lancet Oncol* 2002;3:10.
- [22] Micke O, Bruns F, Glatzel M, Schönekaes K, Micke P, Mücke R, et al. Predictive factors for the use of complementary and alternative medicine (CAM) in radiation oncology. *Eur J Integr Med* 2009;1:22–30.
- [23] Bahall M. Prevalence, patterns, and perceived value of complementary and alternative medicine among cancer patients: a cross-sectional, descriptive study. *BMC Compl Alternative Med* 2017;17:345.
- [24] Molassiotis A, Fernández-Ortega P, Pud D, Ozden G, Scott JA, Panteli V, et al. Use of complementary and alternative medicine in cancer patients: a European survey. *Ann Oncol* 2005;16:655–63.
- [25] Sarnath D, Khanna A. Current status of cancer burden: global and Indian scenario. *Biomed Res J* 2014;1:1–5.
- [26] Ganasegeran K, Rajendran A, Al-Dubai S. Psycho-socioeconomic factors affecting complementary and alternative medicine use among selected rural communities in Malaysia: a cross-sectional study. *PLoS One* 2014;9: e112124.
- [27] Suzuki N. Complementary and alternative medicine: a Japanese perspective. *Evid Based Complement Alternat Med* 2004;1:113–8.
- [28] Yamakawa J, Motoo Y, Moriya J, Ogawa M, Uenishi H, Akazawa S, et al. Significance of Kampo, traditional Japanese medicine, in supportive care of cancer patients. *Evid Based Complement Alternat Med* 2013;2013:746486.
- [29] McQuade J, Meng Z, Chen Z, Wei Q, Zhang Y, Bei W, et al. Utilization of and attitudes towards traditional Chinese medicine therapies in a Chinese cancer hospital: a survey of patients and physicians. *Evid Based Complement Alternat Med* 2012;2012:504–7.
- [30] Eisenberg D, Kessler R, Foster C, Norlock F, Calkins D, Delbanco T. Unconventional medicine in the United States. Prevalence, costs, and patterns of use. *N Engl J Med* 1993;328:246–52.
- [31] Richardson M, Sanders T, Palmer J, Greisinger A, Singletary S. Complementary/alternative medicine use in a comprehensive cancer center and the implications for oncology. *J Clin Oncol* 2000;18:2505–14.
- [32] Broom A, Nayar K, Tovey P, Shirali R, Thakur R, Seth T, et al. Indian cancer patients' use of Traditional, Complementary and Alternative Medicine (TCAM) and delays in presentation to hospital. *Oman Med J* 2009;24:99–102.
- [33] Berretta M, Della Pepa C, Tralongo P, Fulvi A, Martellotta F, Lleshi A, et al. Use of Complementary and Alternative Medicine (CAM) in cancer patients: an Italian multicenter survey. *Oncotarget* 2017;8:24401–14.
- [34] Mao J, Palmer C, Healy K, Desai K, Amsterdam J. Complementary and alternative medicine use among cancer survivors: a population-based study. *J Cancer Surv* 2011;5:8–17.
- [35] Kim SY, Kim KS, Park JH, Shin JY, Kim SK, Park JH, et al. Factors associated with discontinuation of complementary and alternative medicine among Korean cancer patients. *Asian Pac J Cancer Prev* 2013;14:225–30.
- [36] Skyler BJ, Park Henry S, Gross Cary P, James B Yu. Use of alternative medicine for cancer and its impact on survival. *JNCI: J Natl Cancer Inst* 2018;110(1): 121–4.
- [37] Johnson SB, Park HS, Gross CP, Yu JB. Complementary medicine, refusal of conventional cancer therapy, and survival among patients with curable cancers. *JAMA Oncol* 2018;4(10):1375–81.