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Complementary and Alternative Medicine in Cancer: Perspectives of Patients and Health Professionals

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Statement of Authentication

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Declaration

I declare that this thesis is my own work and has not been submitted in any form or another degree or diploma at any university or institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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Statement of Contribution of Others

Nature of Assistance	Contribution	Names, Titles and Affiliations of Co-Contributors
Intellectual support	Project Design Editorial assistance Data Analysis	Prof Beverley Glass (College of Medicine and Dentistry) Dr Ian Heslop (College of Medicine and Dentistry) Prof Sabe Sabesan (College of Medicine and Dentistry)
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Data collection	Research assistance Survey/Interview design	Prof Beverley Glass (College of Medicine and Dentistry) Dr Ian Heslop (College of Medicine and Dentistry) Prof Sabe Sabesan (College of Medicine and Dentistry)

Positioning the Researcher

I have been a clinical pharmacist for over 10 years and have worked in the Northern Territory, New South Wales, Queensland, and Victoria, in metropolitan, regional, rural and remote hospitals.

Through these varied experiences I have discussed medications and treatments with a vast array of different patients from different cultural backgrounds and health beliefs. This has given me a unique appreciation of different patients' needs, including therapies that are important to them.

Among the specialities that I have worked during my pharmacy career, I have spent time working in oncology wards. This has given me experience of talking to patients with cancer in a clinical setting as well as taking part in discussions regarding treatment for patients with cancer. As a pharmacist, I have also been required to communicate with other health professionals regarding patient treatments, allowing me an appreciation of the considerations required in deciding on safe and effective therapies for patients with cancer. Additionally, I have had friends and family members who have been diagnosed with cancer and received treatment, giving me a closer understanding of the day-to-day experiences of people with cancer.

This research focusses on treatments that are outside of the conventional health system but are still important to some patients. Through my professional experience, I have observed that complementary and alternative medicines are often overlooked, ignored, or poorly understood in a clinical setting. I have also observed particular frustration from patients who prefer complementary and alternative medicines and express negative feelings toward conventional treatments. I have witnessed this putting strain on patients' relationship with their health professionals. Increasing awareness and advocacy for therapies that are important to patients, as well as those prescribed to patients, can help improve the patient-health professional dynamic. This is especially important in the case of patients with cancer owing to the sensitive and confronting nature of their diagnosis and treatment.

Abstract

Complementary and Alternative Medicines (CAM) are therapies that are outside of conventional medicine, ranging from biological therapies such as herbs and vitamins, to mind and body therapies, such as massage and yoga. People with cancer have been shown to be more likely to use CAM compared to the general population. Some biological CAM can, however, have clinically significant interactions, such as decreasing the clinical effect of chemotherapy or radiotherapy or increasing their toxicity. Less than half of cancer patients have been shown to disclose their CAM use to health professionals, with a major reason for non-disclosure being that they are not asked. This raises safety concerns about cancer patients using CAM without the knowledge of their treating health professionals. In the last decade, Australian literature looking at people with cancer using CAM have focussed mostly on patients in rural areas or radiation oncology centres. Meanwhile, studies of oncology health professionals regarding CAM have been limited to a single knowledge, attitudes, and practices (KAP) study of community and hospital pharmacists. With the lack of Australian studies, this project aimed to provide a brief snapshot of CAM in cancer care from a patient (in Townsville) and broader health professional perspective (in Australia) to assist in prioritising the need for both stakeholder groups to inform future health initiatives to safely integrate CAM.

To investigate the current use of CAM by patients with cancer in Australia, patients were recruited from the waiting area of the Day Oncology Unit of the Townsville University Hospital. 40.2% of respondents were using CAM, with cannabis, massage, and magnesium as the most used therapies. The main reasons for the use of CAM were treating their cancer, the symptoms of their cancer or side effects of their cancer treatment, or to improve their general health. 68% of CAM users had disclosed these therapies to health professionals, mostly wanting a professional opinion or due to concerns about interactions with their cancer therapy. Non-CAM users cited a lack of knowledge regarding CAM or concern over interactions with conventional treatment as major reasons against using these therapies.

The current knowledge, attitudes and practices of Australian health professionals were assessed through surveying doctors, nurses, and pharmacists through professional oncology groups. Most health professionals did not feel that they had enough knowledge of CAM to address their patients' queries and held the belief that CAM had a place complementary to conventional treatment, while expressing concerns about the safety of CAM and interactions with conventional cancer treatment. Regarding practices, respondents believed that 41.8% of their patients were using CAM, with one-third of these discussions about CAM use being initiated by the health professional. Approaches to all health professional's patients using CAM was variable, but more likely inclined to be supportive. The largest barriers to discussions on CAM were lack of data on safety and efficacy, and clinical guidelines.

Comparison of the studies showed that health professionals' estimation of the percentage of their patients using CAM was similar to the proportion of CAM users in the survey of cancer patients. Likewise, both the patients and the health professionals estimated a similar percentage of conversations about CAM that had been initiated by oncology health professionals. This indicates that while health professionals may have a realistic view of the patients' CAM use, they are initiating conversations with a minority of their patients. With health professionals not identified as common sources of information on CAM for cancer patients, this highlights that health professionals need to build more trust so that their patients actively seek them for information on CAM. This would allow the health professionals to can assess the safety of combining CAM with conventional therapies for their patients.

Safety of CAM and their interactions with conventional cancer therapy were the main concerns identified by CAM users, non-users, and health professionals, highlighting this as a primary focus for education of oncology health professionals in the future. Increasing the knowledge base regarding CAM would help to normalise discussions about these therapies, lead to increased disclosure and result in safer therapeutic decision making in oncology care.

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Chapter 1 – Introduction

1.1 – Complementary and Alternative Medicine – History and Definitions

Research in the western world detailing complementary medicine dates from the late 1970s ^[1]. However, the perspective of these therapies when discussed in the literature has generally been cautious and hesitant. Early studies discussing complementary medicines used in cancer care showed some skepticism toward these therapies, referring to them as “unproven” or “fraudulent” cancer cures ^[1]. Later research from the United States of America referred to complementary medicines as “questionable”, “unorthodox” and “untraditional” ^[2]. The early 1990s brought about an increased acceptance and legitimacy to these therapies ^[3]. In 1991 the office of alternative medicine was founded at the National Institute of Health in the United States of America ^[4], which brought with it the additional collective term of alternative medicine to refer to these therapies ^[2]. This office would establish the National Centre for Complementary and Alternative Medicine (NCCAM) in 1998, which is commonly used as a source of information regarding complementary medicine ^[4].

Given the variation of types of therapies, views, and terms to refer to complementary medicines, a general definition was needed to further legitimize these therapies in practice. The most prominent definition was developed by Ernst and colleagues and published in 1995 ^[5]. After meeting with allopathic and complementary health professionals, they defined complementary therapy as “diagnosis, treatment and/or prevention which complements mainstream medicine by contributing to a common whole, by satisfying a demand not met by orthodoxy or by diversifying the conceptual frameworks of medicine” ^[5]. In the ensuing years, the expanded term of Complementary and Alternative Medicine (CAM) became more commonly used to describe these therapies; with complementary pertaining to therapies that are used with conventional treatment and alternative therapies being those taken instead of conventional treatment ^[6].

The term Integrative therapy has also become more common recently, as increased scientific evidence surrounding these therapies is published ^[7] and a focus on wellness, holism and interdisciplinary and multimodal therapies increases in popularity ^[6]. It is worth noting that, while the terms CAM and Integrative therapies may be interchanged in the literature, they are not considered to be synonymous. Integrative healthcare combines conventional and complementary treatments, focussing on treatment of the whole patient, as opposed to single organ or disease treatment. It also involves a multidisciplinary approach, with all members of the health team considered to have equal standing and input to the care of the patient ^[8].

In 2013 the NCCAM changed its name to The National Centre for Complementary and Integrative Health (NCCIH). Their more comprehensive definition of CAM has been a commonly used in

studies focussing on these therapies. They broadly separate CAM into three main categories: (1) Natural Products, (2) Mind and Body Practices and (3) Other Complementary Health Approaches. Natural products refer to products that can be taken, applied, or administered, such as vitamins, minerals, probiotics, and herbal and dietary supplements. Mind and body practices comprise of physical and spiritual therapies that can be taught or carried out by a practitioner. These include massage, yoga, meditation, osteopathic manipulation, acupuncture, hypnotherapy, and Tai Chi. The category of Other Health Approaches includes other therapies that are not clearly defined in the previous groups. These include Traditional Chinese Medicine (TCM), naturopathy traditional healers, Ayurveda and homeopathy [6].

1.2 – Complementary Medicines in Cancer

The use of CAM by cancer patients has also been a subject of interest in the literature of the last few decades, with two systematic reviews published prior to 2018. The first was the 1998 review by Ernst and Cassileth, which analysed studies published from 1977 to 1998, focussed largely on the prevalence of CAM use. While observing heterogeneity between the studies regarding patient populations, definitions of CAM and methodology, they found an average of 31% of adult cancer patients were using CAM [9]. The second review was published in 2012 by Hornerber and colleagues. This study conducted a systematic review and meta-analysis of literature from 1979-2008, again focussing on CAM use. To overcome some of the previously mentioned heterogeneity, they separated CAM use into point prevalence (which was CAM used at the time of survey) and period prevalence (which was CAM used prior to the survey). Focussing on point prevalence, they had found an average CAM use of 40% of cancer patients. The analysis also detailed change in CAM use over time, showing point prevalence of 25% in 1970s and 1980s to 49% in studies from 1999 onward. This highlighted a significant increase in the uptake of CAM by cancer patients over time [10].

Demographics predicting CAM use by cancer patients has also been reported on over the years but has to a lesser extent been consolidated in reviews. The last review of demographics and reasons for CAM use by cancer patients was published in 2005 by Verhoef and colleagues. This systematic review of literature from 1994 to 2004 found that cancer patients were more likely to use CAM if they were female, younger, have a higher education and higher income [11]. Subsequent research has shown some variability in the significance of these demographics [12-15], with a 2013 review on cancer patients' use of non-herbal nutrition supplements by Ben-Ayre and colleagues suggesting that a diagnosis of breast cancer may also be a significant demographic to predict CAM use [12]. The review by Verhoef *et al* also analysed reasons that patients gave for their CAM use. While they observed large variability between responses, the most common reasons were a perceived beneficial response from CAM, wanting control over their treatment, a strong belief in the benefits of CAM and to use it as a last resort [11].

1.3 – Safety of Complementary Medicines

Given CAM use is prevalent in people with cancer, consideration has been raised as to the safety of these therapies, especially when combined with conventional cancer treatment, such as chemotherapy. For example, St John's Wort, which can be used as an anxiolytic, is a potent inducer of enzymes of the cytochrome P450 family, which are key enzymes in the metabolism of medications in the liver. When taken concomitantly with chemotherapy agents such as taxanes or anthracyclines, this could potentially result in decreased serum levels of these agents and reduced effectiveness [7, 16].

Alternatively, *Foeniculum vulgare* (Fennel) has been shown to inhibit cytochrome P-3A4 activity, which could increase the toxicity of chemotherapy agents, etoposide, paclitaxel, and vinblastine [17]. Apart from alterations of drug metabolism, garlic and turmeric can have antiplatelet activity, which could increase the bleeding risk of patients taking anticoagulants [17].

The safety concerns of CAM are compounded by the fact that cancer patients' disclosure of CAM to health professionals is suggested to be low. Published in 2012, Davis and colleagues' systematic review analysed studies from 1990 to 2011 regarding disclosure of cancer patients' CAM use to doctors. The review found an average disclosure rate of 40-50%. The most common reasons for nondisclosure were not being asked by their doctor, fearing their doctor's disapproval, feeling they would be uninterested, feeling that their doctors would be unable to provide information on CAM and that their CAM use was irrelevant [18].

These reviews highlight Complementary and Alternative Medicines as an area for concern in oncology care. Around half of cancer patients are taking non-prescribed therapies with potential safety concerns when combined with anti-cancer therapy. With an average of less than half of those patients disclosing these therapies to doctors, this means that there is a significant cohort of cancer patients who may be compromising their safety or treatment without their treating health team's knowledge. To address this area, it is important to gain an understanding of the status of CAM in cancer care. This would require investigation of the use and disclosure of CAM from patients, as well as establishing an understanding of cancer patients' needs regarding CAM from their health professionals. Additionally, this would also require an understanding of the current attitudes and approaches oncology health professionals have toward CAM and their engagement with their patients regarding these therapies. Understanding both sides of oncology communication would give a clearer understanding of the needs from both patients and health professionals perspectives to bridge this communication gap.

1.4 – Aim and Research Questions

Therefore, the general aim of this project is to understand the current perspectives of CAM by the stakeholders of cancer care in Australia. More specifically the project asks (research questions)

- What is the current CAM use by cancer patients?
- How are these therapies being disclosed to their treating teams?
- What is the current knowledge, attitudes, and practices of oncology health professionals in Australia?
- What are the barriers to patients and health professionals regarding communication of CAM in cancer care?

1.5 – Methodology

After assessing the current literature, the methodology for the project was primarily divided into two parts. A diagram of the study design is shown in Figure 1.

Figure 1 – Flow diagram of Study Design



1.5.1 – CAM Use by Cancer Patients

To assess patient's current use and perspectives on CAM, the first study considered CAM use by cancer patients in a regional Australian hospital. This involved recruiting patients currently receiving treatment from the day oncology waiting area of the Townsville University Hospital. Interested patients were asked whether they wished to participate in a telephone interview or a self-completed survey.

The question schedule was informed by the CAM Healthcare Model ^[19]. This model has been closely based on the Behavioural Model for Health Service Use ^[20]. Prior to the development of the CAM model, the Behavioural Model had been used to assist in determining motivations for the use of most CAM practices. However, it was limited to healthcare provider services and did not accommodate for self-directed practices ^[19]. Given this thesis is using the NCCIH definition of CAM, which includes self-directed practices, it was determined that the CAM Healthcare Model was the most appropriate to assist in schedule design.

The CAM Healthcare Model was considered more appropriate than other commonly used healthcare models, such as the Health Belief Model. This model focuses on a combination of modifying factors, such as demographic characteristics, with perceptions of their disease, benefits of treatment and barriers to care as influencing factors regarding their uptake of health services. While many of these aspects are included in the CAM healthcare model, one of the main factors of the Health Belief Model affecting the individual taking action is "Perceived Susceptibility" to disease ^[21]. Given the question schedule would be for people receiving treatment for their cancer, this factor is relatively redundant in the target population, making the model less appropriate for this research.

The CAM Healthcare Model details key determinants that guide a person's choice to use CAM, which are divided into three major groups. Predisposing Factors detail inherent factors, such as age, gender, marital status, education, and health status. Enabling Factors detail an individual's access to CAM, information on these therapies and CAM practitioners. Need for Care Factors detail a person's need for CAM and conventional therapy, such as their illness experience and perceived need for treatment. These determinants act as "push" and "pull" factors to influence utilisation of CAM and the demand for these services. The ultimate outcome of both healthcare models is influence on people's quality of life ^[19]. The question schedule incorporated each of the factors detailed in the CAM Healthcare Model to allow a comprehensive analysis of factors determining cancer patients' choice for or against CAM use.

The question schedule was quantitative and asked about CAM use, reasons for or against their use, and discussions with health professionals, which addresses the first two research questions. They were then also asked demographic questions and to complete a quality-of-life survey. For the latter,

respondents were asked to complete the FACT-G survey. This is a questionnaire from the FACIT groups that has been previously assessed for high reliability and validity [22], which assesses cancer patient's emotional, physical, social and functional wellbeing as well as their overall quality-of-life. Data from the schedule were analysed using chi-squared tests and independent t-tests to determine significant patterns between CAM users and non-users.

1.5.2 – Knowledge, Attitudes and Practices of Health Professionals

To assess the question of knowledge, attitudes, and practices (KAP) of oncology health professionals, Australian doctors, nurses, and pharmacists working in oncology were surveyed online through professional associations. Specifically, these were the Clinical Oncology Society of Australia (COSA), the Cancer Nurses Society of Australia (CNSA) and the oncology and haematology special interest group of the Society of Hospital Pharmacists of Australia (SHPA). The question schedule for this survey was based, with permission, on a study by Lee and colleagues on the KAPs of oncologists in the United States of America regarding herbal medicines [23]. Our schedule utilised the general format of the original, with alterations made to specifically represent the knowledge, attitudes and practices of doctors, nurses and pharmacists in Australia. The schedule for this study tested respondent's knowledge using 10 multiple choice questions on CAM used in cancer or their interactions with conventional therapies, which was amended from the original schedule to expand the number of questions and more accurately address therapies encountered in Australia. They were then asked questions about their attitudes and practices, which were largely based on the questions from the original schedule, with some questions being reworded or changed to focus less on prescribing CAM and more on CAM discussions and recommendations. This was followed by questions regarding their education around CAM in cancer care, and lastly demographic questions. Respondent data were then analysed using chi-squared tests and independent t-tests to determine any patterns in the data collected between the professions as well as among health professionals in general.

1.5.3 – Perspectives of Stakeholders in Cancer Care Regarding CAM in Australia

The two studies would provide current perspectives of the stakeholders in cancer treatment regarding the use of CAM. Data from the studies were then compared to synthesise perspectives of patients and health professionals on issues surrounding CAM in oncology. This comparison would then form the basis of a commentary article on the perspectives of both groups regarding CAM in cancer and how to address identified issues in the cancer care setting.

1.5.4 – Summary of Expected Outcomes and Contribution to CAM in Cancer

Based on the literature, there are areas of need on both sides of the oncology treatment relationship. The data from the patient surveys described in the methodology would determine the prevalence of CAM use in cancer patients receiving treatment as well as the common CAM being used.

Additionally, this data will give an understanding of reasons for CAM use as well as the information on these products that are most important to patients. The data from the health professional's surveys will determine the current perspectives and practice patterns of doctors, nurses, and pharmacists in oncology regarding CAM. It will allow an understanding of the areas of CAM in oncology that are important to Australian health professionals. Together, the data from both surveys will also give an understanding of how often discussions regarding CAM are occurring, as well as how often these therapies are being disclosed to health professionals.

Findings from these studies will identify priority areas for CAM education for oncology health professionals as well as to how best to increase acceptance of CAM, disclosure to health professionals and provide optimised clinical decision making for oncology patients.

1.6 – Thesis Outline

This is a thesis by publication. Each of the following chapters will consist of published work that combine the research carried out for this project. The next two chapters are the two systematic reviews of the past literature on CAM use by cancer patients and the knowledge, attitudes, and practices of health professionals respectively. Chapter 4 and 5 detail the research into the current perspectives of CAM by the stakeholders of cancer care in Australia. The final chapter is a commentary bringing together these two previous chapters by comparing the findings from the research into both patients and health professionals and the broader status of CAM in oncology. The chapters and their corresponding articles are detailed in Table 1:

Table 1 – Thesis Chapters and Corresponding Publications

Chapter	Title	Publication	Citations (as of 7 th November 2022)
Chapter 1	Introduction	N/A	N/A
Chapter 2	Complementary and Alternative Medicine Use in Cancer: A Systematic Review	Keene, M.R., Heslop, I.H., Sabesan, S.S., Glass, B.D., <i>Complementary and alternative medicine use in cancer: A systematic review</i> . <i>Complementary Therapies in Clinical Practice</i> , 2019. 35 : p. 33-47.	108
Chapter 3	Knowledge, Attitudes and Practices of Health Professionals toward Complementary and Alternative Medicine in Cancer Care – A systematic review	Keene, M.R., Heslop, I.H., Sabesan, S.S., Glass, B.D., <i>Knowledge, attitudes and practices of health professionals toward complementary and alternative medicine in cancer care – a systematic review</i> . <i>Journal of Communication in Healthcare</i> , 2020. 13 (3): p. 205-218	4
Chapter 4	Perspectives of Complementary and Alternative Medicine Use by Cancer Patients in a Regional Hospital in North Queensland, Australia	Keene, M.R., Heslop, I.H., Sabesan, S.S., Glass, B.D., <i>Perspectives of Complementary and Alternative Medicine use by cancer patients in a regional hospital in North Queensland, Australia</i> . <i>Complement Ther Med</i> , 2022. 71 : p. 102879.	1
Chapter 5	Knowledge, Attitudes and Practices of Australian Oncology Health Professionals on Complementary Medicines	Keene, M.R., Heslop, I.M., Sabesan, S.S. and Glass, B.D. (2022), <i>Knowledge, attitudes, and practices of Australian oncology health professionals on complementary medicines</i> . <i>J Pharm Pract Res</i> . https://doi.org/10.1002/jppr.1838	N/A
Chapter 6	Current Status of Complementary and Alternative Medicine in Oncology in Australia	In press – submitted to the <i>International Journal of Pharmacy Practice</i>	N/A

Chapter 2 – Complementary and Alternative Medicine Use in Cancer: A Systematic Review

(This review was published in the journal Complementary Therapies in Clinical Practice in 2019)

Authorship Statement

Martin Keene: Conceptualization, Methodology, Investigation, Formal analysis, Data Curation, Writing - Original Draft, Writing - Review & Editing.

Ian Heslop: Conceptualization, Supervision, Writing - Review & Editing.

Sabe Sabesan: Conceptualization, Supervision, Writing - Review & Editing.

Beverley Glass: Conceptualization, Methodology, Funding Acquisition, Supervision, Writing - Review & Editing

Abstract

Background and purpose: Complementary and alternative medicine (CAM) use in cancer is increasing. The purpose of this study was to systematically review the literature to determine demographic profiles and prevalence and reasons for use in cancer patients.

Methods: In this systematic review, the databases OVID, PubMed, and Scopus were searched for studies on CAM use in cancer between 2009 and June 2018.

Results: The results showed that an average of 51% of cancer patients used CAM. Common independent demographic characteristics associated with CAM use were younger, female cancer patients, having higher education, earning a higher income and having previously used CAM. Frequent reasons for use, grouped into themes were shown to be to influence their cancer and general health and to treat complications of the cancer or therapy.

Conclusion: The review provides an insight and will serve to better inform health professionals on how this population is using CAM.

2.1 – Background

Complementary and alternative medicine (CAM) use in cancer patients has been the subject of research since the 1970's^[1]. Results from the 2015 National Consumer Survey on the Medication Experience and Pharmacist's Role (NCSME-PR) in the USA found that herbal medicine use by

cancer patients was at 43% compared to 34.6% in other patients ^[24]. Additionally, the most recent systematic review of cancer patients surveyed globally has shown an increase in CAM use from 25% prior to 1990 to 49% from 2000-2009^[10]. CAM usage has also been shown to be influenced by geography ^[10], which has been speculated to be a result of cultural attitudes towards health and ability to access conventional and CAM therapies ^[25-27]. For example in Taiwan, Traditional Chinese Medicine (TCM) is covered by a National Health Insurance program, which would explain both the increased acceptance of and accessibility to these therapies ^[28]. A study from Nigeria has reported that in Africa, CAM is used as primary healthcare due to a general lack of access and means to afford conventional westernized therapies ^[29].

While CAMs are broadly defined as health practices that are outside conventional medicine, the National Centre for Complementary and Integrative Health (NCCIH) is often quoted in studies, attempting to provide a more specific definition. ‘Complementary’ therapy is referred to as unconventional practices in addition to conventional therapy, with replacement of conventional therapy defined as ‘alternative’. ^[6] While it is common to refer to these practices generally as CAM, this distinction can be important, for example, when referring to therapies and techniques that are adopted in rejection of patriarchal healthcare ^[30]. Whether complementary or alternative, the NCCIH separates these practices into three main categories; (1) “Natural Products”, which are products that can be taken, applied or administered, (2) “Mind and Body Practices”, which are physical and spiritual therapies, that can be taught or carried out by a practitioner and (3) “Other complementary health approaches”, which include therapies such as traditional healing practices and homeopathy^[6]. However, despite this baseline definition, previous reviews of CAM use in cancer patients have found patterns for inclusion of therapies into each category amongst individual studies to be diverse ^[9, 10].

Research carried out to understand the types of cancer patients that would adopt CAM has attempted to identify demographic characteristics that are associated with CAM use. Patients who are female, younger^[11, 12, 14, 15], have obtained higher education^[11, 13-15], have a higher income^[15] and have a diagnosis of breast cancer^[12] have been identified as being more likely to adopt CAM. However, there is contention amongst reviews regarding which variables are predictive of CAM use; citing heterogeneity in survey design and inconsistent methods of statistical analysis as likely reasons for this variation ^[11-13]. Similarly, reasons for cancer patients to use CAM may vary widely; although this is believed to be a result of patient preference as well as being dependant on the diagnosis and treatment received ^[14].

Patients’ use of CAM, especially in cancer can also raise some safety concerns. Natural products and some traditional CAM may increase a patients bleeding risk or potentially alter the metabolism of chemotherapy agents ^[7, 31]. In the latter case this could reduce the effectiveness of the anti-cancer treatment or result in exposure to toxic side-effects of the chemotherapy^[7]. In addition to these

potential interactions, a 2012 systematic review of patient-doctor communication regarding CAM found cancer patient's non-disclosure rates to physicians was between 20%-77%, with an average around 40%-50% [18]. These factors, along with a study showing some practitioners' attitudes toward CAM to be dismissive, due to lack of knowledge or belief in these therapies [32], highlight that cancer patients could be at increased risk of harm.

The aim of this systematic review on CAM use in cancer patients, is with specific reference to the prevalence of this use, the demographic profiles of the users and reasons for these patients to adopt these therapies. To our knowledge, no studies have examined CAM use in these three areas. The information provided will allow clinicians to better understand how widespread the use of these therapies are and the types of patients that would be inclined to adopt them and their reasons for doing so.

2.2 – Methods

This systematic review follows the PRISMA preferred reporting items for systematic reviews and meta-analyses guidelines where applicable [33].

2.2.1 – Search Strategy

Between February and June 2018, the databases OVID (1946 – 2018), PubMed (1946 – 2018) and Scopus (1970-2018) were searched for appropriate articles. Searches used the free text terms 'complementary', 'alternative', 'medicine', 'cancer', 'prevalence', 'predictor' and 'reason' as well as synonyms for these terms.

2.2.2 – Study Selection and Exclusion Criteria

To be included in this study, articles needed to have been published in the last 10 years, be developed with the intent to determine prevalence of use and reasons for adopting CAM therapy in cancer patients, to be in English and reporting original data with a sample population of at least 100 adult patients, with an active cancer diagnosis and currently undergoing cancer treatment. Studies were excluded if they focused on individual mind and body therapies, such as yoga or prayer. Duplicate studies were removed.

2.2.3 – Data Extraction

Each article that met the inclusion criteria was read in its entirety. Data were then extracted from each article pertaining to year of publication, sample size, means of survey administration, population cancer type (if specified), prevalence of CAM use, CAM types assessed, time CAM was started, nationality of population, demographics predicting CAM use, statistical analysis used and reasons for CAM use. All extracted data were entered into a Microsoft Excel spreadsheet.

Demographic predictors were categorized by how many articles had identified a specific predictor as statistically significant. They were then further categorized under which statistical test had been performed to show significance and if regression models had been employed to adjust for confounders in the study.

Reasons for CAM use were recorded, thematically analysed and grouped into 7 common, distinct themes. Most of the reasons for use could be grouped as a desire to influence their cancer, treat the complications of their cancer (such as symptoms of disease or side effects from therapy), influence general health, seeking holistic healthcare, taking control of their treatment, belief in CAM therapies or dissatisfaction with conventional therapy and recommendations by other people. These themes were then categorised by the frequency of their appearance in the included studies.

2.2.4 – Quality Assessment of Articles

The included articles were also assessed for quality using the “Qualsyst” tool detailed by Kmet and colleagues^[34]. This tool provides a systematic scoring system for qualitative and quantitative studies using 14 item criteria that addresses the quality of each component of the published article. The total score is then determined between 0 and 1, with a higher score being indicative of a more robust design and reporting of the study. Based on previous reviews that have used this system^[18], a score of 0.75 was accepted as an appropriate cut-off for a study of good quality^[18]. These analyses were carried out independently by two reviewers (MK and BG) to reduce the risk of bias. Any differences in Quallsyst scores were discussed and agreed upon before decision to include into the review.

2.2.5 – Data Synthesis:

The Excel spreadsheet was imported into Statistics Package for Social Sciences (SPSS) version 25^[35]. This software was used to generate basic statistics, such as means, ranges and 95% confidence intervals (if appropriate) of CAM prevalence generally, as well cancer type and country of patients. It

was also used to carry out independent samples T-tests and one-way ANOVA tests to determine statistical significance between means. Graphs of prevalence data were also generated with this software package.

2.3 – Results

2.3.1 – Study Selection

A flowchart of the study selection process is shown in

Figure 2. The search identified 61 research articles for inclusion in the review, in which a total of 21249 cancer patients were surveyed. The details of each article are presented in Table 2. 42 of these articles had surveys of patients with multiple cancer types. Breast cancer patients were the most common population represented in surveys of specific cancer groups (10 articles), followed by haematological cancers (2 articles). Other cancer groups were represented in single studies.

Figure 2 – PRISMA Flowchart of the inclusion of studies in the systematic review ^[33]

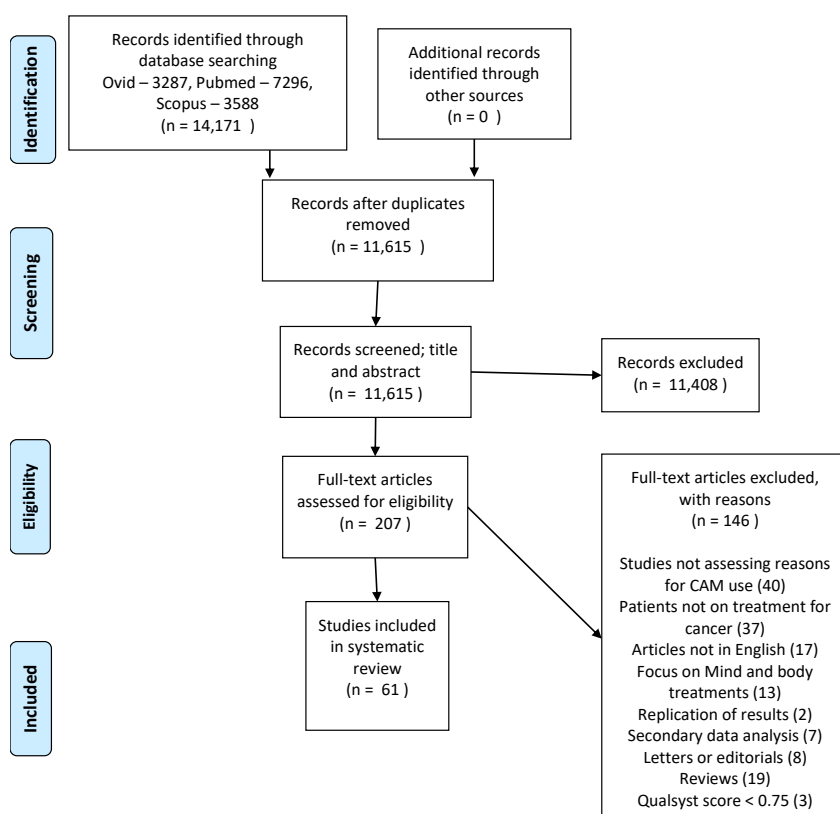


Table 2 – Characteristics of studies (n=61) in the review, including, prevalence of use, demographics predicting use and reasons for use

Author and Country	Aim of study	CAM prevalence of use (%) - [Population Size]	Demographics predicting CAM use	Statistical analysis of demographics in study	Reasons for CAM use
Abuelgasim et al, 2018, Saudi Arabia ^[36]	CAM use in cancer patients	69.9% - [156 respondents]	Female, Radiation therapy, Younger, Not having surgery	Multivariate Logistic Regression Analysis	Influence Cancer: Cancer treatment (75%) Holistic Healthcare: Improve mood (18.3%), To increase fitness (6.4%), Improve appetite (4.6%) Influence General Health: To control pain (11.9%), To improve the immune system (11%)
Al-Naggar et al, 2013, Malaysia ^[37]	CAM use by cancer patients	72.7% - [200 respondents]	Higher education	Student t-test	Influence General Health: Relieve pain (19.5%), Heal wounds (8.5%) Treat Cancer Complications: Relieve symptoms (16.5%) Influence Cancer: Cure cancer (13.5%) Recommended By Others: Doctors suggestion (13.5%), Family (10.5%) Holistic Healthcare: Relaxation (8.5%), Reduce stress (6.5%), Emotional well-being (2.5%)
Ali-Shtayeh et al, 2016, Palestine ^[38]	CAM use and safety amongst cancer patient in Outpatient department	62.4% - [472 respondents]	<65 years of age, Female, >3 children, Breast Cancer, Interest in a spiritual quest, No chronic disease	Chi-Squared Test	Influence Cancer: Cure (79.3%), Slow disease (27%) Treat Cancer Complications: Relief of symptoms (43%), Side-effects (3.4%)
Ali-Shtayeh et al, 2011, Palestine ^[39]	Herbal medicine use by cancer patients	60.9% [1260 respondents]	Female, >40 years of age, Live in rural area	Chi-Squared Test	Influence Cancer: Slow down disease (40.5%), Cure (39.6%) Treat Cancer Complications: Relieving symptoms (30.2%), Reduce side effects (21.9%)
Aliyu et al, 2017, Nigeria ^[29]	CAM use in cancer patients in hospital	66.3% - [240 respondents]	Male, Absence of co-morbidities	Linear Regression Analysis	Influence Cancer: Improves conventional treatment (37.1%) Belief in CAM: Readily available (25.1%), Affordable (18.9%) Holistic Healthcare: Spiritual/cultural importance (18.9%)
Amin et al, 2010, Ireland ^[25]	CAM use with head and neck cancer	21.7% - [106 respondents]	<50 years of age	Chi-Squared Test	Treat Cancer Complications: Counteract the ill effects of treatment and to increase the body's ability to fight cancer (82%) Taking Control: "might help, can't hurt" (65%) Influence Cancer: Fight cancer (13%)
Aydin Avci et al, 2011, Turkey ^[40]	CAM use and cost for cancer patients	58.9% - [281 respondents]	Female, Elementary school graduates, Married, Nuclear families, Live in cities, Income = expenditure	Chi-Squared Test	Belief In CAM: Perceive to be useful (85.2%), Others had tried (26.2%) Taking Control: Curious (23.5%) Influence Cancer: Combine with medical treatment (7.4%)
Bahall, 2017, Trinidad and Tobago ^[41]	CAM use in oncology department	39.1% - [350 respondents]	None found	Bivariate Analysis	Taking Control: Desire to try anything (67.6%), Desire for control (30.7%) Belief In CAM: CAM is more keeping with personal beliefs (59.1%), Conventional medicine too expensive (39.4%), Disappointment with conventional medicine (19%), Conventional medicine too toxic (9.6%), Conventional medicine too mechanistic and lacked human touch (8.8%)
Ben-Ayre et al, 2014, Israel ^[42]	CAM use and perspective amongst Israeli-Arab patients	39.6% - [324 respondents]	Active treatment, Higher "degree of spiritual quest"	Multivariate Logistic Regression Analysis	Holistic Healthcare: Quality of Life (no frequency given)
Berretta et al, 2017, Italy ^[43]	CAM in cancer patients from multiple centres	48.9% - [468 respondents]	Higher education, Treatment in specialised clinic	Multivariate Logistic Regression Analysis	Holistic Healthcare: Supportive care (63.8%) Influence Cancer: Anticancer treatment (6.6%)

Table 2 (cont)

Author and Country	Aim of study	CAM prevalence of use (%) - [Population Size]	Demographics predicting CAM use	Statistical analysis of demographics in study	Reasons for CAM use
Bismark et al, 2014, USA ^[44]	CAM use among patients with Thoracic malignancies	41.7% - [108 respondents]	Fearful and devastated at time of diagnosis	Multivariate Logistic Regression Analysis	Taking Control: To support themselves (44.4%) Influence General Health: To improve their immunity (42.2%) Holistic Healthcare: For emotional/spiritual well-being (33.3 %).
Bonacchi et al, 2014, Italy ^[45]	CAM use and benefits by cancer patients	37.8% - [803 respondents]	Female, <60 years of age, Previous use of CAM	Multivariate Logistic Regression Analysis	Influence General Health: General health (60.5%) Influence Cancer: Support medical treatment (35.4%), Treat cancer (11.8%) Treat Cancer Complications: Symptoms (23.6%) Holistic Healthcare: Psychological distress (11.8%)
Brahmi et al, 2011, Morocco ^[46]	CAM use in cancer patients	46% - [100 respondents]	None found	Chi-Squared Test	Influence Cancer: Cure (66%) Treat Cancer Complications: Symptoms of tumour (44%), Ill effects of medical treatment (1%) Taking Control: Everything possible (33%)
Broom et al, 2010, Sri Lanka ^[47]	CAM use by cancer patients	67.4% - [500 respondents]	Female, Shorter diagnosis, Buddhist	Linear Regression Analysis	Influence Cancer: Cure (95%) Recommended By Others: Advice from family and friends (91.4%) Belief In CAM: Previous use (44.8%), Cheaper (41.2%), Difficulty accessing hospital (26.5%), Difficulty accessing doctor (20.9%) Holistic Healthcare: Religious beliefs (44.8%)
Can et al, 2009, Turkey ^[48]	Quality of Life and CAM use in cancer patients	71.5% - [179 respondents]	Health insurance	Univariate Analysis	Influence General Health: Strengthen immune system (42.5%), To keep blood cells high (40.8%) Influence Cancer: To improve the effects of therapy (34.6%), To prevent the advance of the disease (33%) Holistic Healthcare: To feel better emotionally (26.3%), Hopelessness (10.6%) Recommended By Others: Requested by a physician (17.9%), Family and friends wanted them to (10.6%), Requested by nurse (2.2%) Taking Control: Requested by patients (5%)
Chang et al, 2011, Ireland ^[49]	Patients and health care professionals feelings on CAM	29.1% - [219 respondents]	Not Specified to Cancer Patients	Not assessed	Influence Cancer: Complement conventional therapy (4.1%), Cure (0.7%), Slow disease progression (0.7%) Treat Cancer Complications: Relieve symptoms (4.1%)
Chui et al, 2014, Malaysia ^[50]	CAM and Prayer for health in Breast Cancer patients	70.7% - [546 respondents]	Higher education, Higher income, Advanced disease	Multivariate Logistic Regression Analysis	(Natural Products) Recommended By Others: Recommended by others (68.2%) Holistic Healthcare: Improve physical wellbeing (67.3%), Improve emotional wellbeing (63.6%) Influence General Health: Strengthen the immune system (64.5%), Keep blood cell count high (41.8%) Influence Cancer: Assist in treating cancer (61.8%), Prevent reoccurrence and spread (45.5%), Cure the cancer (10%) Treat Cancer Complications: Reduce symptoms and side-effects (59.1%)
Corner et al, 2009, England ^[51]	CAM use in cancer patients	28.9% - [304 respondents]	<50 years of age, Female, Used before diagnosis	Stepwise Regression Analysis	Influence Cancer: Add to treatment Holistic Healthcare: Stress, Relaxation, control Treat Cancer Complications: Side effects (no frequency stated)
D'Arena et al, 2014, Italy ^[52]	CAM in patients with lymphocytic leukaemia	16.5% - [442 respondents]	Female, Profession (education, manager), Military, Internet use, Central Italy residency	Multivariate Logistic Regression Analysis	Influence Cancer: Directly fight Chronic Lymphocytic Leukaemia (40%), Increase the body's ability to fight cancer (13%) Holistic Healthcare: To increase physical well-being (27%)

Table 2 (cont.)

Author and Country	Aim of study	CAM prevalence of use (%) - [Population Size]	Demographics predicting CAM use	Statistical analysis of demographics in study	Reasons for CAM use
Dhanoa et al, 2014, Malaysia [53]	CAM in Orthopaedic cancer patients	61.3% - [274 respondents]	Malignant tumour, Surgery, Paediatric Patients	Multivariate Logistic Regression Analysis	Influence General Health: Enhance overall health/physical well-being (60.8%), Enhance wound healing (40.6%), Boost immune system to fight disease (25.9%) Taking Control: Trying everything that can help (59.4%), More control over own treatment (8.4%) Influence Cancer: Control disease progression (30.8%), Seeking a cure (13.3%), Complementary effect to conventional medicine (11.2%) Treat Cancer Complications: Alleviate disease symptoms/toxic effect of conventional therapy (25.2%) Holistic Healthcare: Improve psychological well-being and finding hope (18.9%) Belief In CAM: More compatible with own value/belief towards life and health (16.8%), Allow relaxation and helps in sleep (14%), Conventional treatment is too toxic (4.2%), Dissatisfied with conventional medicine (2.8%)
Dissiz et al, 2016, Turkey [54]	CAM and health literacy in cancer patients	24% - [250 respondents]	Not assessed	Not assessed	Taking Control: Try everything (46.4%) Belief In CAM: Belief that alternate therapy is good for health (19.5) Recommended By Others: Recommendation from family (18.3%)
Dogu et al, 2014, Turkey [55]	CAM use in cancer patients	23.5% - [494 respondents]	Higher education, Higher income, Family history of comorbidity, Single, presence of co-morbidities	Linear Regression Analysis	Influence Cancer: Add to treatment (39.8%) Recommended By Others: Advised from friends (36.1%) Belief In CAM: Not benefited from conventional therapy (15.8%)
Edwards et al, 2014, Australia [56]	CAM prevalence in radiation patients	82.9% - [639 respondents]	Female, Breast Cancer, Lung Cancer, Prostate Cancer	Chi-Squared Test	Holistic Healthcare: Improve quality of life (42.6%), Hope (11.1%) Influence General Health: To boost the immune system and general health (33.6%), To increase energy levels (32.6%), To live longer (28.9%), Influence Cancer: Cure (21.1%) Treat Cancer Complications: Prevent/reduce symptoms (19.1%), Side effects (18.1%) Taking Control: Doing everything possible (18.7%), Feel in control (12.5%) Recommended By Others: Recommended by Family/friends (3.4%)
Erku, 2016, Ethiopia [57]	CAM use and effects on Quality of life in cancer patients receiving chemotherapy	79% - [195 respondents]	Higher income, Higher education, Comorbidities, Late stage cancer	Multivariate Logistic Regression Analysis	Belief In CAM: Belief in CAM (23.4%), Dissatisfaction with conventional therapy (14.9%) Recommended By Others: Family Tradition (13%) Holistic Healthcare: Emotional support (11%) Influence General Health: Boost Immune system (8.4%) Treat Cancer Complications: Treat Side Effects (5.8%) Influence Cancer: Synergic effect to treat cancer (5.2%), Prevention of recurrence (5.2%) Other: Treatment of other medical problems (9.7%)
Eustachi et al, 2009, Switzerland [58]	CAM use in interdisciplinary cancer treatment centre	51.9% - [156 respondents]	Informed about CAM, CAM considered important	Linear Regression Analysis	Holistic Healthcare: Quality of Life (48.1%) Influence General Health: Immunity (40.9%), Detoxification (21.4%), Healing (18.2%), Treat Cancer Complications: Side effects (37%), Symptom relief (26.6%) Influence Cancer: Enhance conventional therapy (24.7%)
Firkins et al, 2018, Germany [59]	CAM use and interactions across cancer centres	29% - [711 respondents]	Higher education	Chi-Squared Test	Influence General Health: Immunity (12.8%) Taking Control: Actively doing something (9.6%), Not wanting to miss a chance (9.4%) Treat Cancer Complications: Side effects (8.2%) Influence Cancer: Minimise relapse (7%)
Fox et al, 2013, Ireland [60]	CAM use amongst Breast cancer patients	57% - [405 respondents]	>50 years of age, Stage 3 cancer, Retired, Disease longer than 5 years, On treatment, Private patient	Sequential Logistic Progression	Treat Cancer Complications: Reduce symptoms/side effects (38.2% [S], 48% [H], 42.2% [A]) Taking Control: Gain a feeling of control over the treatment (25.4% [S], 19.2% [H], 28.2% [A]) Holistic Healthcare: Reduce psychological stress (3.6% [S], 6.8% [H], 2.8% [A]) <i>S = Health Supplements, H = Herbal Supplements, A = Antioxidants</i>

Table 2 (cont.)

Author and Country	Aim of study	CAM prevalence of use (%) - [Population Size]	Demographics predicting CAM use	Statistical analysis of demographics in study	Reasons for CAM use
Gan et al, 2015, Malaysia [61]	CAM use in Haematological cancer patients	70.2% - [245 respondents]	Chinese, Higher anxiety, Higher income	Multivariate Logistic Regression Analysis	Influence General Health: Immunity (57%), Prolonged Survival (10%) Influence Cancer: Cure cancer (24%) Treat Cancer Complications: Side effects (14%)
Gillett et al, 2012, Australia [62]	CAM use by Radiotherapy patients	37.6% - [101 respondents]	None found	Chi-Squared Test	Influence Cancer: Cure (27.8%), Assist other treatments (27.8%), Control cancer (18.4%), Prevent recurrence (13.2%) Treat Cancer Complications: Relieve symptoms (23.7%), Side effects (18.4%)
Heese et al, 2010, Germany [63]	CAM use in glioma patients	28.3% - [621 respondents]	<50 years of age, Female, Higher education	Chi-Squared Test	Influence Cancer: "To support the conventional therapy" (90%), "To build up body resistance" (80%), Taking Control: "To do something for the treatment by myself" (80%), "To have tried everything possible" (80%) Belief in CAM: "Only minor side effects" (75%), "Sure that it works" (65%), Highly convinced (57%), helped others (56%), Physicians don't have enough time (15%), Afraid of conventional therapy (10%) Holistic Healthcare: Psychological and physical distress (70%) Treat Cancer Complications: Side effects of therapy (70%)
Huebner et al, 2014, Germany [64]	CAM use of patients at cancer centre	60% - [165 respondents]	None found	Chi-Squared Test	Influence General Health: Immunity (72.7%), Strengthening oneself (69.1%), Detoxify (32.7%) Taking Control: Doing something for themselves (49.1%) Influence Cancer: Fighting cancer (35.8%)
Hunter et al, 2016, Australia [65]	Differences in CAM use between rural and metropolitan radiotherapy patients	45.7% - [265 respondents]	Regional - Women, Younger, Higher education, No children - None for Metropolitan	Chi-Squared Test	Taking Control: Personal choice (61% [R], 52% [M]) Recommended By Others: Recommended by family and friends (25% [R], 27% [M]), Doctor's recommended (19% [R], 19%[M]) R – Rural M- Metropolitan,
Jardat et al, 2016, Palestine [66]	Herbal remedy use of breast cancer patients	68% - [103 respondents]	Higher education, Shorter time since diagnosis, Not having surgery, Not having endocrine therapy	Bivariate Analysis	Influence General Health: Immunity (41.1%), Pain and fatigue (1.4%) Recommended By Others: Advised to use (20.5%) Belief In CAM: Available and affordable (12.3%), Don't believe in Chemotherapy (8.2%), Herbs are safe (6.8%), Effectiveness of herbs (4.1%), Previous experience (2.7%) Treat Cancer Complications: Improve side-effects (2.7%)
Jazieh et al, 2012, Saudi Arabia [67]	CAM use by cancer patients	90.5% - [453 respondents]	Female, Employed	Multivariate Logistic Regression Analysis	Influence Cancer: Treatment of cancer (90%) Influence General Health: Improve immunity (No frequencies given) Holistic Healthcare: Improve appetite (No frequencies given)
Kang et al, 2012, South Korea [68]	CAM and QOL in cancer patients	57.4% - [399 respondents]	Married, Early stage cancer, Comorbidities	Linear Regression Analysis	Influence General Health: Immunity (53.2%), Health promotion (46.8%) Influence Cancer: Prevention of recurrence (37.7%), Add to conventional treatment (10.5%) Holistic Healthcare: Emotional support (15.5%), Treat Cancer Complications: Side effects (3.6%) Belief In CAM: Dissatisfaction with conventional therapy (0.9%) Other: Treat other conditions (12.3%)
Konig et al, 2016, Germany [69]	CAM use in oncological outpatient clinic	18% - [251 respondents]	Female	Chi-Squared Test	Influence General Health: Support Physical strength (54%), Immunity (35%) Influence Cancer: Cure (15%) Treat Cancer Complications: Improve tolerance (17%)

Table 2 (cont.)

Author and Country	Aim of study	CAM prevalence of use (%) - [Population Size]	Demographics predicting CAM use	Statistical analysis of demographics in study	Reasons for CAM use
Korkmaz et al, 2016, Turkey [70]	CAM and QOL in cancer patients	27.9% - [147 respondents]	Not assessed	Not assessed	Belief In CAM: "It would do me good" (88.1%) Influence General Health: Side effects (11.9%)
Kumar et al, 2016, India [71]	CAM use in cancer patients in Norther India	38.7% - [1117 respondents]	None found	Linear Regression Analysis	Recommended By Others: Advice of friends and family (23.1%) Taking Control: Self-desire (16.7%)
Kust et al, 2016, Croatia [72]	CAM use in malignant cancers in high-volume centre	60.3% - [267 respondents]	Higher income, Divorced, Female, Younger	Multivariate Logistic Regression Analysis	Influence General Health: Immunity (44.1%), Improve blood findings (8.7%), Reduce toxicity (6.8%), Detoxification (3.1%) Recommended By Others: Convinced by family/friends (11.2%) Influence Cancer: Treat cancer (11.2%), Slow disease dissemination (9.3%) Treat Cancer Complications: Symptomatic treatment (4.3%) Taking Control: Desperation (1.2%)
Lettner et al, 2017, Germany [73]	CAM use in radiation oncology	26.4% - [333 respondents]	Not assessed	Not assessed	Influence General Health: Immunity (48%) Treat Cancer Complications: Side-effects (43.8%), Improve current therapy (31.2%) Taking control: Not to miss an opportunity (37.8%), Become more active (25%) Holistic Healthcare: Reduce stress (18%) Belief in CAM: Positive experiences (15%), Positive trial results (10%), Recommended by Others: Recommended by doctor (5%)
Lo-Fo-Wong et al, 2012, Netherlands [74]	Analysis of Self-help vs practitioner driven CAM in breast cancer	57.2% - [159 respondents]	Openness to experience	Multivariate Logistic Regression Analysis	(Biological CAM after treatment) Influence Cancer: Influence cancer (64.7%) Influence General Health: Influence wellbeing (95.5%)
Loquai et al, 2017, Germany [75]	CAM in melanoma patients in multiple centres	40.6% - [1089 respondents]	Higher education, Psychosocial support, Interest in CAM, Previous CAM use	Multivariate Logistic Regression Analysis	Influence General Health: Immunity (63.4%), Detoxify (21%) Holistic Healthcare: Strengthen body/own forces (57.7%) Taking Control: Do something for themselves (53.7%) Influence Cancer: Cancer Remedy (18.9%)
Mani et al, 2015, Germany [76]	Use of CAM before and after urological cancer organ removal	54% - [172 respondents]	Higher education, German	Chi-Squared Test	Holistic Healthcare: Constitution (87%) Treat Cancer Complications: Symptoms (37%) Influence Cancer: Therapy (30%), Tumour (10%)
Moran et al, 2013, USA [77]	CAM use in Breast Cancer patients undergoing Radiotherapy	54% - [360 respondents]	Higher education, Not using HRT	Multivariate Logistic Regression Analysis	Treat Cancer Complications: Symptoms (32%), Non-radiation symptom relief (12.9%) Holistic Healthcare: Relaxation/stress reduction (24.7%) Influence Cancer: Chance of Cure (23.2%) Influence General Health: General wellness (11.9%), Immunity (10.8%), Psychological symptoms (8.8%)
Naing et al, 2011, USA [78]	CAM use by Cancer patients in phase 1 chemotherapy trials	52% - [309 respondents]	Female	Linear Regression Analysis	Taking Control: Explore all options (53%) Influence General Health: Improve immune system (45%), Live longer (16%) Recommended By Others: Recommended by doctor (22%) Treat Cancer Complications: Reduce side effects (14%) Influence Cancer: Cure cancer (8%)

Table 2 (cont.)

Author and Country	Aim of study	CAM prevalence of use (%) - [Population Size]	Demographics predicting CAM use	Statistical analysis of demographics in study	Reasons for CAM use
Naja et al, 2017, Lebanon ^[79]	Prevalence and predictors of CAM in Basile Cancer centre	41% - [150 respondents]	Younger than 55 years of age, Employed, No comorbidities	Multivariate Logistic Regression Analysis	Influence General health: General health (57%), Energy (15%) Influence Cancer: Manage cancer complication/progression (52%) Belief in CAM: Belief in advantages of CAM (44%) Holistic Healthcare: Psychological wellbeing/relaxation (40%), Natural practice (40%), Control of overall health (32%), Religion (7%) Treat Cancer Complications: Reduce Side effects (39%) Taking Control: Curiosity (16%) Recommended By Others: Family tradition (15%)
Naja et al, 2017, Lebanon ^[80]	CAM use and QOL of Breast cancer patients	40.6% - [180 respondents]	Younger, Attending private hospital, Advanced disease	Multivariate Logistic Regression Analysis	Belief In CAM: Belief in CAM (91.2%), Disappointment from conventional therapy (4.1%) Influence Cancer: Managing cancer complications and slowing progression (76.7%) Treating Cancer Complications: Side effects (34.2%) Taking Control: Control (31.5%), Curiosity (4.1%) Recommended By Others: Family tradition/culture (30.1%) Influence General Health: Immunity (24.6%), Energy (15.1%), Holistic Healthcare: Provides hope/prayer (13.7%), Relief from sorcery/spell (6.6%)
Oyunchimeg et al, 2017, Mongolia ^[81]	CAM use in cancer centre	47.9% - [482 respondents]	Female, <55 years of age, Higher education, Shorter time of diagnosis, Prior CAM use	Multivariate Logistic Regression Analysis	Influence Cancer: Cure cancer (41.6%) Influence General Health: Immunity (35.5%) Treat Cancer Complications: Symptom control (18.2%)
Putaweepong et al, 2012, Thailand ^[82]	CAM use in patients being treated with Radiotherapy	60.9% - [248 respondents]	Higher income, Malignant brain cancer, Malignant lung cancer, Genitourinary cancer	Chi-Squared Test	Treat Cancer Complications: Symptoms (33.1%) Influence Cancer: Fight Cancer (31.1%), Assist conventional treatment (25.2%) Influence General Health: Physical Well-being (17.2%) Holistic Healthcare: Emotional well-being/Hope (11.3%) Taking Control: Do everything possible (3.3%)
Rausch et al, 2011, USA ^[83]	CAM use by Radiotherapy patients	92.7% - 153 respondents]	Not assessed	Not assessed	Belief In CAM: Previous use (25%), Thought CAM interesting (3%), Dissatisfied with traditional medicine (1%) Holistic Healthcare: Managing emotional symptoms (23%) Recommended By Others: Physician recommendation (15%) Treat Cancer Complications: Physical symptoms (10%)
Saghatchian et al, 2014, France ^[84]	CAM use amongst early stage Breast Cancer	37.5% - [184 respondents]	Younger, Higher education	Chi-Squared Test	Treat Cancer Complications: Side effects (73.9%), Symptoms of cancer (47.8%) Influence General Health: General health (53.6%), General wellness (49.2%), Immunity (24.6%) Influence Cancer: Anticancer (11.5%)
Saini et al, 2011, Italy ^[85]	CAM use and Quality of life of oncology patients	18.1% - [288 respondents]	None found	Multivariate Logistic Regression Analysis	Influence General Health: Improved general health (32.8%), Stronger Immune system (24.2%), Prolonged survival (10.1%) Holistic Healthcare: Quality of Life (25.7%)
Shih et al, 2009, Singapore ^[86]	CAM usage by cancer patients	56.3% - [403 respondents]	Secondary school, Chinese, Prior CAM use	Chi-Squared Test	Influence General Health: Immunity (53.7%), Wellbeing (16.7%)

Table 2 (cont.)

Author and Country	Aim of study	CAM prevalence of use (%) - [Population Size]	Demographics predicting CAM use	Statistical analysis of demographics in study	Reasons for CAM use
Sullivan et al, 2015, Australia [87]	CAM use by Rural oncology patients	49% - [142 respondents]	Higher education	Multivariate Logistic Regression Analysis	Holistic Healthcare: Physical wellbeing (82%), Emotional wellbeing (45%) Taking Control: Might help/can't hurt (56%) Influence Cancer: Increase body's ability to Fight cancer (48%), Do everything possible to fight cancer (47%), Directly fight cancer (33%) Treat Cancer Complications: Side effects (39%) Recommended by Others: Friends and family wish them to use (36%) Belief In CAM: Conventional treatment not successful (6%)
Tautz et al, 2012, Germany [88]	CAM use and emotional state of Breast cancer patients	63% - [170 respondents]	Higher education, 5 years younger, Advanced disease, Metastases and lymph involvement at diagnosis, Lower Quality of life	Chi-Squared Test	Influence General Health: General health promotion (70%), Enhancement of self-healing powers (57%), Boosting the immune system (55%), Fighting energy loss and fatigue (51%) Taking Control: Actively contributing to one's own health (54%) Influence Cancer: Complementing conventional therapies (54%)
Teng et al, 2010, China [89]	CAM use by cancer patients at teaching hospital	93.4% - [121 respondents]	None found	Chi-Squared Test	Influence Cancer: Fight disease/immunity (44.2%), Cure (40.7%), Prevent recurrence/spread of cancer (8.8%), Complement treatments (8%) Holistic Healthcare: Quality of Life (29.2%), Psychological/emotional wellbeing (15%) Treat Cancer Complications: Relieve symptoms (26.5%) Recommended By Others: Requested by physician (22.1%) Belief In CAM: Safe (19.5%) Taking Control: Do everything possible (2.7%)
Ustundag et al, 2015, Turkey [90]	CAM use in cancer patients	33.8% - [397 respondents]	Female, Housewife, Family history, Breast cancer, Second course of chemotherapy, Surgery, Radio- and chemotherapy together	Chi-Squared Test	Belief In CAM: Expect benefit, no harm (72.4%) Influence General Health: Energy (64.9%) Treat Cancer Complications: Side effects (medication and cancer) (64.2%) Influence Cancer: Fight cancer (50.7%) Holistic Healthcare: Feel better/hope (41%) Taking Control: Do everything possible (11.9%), Nothing to lose (5.2%) Recommended By Others: Doctor's recommendation (2.2%)
Wilkinson et al, 2014, Australia [91]	CAM use in regional cancer centre	49% - [285 respondents]	Female	Fischer's Exact Test	Belief In CAM: Previous use (37%), Preference for natural therapies (32%), Supportive CAM practitioner (18%) Holistic Healthcare: Hope (29%) Taking Control: Greater personal involvement (23%), Try something new (22%), CAM nontoxic (16%)
Wortmann et al, 2016, Germany [92]	CAM use at different cancer stages	50.7% - [506 respondents]	Female, Active disease, Longer disease, Social support	Bivariate Analysis	Influence General Health: Immunity (58.7%) Taking Control: Become active (51.5%), Not miss opportunity (32%) Influence Cancer: Reduce risk of relapse (38%), Integrative therapy (28%) Treat Cancer Complications: Side effects (31%), Belief In CAM: Less side-effects (21%), Alternative practitioner takes time (12%), Afraid of conventional therapy (9%) Holistic Healthcare: Reduce stress (12%) Recommended By Others: Recommendations from others (12%)
Yang et al, 2017, China [93]	Views on CAM by patients and Oncologists at Hospital	75.1% - [402 respondents]	Disease duration > 9 months	Multivariate Logistic Regression Analysis	Influence General Health: Improve immunity (53.3%) Treat Cancer Complications: Manage symptoms (47%)
Zulkipli et al, 2018, Malaysia [94]	CAM use amongst newly diagnosed Breast Cancer	34.8% - [400 respondents]	Higher education, employed, Malaysian	Univariate Analysis	Recommended by Others: Recommended by family (63%), Friends (32%), Survivors (21%) Holistic Healthcare: Piece of mind/calm (20%) Belief In CAM: Effective and fewer side-effects (16%)

2.3.2 – Study Characteristics

When divided into country of surveyed population, the most common country of research was Germany, which produced 9 of the reviewed studies. 6 Studies were from Turkey, 5 from Australia and Malaysia, 4 from Italy and the USA and 3 from Ireland and Palestine. Chinese, Lebanese and Saudi Arabian patients were surveyed in 2 articles respectively and patients from other countries were represented in single studies.

Variation was found in several areas of study design amongst the studies included in the review. Data were mostly obtained from self- completed questionnaires (carried out in 65.6% of studies). The remainder were carried out by face-to-face or telephone interviews. The difference in the prevalence of CAM use between these two methods of obtaining patient responses was not statistically significant (data not shown). However, the variation in data collection may have influenced other responses in the studies.

Definitions of what constituted CAM were noticeably different between the studies. 53 articles used definitions of CAM, which included mind and body therapies. Meanwhile, 5 studies presented prevalence data specifically for biological therapies, or variations thereof (such as only herbal therapies ^[39, 66] or dietary supplements ^[67]). The remaining studies used definitions of CAM that excluded certain types of therapies. Some studies excluded specific therapies due their ubiquity of use or perceiving them as general self-care, such as relaxation and support groups ^[77, 84, 95].

The third source of method variation observed amongst studies was the timeframe of CAM use. Most studies asked about CAM use at the time of the survey. Taking the studies not specifying a timeframe as assessing current use, 21 studies asked patients about CAMs being taken currently. In contrast, 13 surveys asked patients if they had ever used CAM. The remaining surveys asked about CAM either within a specific time frame (for example within the last 12 months ^[29, 42, 91]) or in relation to cancer treatment or diagnosis, such as CAM being taken since diagnosis ^[25, 37, 50, 55, 56, 60, 65, 73, 74, 77, 82, 89, 94].

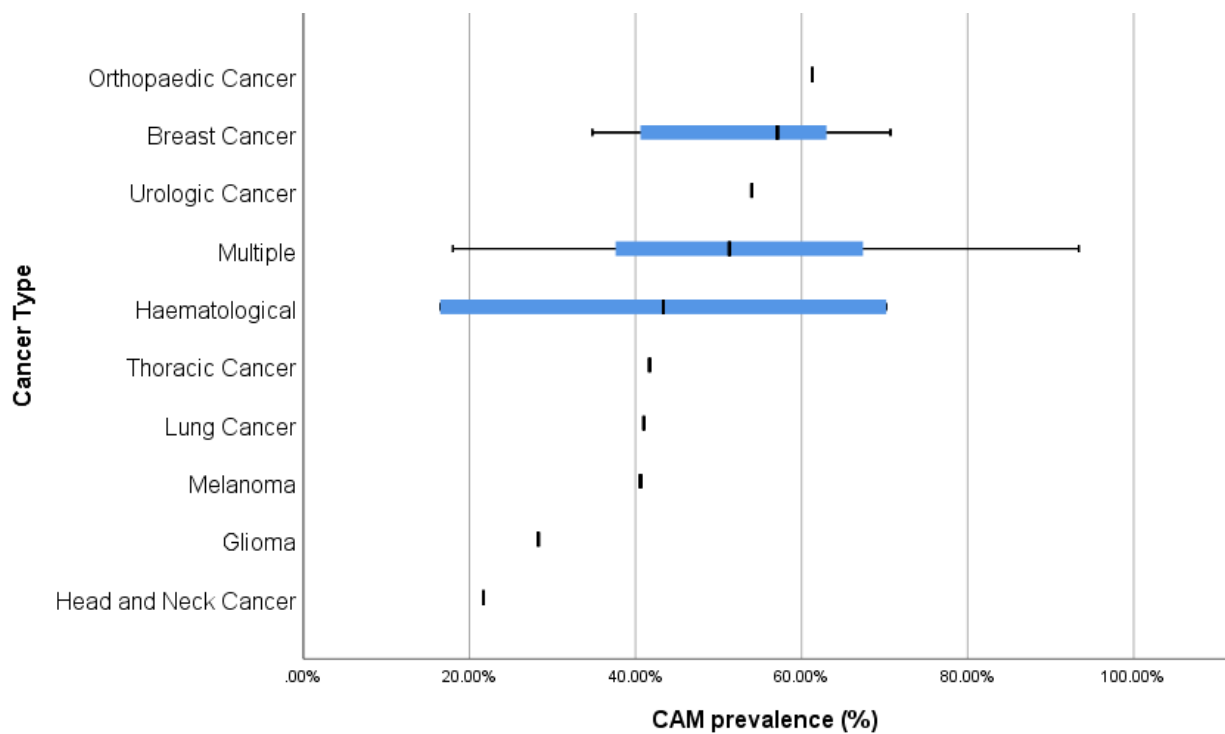
2.3.3 – Complementary and Alternative Medicine Use

2.3.3.1 – Prevalence of CAM Use

The mean percentage of cancer patients using CAM was found to be 51%. Reported range was from 16.5 % ^[52] to as high as 93.4% ^[89] of respondents. From the included studies, 5 identified patients who were using unconventional practices, alternative to conventional therapy ^[37, 40, 41, 79, 87]. A total of 148 patients using alternative therapies were identified from these studies; making up 0.01% of the mean cancer patient population using CAM included in this review.

Figure 3 shows the distribution of CAM use in different cancer types. While the graph does show some distribution of prevalence patterns, an ANOVA test of CAM prevalence of use showed no statistical significance between cancer types (data contained in supplementary material – See Appendix 1).

Figure 3 – CAM prevalence of use indicated for cancer types



Similarly, Table 3 shows the mean CAM use by cancer patients between the most commonly represented countries of surveyed populations. Again, while some variation in means can be observed, an ANOVA test found the differences in CAM prevalence of use between countries not to be statistically significant (data contained in supplementary material – See Appendix 1).

Table 3 – Mean prevalence and range of commonly represented countries in the studies

Country	Mean Prevalence	95% Confidence Interval	Range
Germany (9 studies)	41.1%	28.5%-53.7%	18%, 63%
Turkey (6 studies)	39.9%	18.6%-61.2%	23.5%, 71.5%
Australia (5 studies)	56.6%	33.8%-79.5%	37.6%, 82.9%
Malaysia (5 studies)	61.9%	42.3%-81.6%	34.8%, 72.7%

2.3.3.2 – Demographics Profiles of CAM use

56 of the reviewed articles determined demographic predictors of CAM use in cancer patients. Due to the large variation of significant demographics identified by the included studies, we classified a demographic predictor as common if it appeared in at least 10% of studies. This was determined as a sufficient cutoff point because below this frequency demographic predictors appeared in 3 studies or less, making separation of more common demographics difficult. The most common demographic predictors of CAM use in cancer patients are presented in Table 4.

Table 4 – Summary of common demographic predictors of CAM use in cancer patients (56 studies)

Demographic Predicting CAM use	Number of studies	Total percentage	Studies finding as independent variable	Independent variable percentage	Studies only showing statistical significance	Statistical Significance percentage
Female	19	33.9% (41.3%*)	10	30.3% (40%*)	9	39.1% (45%*)
Higher education	17	30.4%	9	27.3%	8	34.8%
Younger	13	23.2%	7	21.2%	6	26.1%
Higher income	6	10.7%	5	15.2%	1	4.4%
Previous CAM use	5	8.9%	4	12.1%	1	4.4%

* Percentage after removal of studies surveying patients with breast cancer

The methods for determining the significance of demographic identifiers to predict CAM use in cancer patients differed amongst studies. While all 56 studies tested for statistical significance, only

33 of the articles undertook regression analysis to determine significance independent of confounding factors. The data in Table 4 have been separated into studies that tested for independent variables and studies that only tested for statistical significance.

The most common demographic predictor of CAM use by cancer patients was gender, with female patients identified as predominant users (41.3% of studies, 40% of studies identified this as an independent predictor [IP]). This result was after removal of studies of only breast cancer patients, which would not have included gender in this discussion as a demographic predictor. This was followed by patients having obtained higher education (30.36%, 27.27% [IP]), being younger (23.2%, 21.2% [IP]) and having a higher income (10.7%, 15.2% [IP]). Previous use of CAM was stated as a predictor in 12.1% of studies testing for independent variables.

2.3.3.3 – Reasons for CAM Use

Table 5 shows the distribution of themes for motivations respondents gave for CAM use. Wanting to treat or cure cancer was the most common theme, appearing in 73.8% of studies. This was followed by intent to treat the complications of their cancer or therapy (60.7%), influencing general health (57.4%), addressing holistic needs (57.4%), taking control of treatment (45.9%), recommendation by others (34.4%) and belief in CAM (34.4%).

Table 5 – Incidence of reasons for cancer patients to use CAM from thematic analysis.

Theme	Comment
Influence Cancer	45 studies (73.77%). Most common reason: To treat cancer (30 studies)
Treat Cancer complications	37 studies (60.66%) Most common reason: To treat side effects of therapy (25 studies)
Influence General Health	35 studies (57.38%) Most common reason : To increase immunity (28 studies)
Holistic Treatment	35 studies (57.38%) Most common reason: Emotional support and wellbeing (9 studies)
Taking control of Therapy	28 studies (45.90%) Most common reason: Not wanting to miss a chance (14 studies)
Recommended by others	21 studies (34.43%) Most common reason: Recommendation by friends and family (13 studies)
Belief in CAM or Dissatisfaction with conventional therapy	21 studies (34.43%) Most common reason: Belief in CAM (8 studies)

2.4 – Discussion

This systematic review focused on studies that investigated the prevalence of CAM use in cancer patients, common demographic predictors of use in cancer and the most common reasons for these patients to adopt these therapies. From the studies included, a large degree of heterogeneity in methods and reporting of results was observed. The variance in study design observed in this review, regarding respondent-completed questionnaires compared to interviews, has been discussed in other reviews of CAM use in cancer patients [10-13]. While variation was observed in methods of data collection from studies included in this review, they did not however have a significant effect on reported mean prevalence rates. This contrasts the review carried out by Horneber and colleagues in 2012^[10] who suggested that using interviews to conduct surveys increased the reported prevalence.

The variation of CAM definition shown in this review is a common issue mentioned in other reviews [9-11, 13, 15]. Similarly, the difference in the timeframes of CAM use has been identified in other prevalence reviews [10, 11]. Horneber et al [10] in their systematic review of CAM prevalence of use, suggested standardisation of a timeframe for CAM use and CAM definition as well as lists of CAM treatments to be included in surveys as recommendations for future studies.

2.4.1 – Prevalence of CAM Use

The earliest systematic review on the prevalence of CAM in cancer patients that we found was carried out by Ernst and Cassileth and published in 1998^[9]. They reviewed 26 publications dating back to the 1970s. From this review an average prevalence of 31.4% of adult patients taking CAM was found, with a minimum of 7% and a maximum of 64%.

A second major review of CAM prevalence of use was published in 2012 in which Horneber and colleagues carried out a systematic review and meta-analysis of 148 studies also dating back to the 1970s^[10]. The review separated general prevalence of CAM use into two categories. One category was patients taking CAM at the time of the survey (called point prevalence) from which an average use of 40% with a range of 9% to 88% was found from 39 articles. The other category was patients using CAM during a time before the survey (called period prevalence) from which an average use of 43% with a range of 6% to 91% was found from 115 articles.

From the 61 studies included in this review the mean prevalence of CAM use by cancer patients was 51%. This result is higher than both mentioned systematic reviews of CAM use in cancer patients. However, the 2012 review found that point prevalence of CAM use in studies from 2000-2009 was 49%^[10]. The result from this review suggests that literature published in the last decade does show some similarity to previous findings.

Although patients using unconventional practices alternative to conventional treatment represented a very low percentage of CAM users (0.01%), which is in agreement with the NCCIH^[6], some studies have highlighted that surveys conducted in clinical settings would have under-representation of patients taking alternatives to conventional medicine^[11, 45]. All of the included surveys in this study took place in a clinical setting, which would suggest that respondents at least partially accepted conventional treatment and therefore the findings may not be a true reflection of alternative therapy users. There is an opportunity for future surveys to be conducted in appropriate settings to obtain an accurate representation of the prevalence of alternative therapy in cancer patients.

2.4.2 – Demographic Profiles of CAM Use

This is the first review of cancer patients, to our knowledge, to categorise demographics predicting the use of CAM in terms of regression analyses. In a systematic review of demographic variables and reasons relative to CAM use in cancer patients, Verhoef et al suggested that just testing for significance can give way to bias and inaccurately identify variables as significant^[11].

The three most common demographic predictors identified in this review, having higher education, being younger and female, have been found to be significant predictors of CAM use in many of the previous reviews of cancer patients [11-15, 18].

Female gender was found to be the most common demographic predictor of CAM use in the included studies. A suggestion as to why this may be a common predictor of CAM use is that women are more likely to use healthcare therapies [11]. Alternatively, women may also be more likely to discuss their health and their diagnosis with friends and family, who have been observed to be common sources of information on CAM [14].

The next most common demographic variable associated with cancer use was respondents having obtained higher education. Patients with higher education are often mentioned in other reviews together with higher income; suggesting that they are interrelated [11, 13, 15]. The theory suggests that CAM in most cultures is paid for out of pocket and so patients with higher incomes, usually from professions requiring higher education, will have more disposable income for these therapies. Given in this review that higher income was found to be an independent demographic predictor of CAM use in less than half of the articles that identified higher education as a predictor, this association may not be the only reason. Another perspective may be that patients who have a higher education would be more inclined to question mainstream medicine and paternalistic practices of healthcare, leading them to seek alternative views and therapies.

Looking at younger patients being more likely to adopt CAM, Poomthaniwatkul and colleagues [15] in their 2015 review of herbal medicine studies in cancer patients suggested that younger patients may be more likely to use the internet and media for health information and this may explain this result. Meanwhile Verhoef et al [11] suggested that younger patients would be more likely to see a cancer diagnosis as threatening to future life plans and so would be more motivated to seek all possible treatment options.

Outside of these 3 most common demographic predictors of CAM use, previous CAM use was also found to be a significant variable, which was also identified by Poomthaniwatkul et al [15]. Meanwhile breast cancer was not found to be significantly related to CAM use, despite being mentioned as a significant predictor in previous reviews [11, 12].

2.4.3 – Reasons for CAM Use

While individual reasons for CAM use were varied across the included studies, a thematic analysis similar to that performed by Ernst et al [96] in their 2011 review on general CAM use allowed categorising of all responses to better understand general motivations of cancer patients for CAM use.

This method of grouping reasons for use has not been carried out in any other identified review of cancer patients utilizing CAM. The most common themes were to influence their cancer or treat the symptoms of their cancer or treatment. This suggests that issues surrounding the cancer itself are the focus of reasons cancer patients gave for adopting CAM. The systematic review by Poonthaniwatkul et al^[15] found that reasons associated with treating cancer or side effects of conventional cancer therapy were amongst the most common motivations for CAM use, but were less prominent than use for improving physical and emotional health. The 2011 review by O’Callaghan^[14] however cited a relatively small representation of respondents expecting that CAM would cure or assist in treating their cancer. They did find that a common reason for CAM use was to reduce the side-effects of conventional treatment, which is contained in our theme of treating cancer complications.

The next 2 common themes were to improve general health and adopting CAM to meet holistic healthcare needs. The review by O’Callaghan also found intention to “improve physical wellbeing” and “improve emotional wellbeing” among the most common motivations for CAM use^[14].

The desire to take control of their condition and treatment appeared in slightly less than half of the studies. Given CAM is available outside of the conventional health system, the adoption of these therapies can give not only a sense of empowerment, but also a feeling that every avenue has been addressed in their cancer journey. A review of men with prostate cancer noted that wanting to gain a sense of hope and control was a common reason for utilization of CAM^[13].

Recommendation of CAM by others was a less common reason, found in slightly over a third of included studies. This reason was only mentioned in the reviews by Verhoef et al^[11] and Davis et al^[18], which both found this reason to be uncommon for adopting CAM therapies.

The last identified theme, which had a similar occurrence to the recommendation of CAM from outside sources, was belief in the benefits of CAM or dissatisfaction with conventional treatment. While generally adopting of CAM would require a degree of belief that the therapy would work, the responses in this theme showed a subscription to the concept of CAM and a positive attitude towards its benefits beyond their conventional treatment.

This theme also encompassed negative motivations or being disenfranchised with their cancer treatment. Discontent with conventional medicine is an expected response given the underlying stress associated with being treated for and living with cancer. However, few of the included surveys found patients who were using CAM as an alternative to conventional therapy, an observation also made by the National Centre for Complementary and Integrative Health^[6]. This would suggest that this disenfranchisement with conventional care would be more of an impetus to adopt CAM together with, rather than looking for a replacement for, their therapy; an observation which was also made in O’Callaghan’s review^[14]. It should be noted that most of the included studies were carried out in

oncology centres or hospitals. It would therefore be unlikely that these facilities would have a large representation of cancer patients who were using CAM as an alternative to conventional treatment.

Identifying reasons that cancer patients adopt CAM may aid in encouraging practitioners to broach this topic with patients. A literature review by Stub and colleagues published in 2016^[97] found that most oncologists and physicians were only inclined to discuss CAM when their patient had brought up the subject. This is a concerning observation given that Davis and colleagues found in their 2012 review that main reasons for nondisclosure of CAM use included doctors not asking, feeling the doctor would not approve and that they were not interested^[18]. Given that nondisclosure of CAM to treating doctors, nurses and health professionals carries a risk to patient safety and effectiveness of cancer treatment, some review have suggested by opening communication and normalising CAM in communication will increase the likelihood of disclosure from patients^[13, 18].

2.4.4 – Limitations

There were limitations to this review. Only articles in English were used in the analysis, which may have limited the inclusion of studies that were published in other languages. Not all studies separated patients who were currently receiving cancer treatment from those that had finished their therapy, which may have also influenced reported data. The continued variation of study design and reporting in the individual studies shows that this lack of a standardization is a potential source of variability amongst surveys of cancer patients using CAM.

2.5 – Conclusion

To our knowledge this is the first review of CAM use in general cancer patients that systematically analyses prevalence of CAM use, independent demographic predictors and includes a thematic analysis of reasons for adopting these therapies. From the 61 studies included in the review, there was a large degree of heterogeneity in study design. Main variations were related to method of data collection, definitions of CAM and timeframes of respondent use of CAM, which have been identified in previous reviews and is suggested as possibly influencing results of the studies. The review by Horneber and colleagues^[10] provided a list of recommendations including standardization and clarity regarding definitions of CAM and timeframes for CAM use. It is suggested that these recommendations be more widely observed in an effort to form a generalized process of preparing and reporting studies on cancer patients in the future.

Overall, the prevalence of CAM use in cancer patients in the last 10 years was found to be slightly over half of all surveyed populations. While analyses were carried out to identify differences between different cancer types and countries of surveyed populations, no significant differences were found. Demographics predicting the use CAM by cancer patients were being younger, female, having a higher education, higher income and previous CAM use. These demographic patterns have been identified in previous reviews, but this is the first review to show these variables as significant, independent of confounding factors. Themes of reasons for CAM use were, in order of frequency in the included studies; to influence their cancer, to treat the complications of their cancer, to influence general health, provide holistic healthcare, taking control, recommendation from others and belief in CAM.

This knowledge potentially provides health practitioners with clearer insight into the CAM use in cancer, allowing more informed discussion with these patients. Subsequent willingness to discuss CAM with patients should encourage disclosure from patients, leading to optimized cancer therapy and increased safety.

Chapter 3 – Knowledge, Attitudes and Practices of Health Professionals toward Complementary and Alternative Medicine in Cancer Care – A systematic review

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Authorship Statement

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Abstract

Background: Cancer patients' disclosure rate of their complementary and alternative medicine (CAM) use to health professionals is low, mainly attributed to health professionals' attitude toward CAM. Thus, we aimed to identify and compare the knowledge, attitudes and practices of doctors, nurses and pharmacists regarding CAM use in cancer patients.

Methods: The databases AMED, CINAHL, Embase, Emcare, Medline, PubMed, Scopus and Web of Science were searched for surveys of health professionals published between 2008 and 2020.

Results: The knowledge of CAM in cancer care was generally poor for all three professions in the included studies, although how knowledge was assessed showed large variability. Doctors were found to dismiss or discourage CAM use out of concerns for side-effects and interactions. Nurses were generally positive and supportive toward CAM use by cancer patients. Pharmacists were neutral toward CAM, but believed they should be a reliable source of information for patients. All professions felt a major barrier to discussions with patients about CAMs was a lack of evidence of their safety and efficacy. Studies of all three professions also showed a general desire for more education regarding CAM.

Conclusion: The review suggests that doctors, nurses and pharmacists may lack appropriate knowledge to inform CAM use in a cancer care setting, which determines their attitude, influences practice and potentially impacts patient outcomes. Our findings indicate that increased access to research-based education on CAM would strengthen health practitioners' confidence in discussing CAM with cancer patients, which would lead to more disclosure and safer therapeutic decision making.

3.1 – Background

Complementary and alternative medicine (CAM) use by cancer patients has been shown to have increased over the last 30 years ^[10]. In the last decade CAM has been adopted by around 50% of cancer patients ^[98], with common reasons for use being to treat their cancer or to alleviate the side-effects of conventional anti-cancer treatments ^[98].

The term CAM is generally used to define medicines, therapies or treatments which are outside orthodox or conventional medical practices ^[99]. They may be used either alongside conventional therapy, and classified as “complementary”, or in place of conventional therapy, and classified as “alternative”. These therapies can range from natural therapies, such as vitamins and herbs, to mind and body therapies, such as yoga, meditation and acupuncture ^[6].

There are, however, some safety concerns when CAMs are used by cancer patients. Biological CAM, such as herbs, can interact with conventional cancer therapies, potentially resulting in an increased risk of bleeding or alterations in the metabolic pathways of chemotherapy agents ^[17, 100]. The latter interaction could result in either reduced efficacy or increased toxicity and incidence of side-effects of the chemotherapy.

Given this potential risk of interactions, the safety of cancer patients using CAM may be further affected by low rates of disclosure of this use to health professionals. A review of cancer patient’s discussions of CAM use with doctors found an average disclosure rate of only 40-50% ^[18]. Common reasons for this lack of disclosure were doctors not asking about CAM, fearing doctor disapproval, doctors not being interested or lack of faith in their doctor’s knowledge of CAM ^[18].

Each of the highlighted reasons for non-disclosure may be related to the knowledge, attitudes and practices of doctors regarding CAM use in cancer. While the current knowledge, attitudes and practices of doctors toward CAM use in cancer patients is important, the treatment plan for these patients often involves the input from multiple health professionals, including nurses, pharmacists, radiation therapists and dieticians ^[8]. To our knowledge, the only review of knowledge, attitudes and practices of health professionals toward CAM in cancer care was the 2016 review by Christina and colleagues, focusing exclusively on nurses and addressing mostly their knowledge and attitudes toward CAM ^[101]. Therefore, this review aims to investigate and compare the current knowledge, attitudes and practices held by conventional health professionals regarding CAM use in cancer.

3.2 – Methods

This review follows the PRISMA preferred reporting items for systematic reviews and meta-analyses guidelines where applicable ^[33].

3.2.1 – Search Strategy

After initial consultation with research librarians, between August 2018 and January 2020 the databases AMED (1995-2020), CINAHL (1981 – 2020), Emcare {via Ovid} (1995-2020), EMBASE {via Ovid} (1947 - 2020), Medline {via Ovid} (1946 – 2020), PubMed (1946 – 2020), Scopus (1970-2020) and Web of Science (1965-2020) were searched individually using the following search string:

“(oncologist OR doctor OR physician OR nurse OR pharmacist) AND (knowledge OR attitude OR practice) AND (complementary OR alternative OR integrative) AND (therap*¹ OR medicine) AND (cancer OR oncology OR palliative)”

The reference list of identified studies and reviews were also searched to identify additional eligible studies.

3.2.2 – Eligibility Criteria

To be included in this review, full research papers needed to have been published between 2008 and 2020, assess the knowledge attitudes and practices of health professionals regarding CAM use in oncology care, be full research papers and be written in English. Studies were excluded if they used a purely qualitative methodology and if the study had recruited multiple types of health professionals, but did not differentiate between these professions in the results. Duplicate studies were removed. This screening process was carried out by the primary researcher.

3.2.3 – Quality Assessment of Articles

To ensure the quality of the articles, the QualSyst tool for methodological quality by Kmet and colleagues ^[34] was used. This tool contains 14 criteria, addressing all elements of study design and reporting, resulting in a score between 0 and 1, with a higher score being indicative of a more robust study. Each of the studies that were read in their entirety were assessed for methodological quality

¹ - the * indicates a truncation or wildcard in the search string

using this tool. Based on reviews previously using this tool ^[18], a cut-off score of 0.75 was used to indicate a study of appropriate quality. These analyses were carried out independently by two reviewers to reduce the risk of bias. Any differences in QualSyst scores were discussed and agreed upon before deciding to include into the review. The QualSyst analysis and scores for each of the included studies is contained in Supplementary Document #1 (see Appendix 2).

3.2.4 – Data Synthesis and Extraction

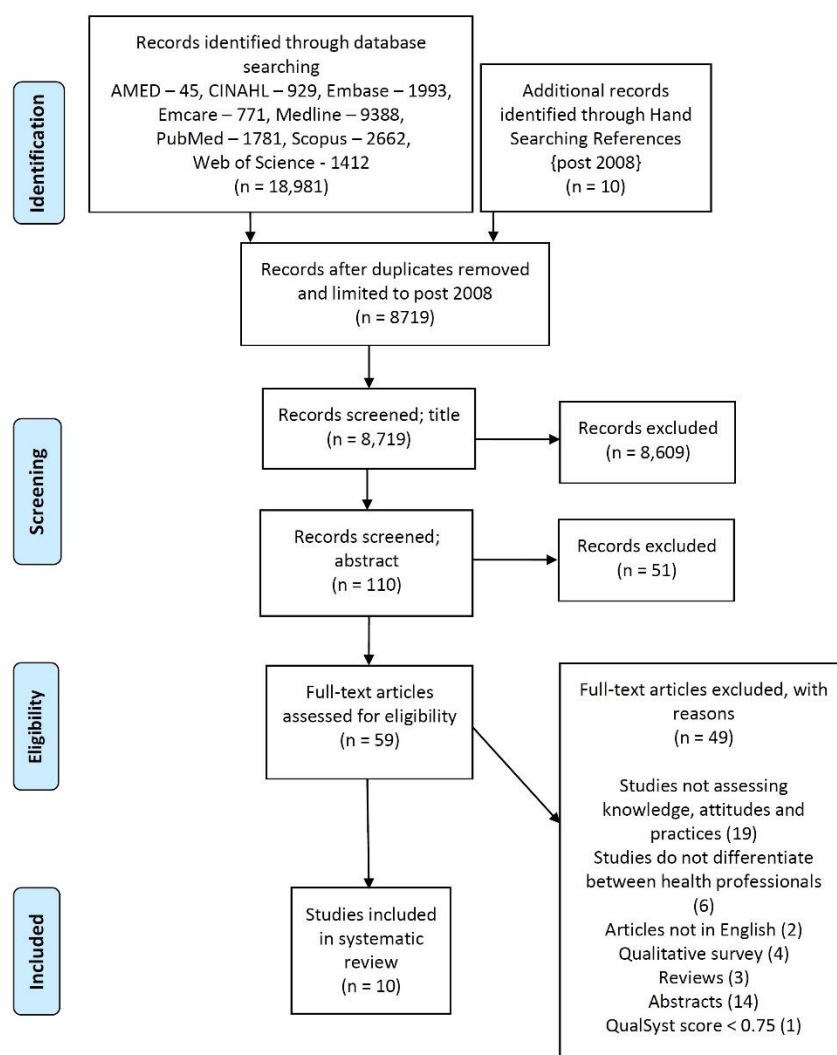
The articles were imported into a database using NVivo qualitative analysis software, version 12 ^[102]. Given a large variation in survey design was evident between the included studies, it was decided that a narrative synthesis approach would be appropriate to allow comparison of findings. To conduct this analysis the studies were coded using a method adapted from the process of thematic synthesis, detailed by Thomas and Harden ^[103]. Briefly, this involved an initial stage of coding the entire results section of each of the included papers. The coded results were then separated into knowledge, attitudes or practices. In the second stage, each of the results were further coded into descriptive themes to identify similarities and differences. The third stage of the synthesis involved reviewing the descriptive themes and translating them into analytical themes, allowing comparison of findings within and between the respective professions. These themes were analysed by two researchers, again, to reduce the risk of bias.

The findings from each of the analytical themes were summarized and tabulated along with additional details of the respective studies. These details included population size, response rates, study setting, professions surveyed and data collection instrument.

3.3 – Results

The PRISMA flowchart detailing the screening process for the studies included in the review is shown in Figure 4. The search provided 10 studies that were suitable for inclusion into the review. The characteristics of each included study are described in Table 6.

Figure 4 – PRISMA Flowchart for screening of articles included in review



3.3.1 – Study Characteristics

From the 10 articles included in this review, 8838 health professionals were surveyed. Individual study populations ranged from 63^[104] to 6007^[105] with an average respondent population of 834. Response rates were similarly varied, ranging from 24%^[106] to 90%^[104]. The most common country of surveyed respondents was the United States of America, which was represented in three studies^[23, 106, 107]. This was followed by China, which was represented in two studies^[105, 107], while all other countries were represented in single studies. It should be noted that the article published by Lee and colleagues in 2008 surveyed oncologists from the United States of America, China and Taiwan^[107]. In regards to health professional groups surveyed, two articles focused on doctors (GPs and oncologists)^[108, 109], three on oncologists^[23, 105, 107], three on nurses^[106, 110, 111], one on pharmacists^[104] and one on hospital staff, including doctors, nurses and CAM practitioners^[112].

The definition of CAM varied between the included studies. A majority of the studies used the definition of CAM given by the National Centre for Complementary and Integrative Health (NCCIH)^[6] or similar definitions; including all therapies outside orthodox or conventional therapy.

Alternatively, the included national survey of oncologists in the United States of America addressed herbal medicines only^[23]. The Harnett and colleagues' report on Australian pharmacists, focused solely on "biological-based" CAM^[104].

All studies used cross-sectional, self-completed surveys. The means of survey administration were either online, by mail or delivered by hand. There was however no standardization of questions between the surveys.

Table 6 – Characteristics of studies included in this review (n = 10) including responses regarding knowledge, attitudes and practices.

Author and year	Country	Population size (Response rate)	Profession	Knowledge	Attitudes	Practices
Al-Omari, A. et al, 2013 ^[108]	Jordan	71 (71%)	GPs and Oncologists	Self-assessed knowledge: 83% of respondents felt they had little to no knowledge of the composition of herbal remedies.	Concerns with CAM: Respondents were asked about implementing a CAM program into their hospital. Lack of support from medical oncologists, proof of benefit and safety of CAM and lack of specialists to run the program were identified as the major barriers. Interest in CAM: 49% interested in CAM. 80% interested in learning more about CAM in oncology. Doctors younger than 40 years of age or those who had used CAM personally were more inclined to want to learn about CAM.	Advising patients on CAM : When informed that a patient was using CAM: 57% would discourage CAM use and educate the patient of risks, 23% felt that it was dependent on the situation, but let them continue if there was no harm involved, 21% had no knowledge of CAM and were indifferent. Asking about CAM: 14% never ask about CAM. Main reasons were lack of time and lack of knowledge. 65% of doctors who asked about CAM would ask about herbal, citing concern regarding interactions as the main reason. Estimation of patient CAM use: 79% estimated less than 30% of their patients were using CAM.
Bocock, C. et al, 2011 ^[109]	New Zealand	235 (59%)	GPs and Oncologists	Self-assessed knowledge: 73% felt they did not have sufficient knowledge to advise patients on CAM.	Concerns with CAM: Interactions with conventional therapy (89%), side-effects (87%), quality of knowledge about CAM (86%), financial cost to patients (84%), reasons for patients adopting CAM (54%). Interest in CAM: 22% wanted to use more CAM in practice; 26% used CAM personally. Place of CAM in therapy: Role of CAM in cancer care: adjunctive therapy (53%), for symptom control (17%), for palliation (9%). 95% believed that body, mind, spirit and lifestyle should be addressed in cancer care. 60% felt CAM should be included into practice.	Advising patients on CAM: 93% would recommend CAM to less than a quarter of their patients (42% would not recommend at all). Asking about CAM: 58% would ask less than a quarter of their patients about CAM use. Doctors were more likely to recommend CAM if they were female, more likely assess their own knowledge of CAM as adequate, work in the community, be willing to use CAM professionally, use CAM personally and less concerned about scientific research of CAM Combining CAM and conventional therapy: 71% would be comfortable with CAM use in patients with cancer considered curable. 86% would be comfortable with CAM use in patients with incurable cancer. Estimation of patient CAM use: 71% estimated that less than 25% of their patients were using CAM.
Gok Metin, Z. et al, 2018 ^[110]	Turkey	127 (66.8%)	Nurses	Self-assessed knowledge: 90% felt they didn't have complete knowledge of CAM Knowledge sources: Audio-visual media (81%), scientific resources (48%), and family friends (46%)	Concerns with CAM: Barriers to CAM use were lack of knowledge (61%), Need to obtain doctor's approval (52%), legal and institutional issues (47%), limited education and training (44%), not believing in CAM (31%), lack of equipment to deliver CAM (27%), unwillingness to apply CAM (25%), patient unwilling to receive CAM (24%). 72% of respondents felt that their hospital's CAM resources did not contain sufficient information. 51% believed that the benefits of CAM were from the placebo effect. 41% believed that CAM can adversely affect cancer. Place of CAM in therapy: 85% felt nurses should ask patients about CAM, 71% believed CAMs are effective for cancer treatment and symptom management, 69% felt they should respond to CAM queries, 60% believed discussing CAM increases patient confidence and communication, 56% felt that CAM use decreases health costs, 38% felt CAM should be included into nursing care.	Advising patients on CAM: 19% used CAM in patient care. Reasons were improving wound healing (20%), managing constipation and diarrhoea (9%), decreasing anxiety (8%), reducing nausea and vomiting (7%), managing chronic pain (6%). 27% recommended CAM to their patients. Most recommended therapy was herbal products.

Author and year	Country	Population size (Response rate)	Profession	Knowledge	Attitudes	Practices
Harnett, J. et al, 2018 ^[104]	Australia	63 (90%)	Pharmacists	<p>Tested knowledge: Doses of CAM and interactions (Median score 10/16)</p> <p>Knowledge sources: Information sources for CAM queries – Pharmacy-specific databases (36%), CAM specific databases (29%)</p> <p>Sources of CAM education – Professional associations (53%), University (37%), Manufacturers of CAM (11%)</p>	<p>Concerns with CAM: Barriers to pharmacists giving advice on biological-based CAMs use were inadequate training and education about CAM (91%), lack of access to reliable resources (64%), concerns about CAM safety (51%), lack of adequate knowledge of CAM therapies (50%), concerns about CAM efficacy (44%), lack to time (25%). 50% of respondents also agreed there is insufficient evidence for the safety of CAM use during conventional therapy.</p> <p>Place of CAM in therapy: CAM reduces side-effects during cancer treatment (44% neutral, 33% disagree). CAM improves quality of life for cancer patients (43% neutral, 30% agree). Pharmacists have a responsibility to: Ask cancer patients receiving treatment about CAM (92% agree), provide information on CAM safety to cancer patients (72% agree), be knowledgeable about interactions between CAM and common cancer therapy (91% agree). Pharmacists are considered reliable resources on CAM information for cancer patients (78% agree), Advising cancer patients on CAM is outside their scope of responsibility (73% disagree), Pharmacists should not be expected to be knowledgeable about CAM (80% disagree), They should refer cancer patients to CAM practitioners (41% disagree, 30% agree, 29% neutral)</p>	<p>Advising patients on CAM: 19% had “usual” or daily inquiries about CAM from cancer patients. 41% of these respondents consulted information sources to address the query</p>
Kamizato, M. et al, 2013 ^[111]	Japan	787 (69%)	Nurses	<p>Self-assessed knowledge: 58% said they were not knowledgeable about CAM</p>	<p>Concerns with CAM: Barriers to implementation of CAM into practice were lack of skill regarding CAM (74%), lack of time (70%), lack of knowledge (68%), not being able to continue treatment (53%), not knowing when to apply CAM (42.6%), not knowing how to evaluate CAM use (40%), financial problems (19%), difficulty with coordination with staff (18%), no time to explain CAM to patients (17%)</p> <p>Interest in CAM: 80% were interested in incorporating CAM into practice. Interest in CAM was found to differ depending on the CAM practice, with mind and body techniques being the most popular. 59% were interested in further CAM education</p>	<p>Advising patients on CAM: 56% had professional experiences with patients using dietary supplements. Their responses to queries regarding dietary supplements were to consult with the patient’s doctor (88%), give advice with limited knowledge (33%), not give advice (5%) and give advice after consulting a reference (3%)</p>

Author and year	Country	Population size (Response rate)	Profession	Knowledge	Attitudes	Practices
Lee, R. T. et al, 2014 ^[23]	United States	392 (42%)	Oncologists	<p>Tested knowledge: Interactions of herbal medicines with conventional therapies – 32% answered at least 3 out of 4 questions correctly</p> <p>Knowledge sources: Education sources - Informal discussions (76%), lectures (70%), conferences (38%) and courses (13%)</p> <p>Information for addressing queries - MEDLINE (41%), online sources (37%), colleagues (4%) and textbooks (3%)</p>	<p>Concerns with CAM: 93% concerned about the interactions between herbal supplements and conventional therapy</p> <p>Place of CAM in therapy: 54% believed discussions of CAM neither strengthened nor weakened their dynamic with their patient. 40% believed discussions strengthened their relationship with their patients. 3% believed discussions weakened their relationship</p>	<p>Advising patients on CAM: 80% would discourage CAM use in a potentially curable patient. 37% would discourage use in an incurable patient</p> <p>Asking about CAM: 41% spoke with their patients about CAM. 26% of these conversations were initiated by the oncologist</p> <p>Combining CAM and conventional therapy: 93% of oncologists would be at least somewhat likely to provide conventional treatment to patients insisting on using unfamiliar herbs. 86% have provided chemotherapy to a patient that was also taking herbal therapies in the last year. On average, respondents would have provided therapy to 19 of these patients in the last year</p>
Lee, R. T. et al, 2008 ^[107]	United States, China and Taiwan	95 (38%)	Oncologists	<p>Self-assessed knowledge: 78% felt they were not prepared for CAM integration during medical training</p> <p>Knowledge sources: Most frequent sources of CAM education were journals, the internet and patients (no numbers reported)</p>	<p>Concerns with CAM: > 90% were concerned about interactions, patient safety and the lack of scientific knowledge regarding CAM use and 59% concerned about reasons for taking CAM. 75% agreed that biological supplements were the most concerning CAM therapy in cancer care. 18% said that biological supplements should never be combined with conventional therapy</p> <p>Interest in CAM: 71% wanted to learn more about CAM, 31% wanted to use more CAM. 95% would increase CAM use if randomized control trials showed improvement in quality of life for patients</p>	<p>Advising patients on CAM: 76% would recommend CAM to less than 10% of their patients. Oncologists that would recommend CAM did so to improve quality of life and relieve symptoms</p> <p>Asking about CAM: 43% ask about CAM in more than a quarter of their patients. 27% ask more than half of their patients</p> <p>Combining CAM and conventional therapy: 63% would be comfortable with CAM use in patients with potentially curable cancer. 95% would be comfortable with CAM use by patients with incurable cancer</p> <p>Estimation of patient CAM use: 48% estimated that more than 25% of their patients were using CAM</p>
Rojas-Cooley, M. T. et al, 2009 ^[106]	United States	850 (24%)	Nurses	<p>Tested knowledge: Identifying CAM modalities – Average score was 70%</p>	<p>Place of CAM in therapy: Average score from Likert scales regarding agreement to survey statements – How important is CAM education to oncology nurses? (7.66/10) It is the patient’s right to integrate CAM into conventional treatment? (7.44/10), How accountable are patients for disclosing CAM? (6.6/10) How accountable are nurses for disclosing CAM? (5.6/10) Should CAM have a role in nursing practice? (5.47/10) How comfortable are you with assessing CAM use (3.95/10) How easily can you find reputable CAM resources for your patients (3.31/10) How comfortable are you with answering CAM queries? (3.13/10) How familiar are you with the Oncology Nursing Society’s CAM position statement? (1.28/10) How familiar are you with the board of registered nursing’s CAM advisory statement? (0.63/10)</p>	<p>Asking about CAM: In response to the statement “Do you assess your patient’s CAM use on a daily basis?”, the average score was low (3.10/10)</p>

Author and year	Country	Population size (Response rate)	Profession	Knowledge	Attitudes	Practices
Stub, T. et al, 2018 ^[112]	Norway	211 (40%)	GPs, oncologists and nurses	Self-assessed knowledge: Assessing for good knowledge of individual therapies – Doctors ranged from 1% for reflexology and Chinese herbal medicine to 29% for mindfulness. Nurses ranged from 0% for herbal medicines (other than Chinese herbal medicine) to 33% for mindfulness	Concerns with CAM: Side effects (doctors 94%, nurses 93%), Using CAM will delay conventional treatment (doctors 78%, nurses 71.4%), risky to combine CAM and conventional treatment (doctors 78%, nurses 93%), interactions (doctors 77%, nurses 85%). Belief that more testing on CAM is need before adopting (doctors 89%, nurses 89%). Most important evidence about CAM in treatment (Doctors- 40% said efficacy is most important, 38% said safety, 18% said both. Nurses – 60% said safety was most important, 40% said efficacy)	Advising patients on CAM use: When asked about CAM, 61% of doctors and 55% of nurses would neither encourage nor discourage use. 30% of doctors and 51% of nurses had at least one patient who was using CAM decide to delay or decline conventional treatment. When presented with a patient using CAM and refusing or delaying conventional anti-cancer therapy: 64% of doctors and 61% of nurses would inform the patient of the risks of not having conventional therapy, 40% of doctors and 51% of nurses would respect the patient's choice, 46% of doctors and 19% of nurses would try to convince the patient to use conventional treatment, 24% doctors and 35% of nurses would encourage the patient to get a second opinion, 5% of doctors and 3% of nurses would ask family members to intervene Combining CAM and conventional therapy: 24% of doctors and 49% of nurses have treated patients for whom CAM has been effective, 38% of doctors and 52% of nurses have treated patients in whom CAM has been harmful. Regarding approval of combining CAM and conventional therapy: 63% of doctors and 60% of nurses would approve sometimes. 20% of doctors and 17% of nurses would approve often
Yang, G. et al, 2017 ^[105]	China	6007 (53.3%)	Oncologists	Self-assessed knowledge: ~ 80% of respondents did not feel they had adequate knowledge to answer patients' questions about CAM	Concerns with CAM: 33% did not wish to initiate discussions about CAM with their patients. Reasons given were lack of knowledge regarding CAM (76%), time constraints (10%), not believing in CAM (6%) and having no interest in CAM (5%). 17% of respondents were also concerned about interactions between CAM and conventional therapy Interest in CAM: 76% used CAM personally Place of CAM in therapy: CAM is beneficial for symptoms such as pain and fatigue (45%), decreases side-effects of therapy, such as myelosuppression and digestive tract reactions (44%)	Advising patients on CAM use: Recommend CAM to an average of 30% of their patients. Reasons for recommending CAM: improving immunity (84%), improving quality of life (66%), managing symptoms (54%), increasing the effect of conventional treatment (46%), cure their disease (24%). When asked about CAM: 56% would neither encourage nor discourage use, 38% would encourage use, 3% would advise to stop. When patient discloses CAM use: 63% neither encourage nor discourage, 36% would encourage continuation of CAM, 1% would advise to stop Asking about CAM: Oncologists discussed CAM with an average of 37% of their patients. 68% wished to initiate conversations about CAM with their patients. Oncologists were more likely to wish to initiate discussion were female, older than 33 years of age, had obtained a medical license for Traditional Chinese Medicine, had adequate self-reported knowledge of CAM or had professional CAM education. Estimation of patient CAM use: Oncologists believed an average of 40% of their patients were using CAM. Oncologists estimate that an average of 29% of their patients were combining CAM and conventional treatment

3.3.3.2 – Knowledge

The knowledge results of each of the included studies were coded into means of knowledge assessment and CAM information sources. The means of assessing CAM knowledge varied amongst the included studies. Seven of the studies asked the responding health professionals to self-assess their knowledge relating to CAM ^[105, 107-112], while the other three studies tested the CAM knowledge of the participants ^[23, 104, 106].

3.3.3.2.1 – Self-Assessed Knowledge

Self-assessed knowledge of CAM was generally poor. For doctors, out of the four studies that asked respondents to assess their knowledge of CAM or preparedness to integrate CAM into their practice, an average of 76% responded negatively; ranging from 73% ^[109] to 80% ^[108]. From studies that exclusively recruited nurses, it was also found that more than half of respondents assessed their knowledge as inadequate (58% ^[111] to 90% ^[110]).

The study from Stub and colleagues asked doctors and nurses to assess their knowledge regarding 13 specific CAM therapies. Responses showed the therapy of which doctors and nurses were most confident was mindfulness, with a third of respondents feeling their knowledge of the therapy was adequate; while for herbal medicines or Chinese herbal medicines, almost none of the conventional health professionals felt confident in their knowledge ^[112].

3.3.3.2.2 – Tested Knowledge

Each of the included studies that tested the respondents' knowledge of CAM focused on different areas of CAM in cancer care, preventing true comparison between the tested knowledge of different professions. The survey carried out by Lee and colleagues amongst American oncologists contained four questions regarding common interactions between conventional cancer care and herbal therapies, with only 32% of respondents answering at least three out of four questions correctly ^[23].

Rojas-Cooley and colleagues tested the knowledge of American oncology nurses by giving respondents 19 questions asking them to identify CAM terminology and specific CAM therapies. The mean score of the surveyed nurses was 70% ^[106].

The third study to test knowledge of CAM surveyed community and hospital pharmacists. The survey asked 16 questions regarding interactions and appropriate dosing of biological-based CAM. The median score was 63% ^[104].

3.3.3.2.3 – Information Sources

Some variation was observed between the most popular information sources used by specific professions. The two surveys that assessed the knowledge sources used by oncologists showed a preference for journals, lectures and online resources to reference CAM information [23, 107].

Meanwhile, nurses identified journals, media and friends and family as common popular sources of information in two studies [110, 111]. Pharmacists mentioned professional associations, university and CAM manufacturers as common sources of CAM education [104].

3.3.3.3 – Attitudes

To allow comparison of attitudes within studies and between professions, responses detailed in the included articles were translated into the three themes; namely interest in CAM, concerns with CAM and CAM's place in therapy.

3.3.3.3.1 – Interest in CAM

This theme focused on the responses regarding interest of using CAM in oncology practice and interest in CAM education. Most of the surveys of doctors showed low levels of interest in implementation of CAM practices with their current knowledge base; showing an average of 34% of doctors interested in CAM use [107-109]. However, an average of 76% of doctors were interested in learning more about CAM [107, 108]. The report published by Kamizato and colleagues was the only article included in this review that addressed the interest of CAM by nurses; showing that more than three-quarters of surveyed nurses were interested in using CAM in their professional practice [111].

3.3.3.3.2 – Concerns with CAM Use

From the included surveys that addressed doctors' concerns regarding CAM in cancer, issues related to safety were the most prominent. The main identified concerns about using CAM in cancer care were the interactions between the therapies [23, 107, 109, 112], side effects of CAM [107, 109, 112] and the lack of evidence for CAM [105, 107-109, 112]. It should also be noted that the Norwegian survey by Stub and colleagues showed that doctors were divided as to whether safety or efficacy was the most important factor regarding evidence for CAM [112].

The surveys exclusively recruiting nurses that showed perceived barriers to CAM use in a clinical setting were mainly focused on lack of knowledge and training in the use of these therapies ^[110, 111]. Alternatively, the survey by Stub and colleagues showed that Norwegian nurses were mostly concerned with adverse effects of CAM, interactions with conventional therapy and the fact that adopting CAM may delay conventional treatment ^[112]. They also showed that most nurses felt that evidence of safety of CAM was more important than efficacy ^[112].

Harnett and colleagues' survey of Australian pharmacists asked about barriers to communication with cancer patients regarding biological-based CAM. Similar to responses from doctors and nurses, the main barrier was inadequate training and education about CAM, as well as lack of access to reliable information resources. Correspondingly, half of respondents also agreed that there is insufficient evidence for the safety of CAM use during conventional anti-cancer therapy ^[104].

3.3.3.3 – Place of CAM in Therapy

The theme of the place of CAM in therapy arose from two areas of questioning. These were health professionals' feelings on current or appropriate use of CAM in cancer care and what the health professionals believed was their role in terms of communication and delivery of CAM.

Doctors' attitudes placed CAM in cancer care as a complement to conventional cancer therapy, but these views were only shared by about half of respondents ^[105, 109]. Alternatively, nurses showed generally positive attitudes toward CAM being effective for cancer treatment and symptom management ^[110], although it was unclear as to whether this was related to CAM's role to treat cancer or as a complimentary therapy to treat side effects of conventional treatment. Nurses also showed general support of cancer patients' rights to combine CAM and conventional anti-cancer therapy ^[106]. Pharmacists were mostly neutral regarding biologically-based CAM reducing side-effects during cancer treatment and improving quality of life for cancer patients ^[104].

In terms of the role of CAM in the doctors' practice, Lee and colleagues showed most oncologists felt that discussions of CAM neither strengthened nor weakened the dynamic with their patient ^[23]. The perspective of oncology nurses differed, with a majority feeling that discussions of CAM increased patient confidence and that they had a responsibility to ask about CAM and respond to queries from patients ^[110]. However nurses also showed generally low levels of support for both the inclusion of CAM into their practice and their responsibility for including CAM in cancer care ^[106, 110]. The responses of pharmacists reflected on their professional role, generally feeling that it was the responsibility of all members of the profession to be a knowledgeable source of information on CAM, to play an active role in inquiring about CAM use and being competent to address queries from patients ^[104].

3.3.3.4 – Practice

To allow comparison of practice patterns, the responses from the included studies have been translated into four themes; namely asking patients about CAM use, advising patients on CAM use, combining CAM and conventional therapy and estimation of CAM use by patients.

3.3.3.4.1 – Asking Patients about CAM

While variation in survey design made direct comparison of results difficult, most of the studies of doctors suggested that asking their patients about CAM use was not common [23, 105, 107, 109]. The only study that disagreed with this was the survey of Jordanian doctors, which showed less than 15% of respondents never asked their patients about CAM [108]. Similarly, an American study of oncology nurses showed that most did not regularly assess CAM use [106].

3.3.3.4.2 – Advising Patients on CAM Use

Similar to the previous theme, variation in survey design made direct comparison of study results difficult for this theme. However, responses from most surveys showed doctors being more inclined to discourage CAM usage [23, 107-109]. The only study that differed was that of Chinese oncologists conducted by Yang and colleagues. While on average respondents would recommend CAM to around one third of their patients, most would remain neutral about their patients' CAM use [105].

The Norwegian survey also found most doctors and nurses would remain neutral when asked about CAM use. If the patient delayed their treatment, about half of doctors and nurses would respect the patient's choice, but most doctors and nurses would warn patients of the risks of delaying treatment. Interestingly half of doctors would also try to convince the patient to reconsider, while less than 20% of nurses would do the same [112].

From the surveys of nurses alone, over half of Japanese nurses had encounters with cancer patients using dietary supplements [111]. Additionally, around one quarter of Turkish nurses recommended CAM to cancer patients and less than 20% directly used CAM in their patient care [110].

The perspective of pharmacists regarding advising patients showed that less than a quarter of pharmacists had daily inquiries about biological-based CAM from cancer patients. Additionally, most pharmacists stated that they did not give advice on CAM to cancer patients due to concerns about efficacy and safety [104].

3.3.3.4.3 – Combining CAM and Conventional Therapy

This theme encompassed health professionals' practices regarding provision of conventional treatment to patients who openly chose to use CAM. Despite doctors being generally unwilling to recommend CAM, the surveys found a favorable response toward supporting patients taking these therapies [23, 107, 109, 112]; ranging from 63% [107] to 93% [23]. Interestingly, doctors also showed that they would be more likely to support the combination of CAM and conventional therapy in patients who had a diagnosis of incurable cancer [23, 107, 109]. Meanwhile, Stub and colleagues showed that a majority of nurses would support patients choosing to combine CAM and conventional therapy [112].

3.3.3.4.4 – Estimation of Patient CAM Use

Doctors were the only group of health professionals in the included studies that were questioned about the estimation of CAM use; showing a general consensus that most of their patients were not using CAM [105, 107-109]. While the questions addressing this theme varied between studies, estimation of CAM use ranged between 25% [107] and 40% [105] of patients.

3.4 – Discussion

The analysis of the included reviews provides an interesting insight into the different approaches each profession takes regarding CAM in cancer care. The findings are novel as, to our knowledge, the only review of health professionals' knowledge, attitudes and practices regarding CAM in cancer care specifically was a review of oncology nurses published in 2016 [101].

While comparison of tested knowledge was difficult due to variation of survey design, all three professions seemed to show a generally inadequate knowledge of CAM. This is further supported by all professions generally feeling that a lack of knowledge and reputable evidence for CAM was the major barrier to the use of CAM in cancer care. This is in line with the findings from multiple reviews of attitudes regarding CAM, including those of nurses [113, 114], pharmacists [115], various health care professionals [116] and maternity care professionals [117]. The concern accessing reputable information indicates a need for increased education on CAM, a desire shown by all three professions from the included studies. Accessible education programs were also mentioned in the review of nurses and general CAM use by Chang and Chang; suggesting that increasing the knowledge of nurses would empower them and increase confidence around CAM use [113]. Moreover, the review of nurses' attitudes toward CAM by Hall and colleagues suggested that the adoption of CAM would be

assisted by not only educating staff, but implementing workplace policies to support the use of these therapies ^[114].

Doctors generally showed a low level of desire to implement CAM into cancer care, citing interactions with conventional therapy, side effects and lack of quality information as major concerns regarding use of CAM. While the interest in implementation of CAM was shown to be more positive in a review of health professionals' attitudes regarding general CAM use ^[116], the main barriers mentioned in the current review were shared, suggesting this concern extends beyond cancer care. Half of doctors felt that CAM has a place in cancer care as a complement to conventional therapy, an attitude which may be reflected in doctors being more inclined to discourage or remain neutral about a patient's CAM use. Most doctors stated they would continue to treat a patient who insists on using CAM but would be more inclined to try to convince a patient to reconsider delaying conventional treatment while using CAM. Doctors are also likely to underestimate the prevalence of CAM use by their patients, based on the findings of a recent review that around 50% of patients with cancer are using some form of CAM ^[98]. This underestimation may give some insight to the variation in doctors' likelihood of asking patients about CAM use. Overall there seems to be a tendency to disregard or dismiss CAM due to lack of evidence for their safety and efficacy.

Nurses showed a generally positive attitude towards CAM overall, which is in line with the previous findings of oncology nurses ^[101], as well as nurses perspectives on general CAM use ^[118]. However, the included studies also identified issues with the safety of CAM therapy and the fear that CAM use may delay patients seeking conventional treatment as major concerns. Most nurses felt that the place of CAM in cancer care was as a complement to conventional therapy, a view that is echoed in other reviews looking at attitudes toward CAM ^[101, 113]. Interestingly, the included studies also showed a mixed feeling toward nurses having professional responsibility for monitoring and assessing CAM use. This seemed to be re-enforced by nurses also rarely asking about CAM use in cancer patients. Nurses were more inclined to remain neutral about patients' use of CAM but would generally be supportive of treating a patient who insisted on using CAM. This contrasts the findings from previous reviews of nurses practices regarding general CAM use ^[114] and use in obstetrics ^[117], which show that they are generally supportive.

Pharmacists' main concern regarding CAM in cancer care was insufficient evidence of safety when combining with conventional therapy, which was reflected by pharmacists being generally neutral regarding the benefits of CAM. Despite this, they believed that it was part of their professional responsibility to be knowledgeable about the interactions between CAM and conventional anti-cancer therapy and be able to answer queries from cancer patients.

There are a few limitations within the individual studies that should be observed when considering the findings detailed above. It is worth noting that only one of the included studies focused on

pharmacists^[104]. This narrows the scope of what can be extrapolated from the knowledge, attitudes and practices of pharmacists globally, and should be seen in this review as more of a point of comparison to other professions. Future research focusing on the pharmacy profession would greatly assist in providing a clearer picture for this profession regarding CAM in cancer care.

There is a large variation in population sizes and response rates between the included studies. The issue of response rates has been an subject of debate in terms of acceptability and whether lower rates are representative of the population under investigation^[119]. All of the included studies have used some form of statistical analysis partially to overcome this limitation. However only two of the studies (Lee and colleagues' 2014 survey of oncologists^[23] and Rojas-Cooley and colleagues' 2009 survey of oncology nurses^[106]) took a randomized sample of their population to reduce the inherent bias of convenience sampling.

There was also noticeable variation in definitions of CAM between some of the included studies. This heterogeneity in CAM definitions has also been observed in other reviews of knowledge, attitudes and practices of nurses^[101, 113] and amongst various health care professionals^[116]. Specifically, in the review of oncology nurses, it was stated that that the definition of CAM used in some studies had an effect on the reported attitudes of nurses toward these therapies^[101]. It would be recommended that a standard definition of CAM be used in future studies to reduce this potential bias. Alternatively, disclosure of the exact therapies being considered when surveying health professionals may assist in interpreting results.

Another issue observed across all the included studies is the assessment of professionals' knowledge of CAM. While generally the knowledge of all three groups of health professionals was determined to be inadequate, most of the studies asked participants to self-assess their knowledge of CAM. Negative self-assessment of knowledge has been shown in previous reviews of nurses regarding general CAM use^[101, 113]. However, it could be argued that self-assessment is not an ideal measure of knowledge. This was identified in a 2004 review by Leach, which suggested that this method of knowledge assessment is subjective and may negatively impact the validity results in surveys^[118]. Testing of CAM knowledge, while theoretically a more reproducible means of assessment, is relatively uncommon in literature. In this review, comparison of findings between professions was hindered by there being no standardization of the definition of CAM or the method of knowledge assessment in the studies^[23, 104, 106], which highlights potential problems with testing CAM knowledge. Along with the aforementioned agreed definition of CAM, it would be advisable to develop standardized tools to assess CAM knowledge so as to be able to more accurately determine knowledge gaps in professional practice and inform teaching needs for health professionals.

Within the review itself there are some limitations that should be considered. The exclusion of any articles not in English may have resulted in studies that were written in other languages being missed.

There was also large variation in how the knowledge, attitudes and practices were assessed in individual surveys, which was partially overcome by using thematic synthesis.

3.5 – Conclusion

This is the first review which has aimed to investigate the knowledge, attitudes and practices of health professionals regarding CAM use in cancer patients and to compare findings between the professions. While some differences exist between the attitudes and practices of doctors, nurses and pharmacists, there are many similarities in core values regarding CAM use in cancer patients. There is a pattern of professional behavior being governed by poor understanding and health literacy regarding CAM. It has been previously mentioned that further trials of CAM to provide evidence of the safety and efficacy of these therapies are important. However, there is also a strong argument for health professionals to become better informed of the prevalence of use of these therapies in this population and the implications of their use, especially regarding interactions with conventional anti-cancer therapy. Easier access to this information would assist greatly in terms of giving health professionals the tools to address CAM use with cancer patients and normalize discussion surrounding these therapies. This would also increase patients' willingness to disclose CAM use and lead to more integrated therapeutic decision-making in the cancer care setting, optimizing outcomes for patients.

Chapter 4 – Perspectives of Complementary and Alternative Medicine Use by Cancer Patients in a Regional Hospital in North Queensland, Australia

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Authorship Statement

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Abstract

Objectives: This study aimed to investigate CAMs used, and reasons for and disclosure of this use by cancer patients in a regional hospital in North Queensland, Australia.

Methods: Patients attending the Day Oncology Unit of the Townsville University Hospital were invited to participate in a self-completed questionnaire or telephone interview regarding perspectives of their CAM use. Data were analysed using descriptive statistics and chi-squared and independent t-tests were performed to allow comparison between the responses by CAM users and non-users.

Results: 102 completed questionnaires were used in the analysis, where 40.2% of respondents were found to be using some form of CAM. Cannabis, magnesium, and massage were the most prominent therapies used, with cannabis use in cancer, not commonly reported in prior literature. The main reasons given for using CAM were to treat symptoms of cancer, side-effects of treatment or to improve general health. Two-thirds of these respondents disclosed their CAM use to health professionals mostly to obtain a professional opinion or due to concerns of interactions with cancer treatment. CAM users were statistically more likely to have used CAM prior to their cancer diagnosis and have lower emotional wellbeing than non-users. Non-CAM users indicated that a lack of knowledge of CAM or concerns regarding interactions with cancer treatment were the most popular reasons for not adopting these therapies.

Conclusion: While lower than the averages of previously published CAM use, our study highlights that there is still a significant group of cancer patients in the North Queensland region using CAMs.

4.1 – Introduction

Complementary and Alternative Medicines (CAM) use by cancer patients is often contentious in oncology. Since the 1970s^[9] CAM use by cancer patients and their motivations for uptake of these therapies have been investigated^[9, 10, 98, 120, 121], with use shown to be more prevalent than in the general population^[24]. In the last decade, an average of 51% of cancer patients globally have admitted to using some form of CAM^[98].

CAMs are therapies that are outside of “conventional” or “Westernised” medicine used alongside conventional treatments (complementary), or used in place of it (alternative)^[6]. The National Centre for Complementary and Integrative Health (NCCIH) has classified CAM into three categories: Natural therapies, such as herbs, vitamins or supplements; Mind and Body therapies, such as meditation, acupuncture and massage; and “Other” therapies, consisting of traditional therapies and those that do not fit the other categories, such as Ayurveda, Traditional Chinese medicine and homeopathy^[6].

By their nature, CAMs can be patient-initiated and not always disclosed by patients to their treating health professionals. A systematic review reported an average of 40-50% of cancer patients did not disclose their CAM use to their doctor. Common reasons for this non-disclosure were believing that their doctor was not interested, fearing their doctor’s disapproval or their doctor not asking about their CAM^[18]. This is of concern as these therapies may pose safety risks when combined with conventional anti-cancer treatments. St. John’s Wort for example, a potent inducer of the cytochrome 450 enzyme family in the liver, can decrease the therapeutic effect when taken concurrently with several common chemotherapeutic agents such as taxanes or anthracyclines due to increased metabolism^[7, 16].

Together these issues highlight the need to understand the prevalence of CAM use in cancer patients as well the factors that may motivate their use. From an Australian perspective, the assessment of CAM use in cancer patients has focussed almost exclusively on radiation oncology patients^[56, 62, 122] or those patients in rural and remote setting^[87, 91]. Therefore, to address this gap in recent literature, this study looks to investigate the perspectives of cancer patients receiving treatment at a regional Australian public hospital regarding their CAM use.

4.2 – Materials and Methods

4.2.1 – Ethics Statement

The study was approved by the Human Research Ethics Committees of James Cook University (Reference Number H7768) and the Townsville Hospital Health Service (THHS) (Reference Number HREC/2019/QTHS/47181), as well as the Research Governing Office of the THHS (Reference Number SSA/2019/QTHS/47181).

4.2.2 – Setting

The Townsville University Hospital (TUH) is the largest tertiary hospital in the North Queensland region of Australia, with a clinical catchment population of over 695,000 people ^[123]. The population for this study were receiving treatment at the Day Oncology Unit at the TUH. The eligibility criteria for recruitment were those people over the age of 18 with a diagnosis of cancer, currently undergoing cancer treatment. Exclusion criteria were people who could not communicate in English or were not of sound cognition in any manner that would prevent giving informed consent to participate.

4.2.3 – Questionnaire Design and Procedure

The data collection tool was developed to be used as a self-completed questionnaire or administered as a structured telephone interview. Questions design was aligned with the CAM Healthcare model, developed by Fouladbakhsh and Stommel ^[19], based on the Behavioural Model for Health Service Use ^[20]. The CAM Healthcare model suggests that an individual's use of CAM is largely guided by three groups of determinants: Predisposing Factors, Enabling Factors and Need for Care Factors. Predisposing factors generally detail an individual's likelihood to use CAM, including demographic characteristics like gender, race, age, and marital status, and attitudes toward healthcare. Enabling factors involve the individual's ability to access CAMs, including determinants like income, employment, and access to health services. Need for Care Factors focus of the individual's health experience and their perceived need for CAM ^[19]. Each of these groups contain "Push" and "Pull" factors that may impact an individual's choice to use CAMs.

Recruitment was conducted at the Day Oncology Unit waiting area where patients checking in for treatment were informed of the research by administrative officers and, if interested in participating, to approach the primary researcher. They were then provided with study information and asked

whether they wished to participate via questionnaire or telephone interview. The questionnaire was completed while the patient was waiting for treatment. For the telephone interviews, the patient was asked to sign a consent form and arrange a time to conduct the interview.

Recruitment was initially carried out between March 2019 and March 2020. In response to the general health and safety concerns of the COVID-19 pandemic, recruitment was stopped from March to September 2020. The second phase of recruitment was then carried out between October and December 2020.

Prior to being asked questions, respondents were given the NCCIH definition of CAM and examples of each category. Respondents were then asked whether they were using any CAMs, their reasons for this use and whether they disclosed this to their health professionals, while non-CAM users were asked why they had not chosen to use these therapies. All respondents were asked for demographic information, details regarding their diagnosis and treatment and if they had previously used CAM. The final part of the question schedule was a quality-of-life survey, the FACT-G questionnaire, developed by the FACIT group ^[22]. This is a questionnaire from the FACIT groups that has been previously assessed for high reliability and validity ^[22], which asks for responses to statements regarding the respondent's physical, social, emotional, and functional wellbeing. Likert-scale responses to these statements give a score for each of these wellbeing categories, as well as an overall quality-of-life score. This questionnaire was included in our schedule to assess whether the use of CAMs influenced respondents' quality-of-life.

Responses to the question schedule were entered into a Microsoft Excel document to allow tabulation of results and importing into SPSS for statistical analysis. To determine the statistical significance of the findings from the questionnaire, chi-squared tests and independent t-tests were performed comparing the responses given by CAM users and non-users to determine any predictors of CAM use.

4.3 – Results:

A total of 104 people consented to participate in the study (13 telephone interviews, 91 questionnaires). Data from 2 respondents were excluded from the analysis due to not meeting the inclusion criteria. This produced a final cohort of 102 respondents, which based on the 888 people treated annually in the Townsville Hospital oncology day unit according to the TUH data collection service, would allow findings to be stated at a 95% confidence level with a confidence interval of 9.13.

Table 7 shows demographic data and responses to some general questions given by respondents. While slightly more women participated in the project, this was not statistically significant.

Respondents were more likely to be married, be high school educated and born in Australia. Table 8 shows the cancer diagnoses stated by each respondent as well as treatments they had received. The three most common cancer diagnoses were breast (16.7%), lung (14.7%) and prostate cancer (8.8%), with most respondents (89.2%) having received chemotherapy during their cancer journey.

Table 7 – Demographics and Questionnaire Responses of CAM users and Non-Users

Demographics	CAM Users (41)	Non-CAM Users (61)	Significance (Chi-Squared Test)
Gender		(1 response missing)	
Male	18 (43.9%)	30 (50%)	0.594
Female	23 (55.1%)	30 (50%)	
Highest Level of Education			
Postgraduate Qualification	5 (12.2%)	3 (4.9%)	0.219
Bachelor's degree	3 (7.3%)	6 (9.8%)	
Trade Certificate	12 (29.3%)	10 (16.4%)	
Year 12 or equivalent	12 (29.3%)	17 (27.9%)	
Year 10 or below	9 (22%)	23 (37.7%)	
PREFER NOT TO SAY	0	2 (3.3%)	
Marital Status			
Married	17 (42.5%)	25 (41%)	0.924
De-facto	4 (10%)	5 (8.2%)	
Separated	5 (12.5%)	7 (11.5%)	
Divorced	6 (15%)	9 (14.8%)	
Widowed	2 (5%)	6 (9.8%)	
Never married	4 (10%)	8 (13.1%)	
PREFER NOT TO SAY	2 (5%)	1 (1.6%)	
Religion	(1 response missing)		
Christian	18 (45%)	19 (31.3%)	0.189
Muslim	0	1 (1.6%)	
No	19 (47.5%)	38 (62.3%)	
PREFER NOT TO SAY	3 (7.5%)	3 (4.9%)	
Currently Working	(2 responses missing)	(1 response missing)	
Yes	11 (27.5%)	10 (16.9%)	0.305
No	27 (67.5%)	46 (80%)	
PREFER NOT TO SAY	0	3 (5.1%)	
Country of Birth	(1 response missing)	(1 response missing)	
Australia	32 (80%)	47 (78.3%)	0.577
England	4 (10%)	2 (3.3%)	
OTHER*	4 (10%)	11 (18.3%)	
Previously Used CAM	(2 responses missing)	(3 responses missing)	
Yes	28 (68.3%)	5 (8.2%)	<0.001
No	11 (26.8%)	53 (86.9%)	
Interested in conversations regarding CAM	(3 responses missing)	(6 responses missing)	
Yes	23 (56.1%)	34 (55.7%)	0.901
No	15 (36.6%)	21 (34.4%)	

*Other responses included Malaysia, New Zealand, Ireland, Papua New Guinea, Scotland, Singapore, Sri Lanka, and the United Kingdom

Table 8 – Details about respondents' cancer diagnoses and treatment

CANCER DIAGNOSES		
	Frequency	Percentage
Breast	17	16.7%
Lung	15	14.7%
Prostate	9	8.8%
Oropharyngeal Cancer	7	6.9%
AML	6	5.9%
Bowel	6	5.9%
Lymphoma	6	5.9%
Metastatic Melanoma	5	4.9%
Rectal/Anal	5	4.9%
Myeloma	5	4.9%
<i>Multiple – unsure of primary site</i>	4	3.9%
Do not wish to say/responses missing	3	2.9%
Pancreatic	3	2.9%
TREATMENTS RECEIVED (multiple responses permitted)		
	Frequency	Percentage
Chemotherapy	91	89.2%
Radiotherapy	41	40%
Surgery	31	30.3%
Hormone Therapy	17	16.7%
Other	20	19.6%

CAM users were found to be more likely to have used CAM prior to their diagnosis, which was found to be statistically significant ($p < 0.001$) and the only significant demographic trend regarding CAM use.

40.2% of respondents indicated they were using CAMs. Table 9 shows CAM modalities used by more than 2 respondents; however, 56 different CAM modalities were mentioned in completed questionnaires. The most used therapies were cannabis (26.8%), magnesium (24.4%) and massage (19.5%); with the average CAM user utilising at least 2 CAM modalities. The most common sources of recommendation for CAM were friends and family (21%) or personal motivation (19%), while most of the information on CAMs were sourced from the internet (20%). 32% of CAMs were sourced from a pharmacy, while 27% were purchased from online distributors (data not shown).

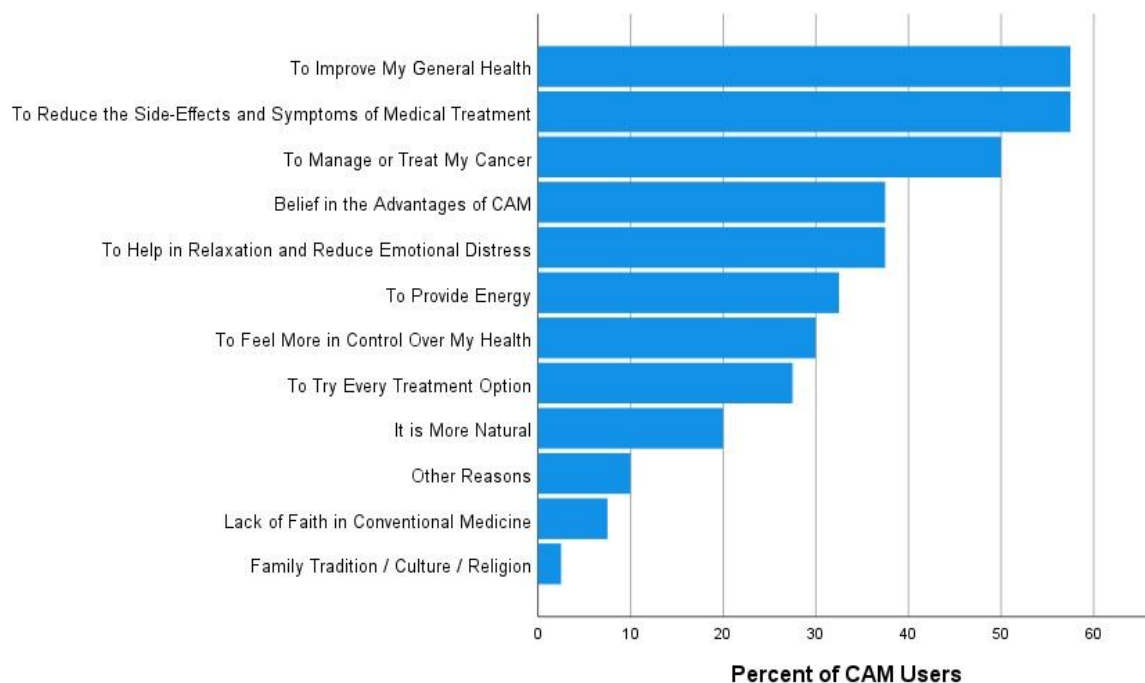
Table 9 – Types of CAM used by respondents

CAM used	Number of users (%)
Cannabis (CBD, Cannabis, THC, Hemp)	11 (26.8%)
Magnesium	10 (24.4%)
Massage	8 (19.5%)
Vitamin C *	5 (12.2%)
Vitamin D *	5 (12.2%)
Yoga	4 (9.8%)
Turmeric *	4 (9.8%)
Meditation/Mindfulness	3 (7.3%)
Calcium *	3 (7.3%)
Zinc *	3 (7.3%)

* Includes combination products

The motivation for CAM use is presented in Figure 5. Over half of CAM users stated that they used CAM to reduce their symptoms or the side effects of their medical treatment (58%), or to improve their general health (58%), while 50% stated that they used CAM to treat their cancer.

Figure 5 – Reasons for CAM use (multiple responses allowed)

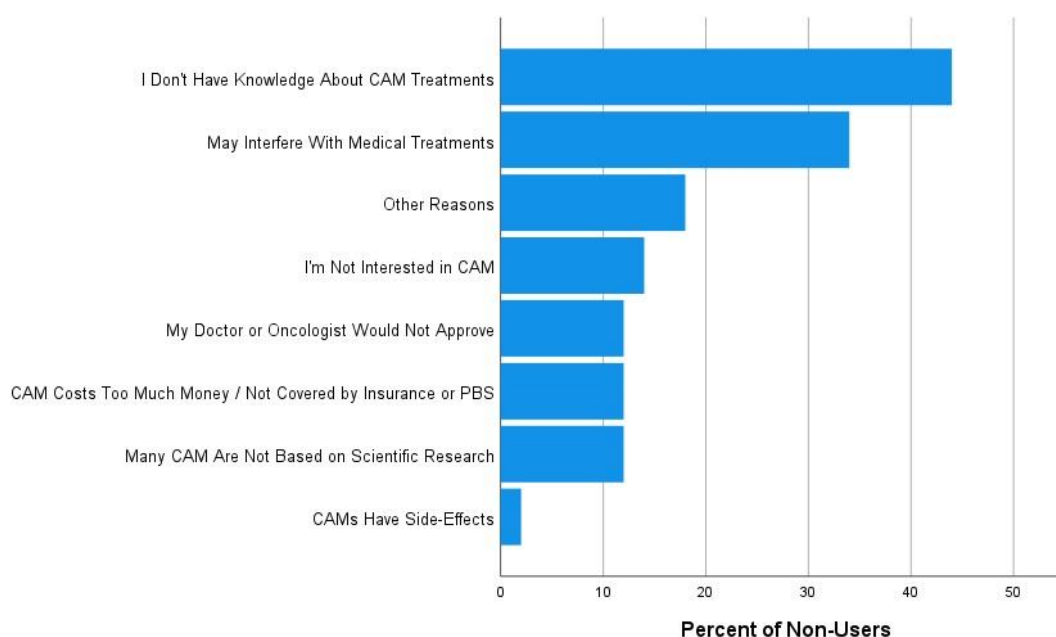


Regarding discussions with health professionals, 34% of CAM users had been asked about CAM, with 57% of them being asked by their oncologist. Meanwhile, 68% had disclosed their CAM use to a health professional. Most users disclosed their CAM use for a professional opinion (67%) or due to

concern about potential interactions with their cancer therapy (44%). Out of the 11 people who gave reason as to why they did not disclose their CAM use to health professionals, 46% indicated it was because they were never asked (data not shown).

61 respondents (59.8%) indicated that they were not using CAM. Figure 6 displays the reasons given by 50 respondents who indicated why they chose not to use CAM. The two main reasons respondents gave were that they did not have knowledge of CAM (44%) and that they were concerned CAM may interact with their cancer treatment (34%).

Figure 6 – Reasons against CAM use (multiple responses allowed)



The average quality-of-life scores for CAM users and non-users are detailed in Table 10. All scores were comparable except for emotional wellbeing. Respondents who were non-users of CAM showed a statistically significantly higher emotional wellbeing score when compared to CAM users ($p < 0.001$).

Table 10 – Quality of Life Score using FACT-G Questionnaire

	CAM Users (40) – 1 missing		Non-Users (58) – 3 missing		Significance (Independent t-test)
	Mean	Standard Deviation	Mean	Standard Deviation	
Physical wellbeing	17.9	6.8	19.4	6.4	.225
Social/Family wellbeing	20	5.8	20.4	6.6	.753
Emotional wellbeing	15.9	5.3	19.2	4.2	<0.001
Functional wellbeing	17.4	6.2	17.2	6.4	.907
Quality of life	70.1	18.27	76.2	16.3	.141

4.4 – Discussion:

The CAM usage by 40.2% of respondents in our study is consistent with systematic reviews of literature from 1970's to 2020, with usage quoted to be between 31.4% and 52% [9, 10, 98, 120]. This is the first study to survey cancer patients from regional North Queensland, with other Australian studies reporting CAM use ranging from 37.4% [62] to 78.4% [56]; and an average CAM use of 52.2%. There may be several reasons for the lower CAM usage in this study: Firstly, most of the Australian studies surveyed patients in radiation oncology centres [56, 62, 65], while this study was carried out at a day oncology unit where most respondents had undergone chemotherapy. While this study did not show statistical difference in CAM use between cancer treatments, 'Healthcare treatment' is one of the 'Predisposing factors' that could influence CAM use outlined in the CAM healthcare model [19]. Secondly, the timeframe of CAM use was variable and could have contributed to the difference in usage rate. Our study was of patients currently using CAM, while the study by Wilkinson and colleagues asked about patient's CAM use in the last 12 months [91], which was 49%. Alternatively, Edwards and colleagues reported CAM use of 82.9% of respondents "during their cancer journey" [56].

This study focussed on the specific CAM therapies used by respondents, while the other Australian studies categorised CAMs into groups (such as 'vitamins', 'herbal therapies' and 'antioxidants'), making direct comparisons with this study difficult. All 5 studies [56, 62, 65, 87, 91] did, however find that vitamins and supplements were one of the most common CAM modalities used by their respondents. This is in line with our findings that magnesium, vitamin D and vitamin C were in the 5 most common individual therapies. Additionally, two of the studies [65, 91] also found that massage was the most common mind and body therapy, which the third most used CAM in this study.

One notable observation was that of cannabis as the most common CAM used by the respondents in this study. This has not been identified in prior literature focussing on CAM use in cancer patients. In fact, recent studies have only identified it as a minor CAM used by cancer patients if at all [16]. However, Drosdowsky and colleagues published an article in 2020 that looked at the medicinal and recreational use of cannabis by cancer patients at the Peter McCallum Cancer Centre in Melbourne, Australia. They found that 4% of cancer patients were using cannabis for medicinal purposes [124], which is lower than our findings. The research for the current study was carried out by an independent researcher who was not attached to any hospital treating teams. It is possible that given the anonymous nature of the survey and that they were assured their health professionals would not know the responses of specific patients, that respondents were more comfortable to be honest as to the nature of their cannabis use.

Despite recent legislation in Australia legalising cannabis for medicinal purposes in 2016, it is currently limited to treatment of chemotherapy induced nausea and vomiting, epilepsy, multiple

sclerosis, pain and palliative care ^[125]. The legislation also requires individual approval for patients ^[126], which can make obtaining of cannabis in Australia a complex process. While not included in the analysis of the results, the respondents of the survey mostly declined to say where they had obtained their cannabis products, with only one respondent indicating they had sourced from a pharmacy. Interestingly, recent literature from Canada, Denmark and the United States of America investigating the medicinal use of cannabis by cancer patients shows a range of use between 9.9%-29.1% of respondents ^[127-131]. The higher respondent use was found in studies carried out in areas where recreational cannabis use has been legalised, such as Washington (24%) ^[131] and Canada (18% ^[129] and 29.1% ^[128]). Moreover, the Canadian study by Hawley and colleagues looked at the use of cannabis before and after the legislation approving the sale for recreational use. They found a statistically significant increase in the disclosure of current cannabis use (23.1% vs 29.1%) ^[128]. These observations could suggest that some cancer patients will choose to use cannabis products, regardless of legal restrictions.

The use of cannabis as a complementary therapy with conventional cancer treatment could provide some complications in an oncology care setting. There are various anecdotal indications for cannabis for oncology patients, including treating chemotherapy-induced nausea and vomiting, depression, insomnia, anorexia, and cancer-related pain, as well as suggested anti-cancer properties ^[132-135]. However, much of the evidence for these indications is considered of low quality, with a recent review suggesting that sufficient evidence is only in support of add-on therapy for nausea and vomiting and refractory pain in a palliative setting ^[135]. Additionally, the various dosage forms of cannabis that can be obtained as well as the different cannabinoids that may be present in these products, increase the variability in this CAM and consequently the difficulty for an oncology health professional to advise when combined with conventional cancer treatment ^[135].

When considering recommendations and information on CAM therapies from the Australian literature^[91], CAM users were most likely to seek information through their own research or from friends and family, which concurred with the findings from our study. Given the extent of patients seeking recommendations for CAM use from outside the healthcare system, it does highlight that cancer patients may not be seeking advice from reputable health information sources. The CAM Healthcare model classes cultural practices and community lifestyle (confiding in friends and family), and self-efficacy (conducting one's own research) as 'Predisposing Factors' that would push a person to use CAM ^[19], supporting this statement.

At least half of the CAM users in this study said they used CAM to treat their cancer, manage side effects or improve their general health. A systematic review of the literature of CAM use by cancer patients in the last decade found, through thematic analysis, the main motivations to be to "Influence cancer", "Treat cancer complications", "Holistic treatment" and "General Health" ^[98]. Focusing on

the Australian studies of the last decade, patterns of use were similar regarding the three major motivations for CAM use identified in our study. The surveys of radiation oncology patients by Hunter et al ^[65] and Wilkinson et al ^[91] both found that the most prominent motivator for CAM use was to improve the individual's immune system, meanwhile a study published in 2012 by Gillet and colleagues, which surveyed outpatients in a radiation oncology clinic in Toowoomba, Queensland found that the major motivation for CAM users was to improve their Quality-of-Life ^[62]. This latter observation may explain CAM users scoring lower than non-users regarding their emotional wellbeing. If CAM users are seeking therapies to improve their quality-of-life, then it could be argued that this could be a motivator for using CAM. The CAM Healthcare model classes perceived health status as a 'Need for Care' Factor which would push someone toward the use of CAMs, supporting this observation ^[19].

Disclosure and discussion of CAM use by cancer patients with health professionals has been highly variable. Four of the Australian studies of cancer patients in the last decade have looked at disclosure of CAM to health professionals, ranging from 20.4% to 77% and with an average of 56.1% ^[62, 87, 91, 122]. Comparatively, this study found 68% of CAM users had disclosed their use. These disclosure rates suggests that patients are wanting to work with their treating team to achieve an optimal treatment outcome. Only one third of CAM users had been asked about these therapies by a health professional, implying some reluctance on the part of health professionals at the TUH to initiate discussion on CAM. This is concerning given the observation that around half of the respondents who gave reasons for not disclosing their CAM use stated it was because they were never asked, which is consistent with the findings by Davis and colleagues in 2012 ^[18]. Health professionals' lack of willingness to discuss CAMs with their patients could also explain why cancer patients are more likely to get recommendations on CAMs from friends and family or their own research.

The motivations of non-CAM users have been less explored in the literature. In this study the main reasons that non-users gave was that they did not have knowledge about CAM or that they were worried about interactions with their cancer treatment. The latter observation is interesting given that concern about interactions was also the main reason CAM users gave for discussing CAM with a health professional. This shows that the safety of CAM use with conventional treatment is an important concern of CAM users and non-users, confirming a role for oncology health professionals in providing information on the safety of CAMs in cancer care. Sullivan and colleagues found that 77% of non-users agreed that a major reason for not using CAM was that they had never thought about it ^[87], similar to the lack of knowledge by non-users in this study. This would also be supported by the CAM healthcare model which classes the availability of CAM literature and self-help information as 'Enabling' factors that would facilitate CAM usage ^[19].

As with all studies, there were limitations in our research. Respondents were recruited using convenience sampling, rather than randomisation of responses. This may have introduced some bias into the results. Recruitment was halted due to the COVID-19 pandemic, which reduced potential respondent numbers and resulted in the recruitment period taking place over longer than 12 months. We were also unable to enlist the assistance of interpreters, which limited respondents to those who understood English. Given that the survey respondents were recruited from a day oncology unit, all respondents were undergoing hospital-based treatment. This limited the observations of this study to people using CAMs as complementary therapies and prevented obtaining a perspective from people using CAM as alternative treatments. While this research was limited by research design and ethics, more detailed information on primary cancer sites and stages of cancer diagnoses could have allowed a closer analysis of cancer types in relation to CAM use.

4.5 – Conclusion:

This is the first study of CAM use by general cancer patients receiving treatment at a regional centre in North Queensland and thus shares their unique perspectives. While the usage of CAM was found to be lower than previously identified globally, medicinal cannabis was found to be the most used CAM, which is inconsistent with other studies on CAM use in cancer patients. CAM users were also found to have lower emotional wellbeing, potentially supporting our findings that CAM users are more likely to take advice and information on CAM from those close to them, rather than health professionals, who may be able to give an informed perspective when combining CAMs with conventional therapy. Concern amongst CAM users and non-users of the interactions with conventional therapy highlighted the importance of health professionals possessing good CAM knowledge. Continuing education on CAMs for oncology health professionals is therefore important to allow them to have informed conversations with their patients. This would, in turn, encourage patients to view their treating team as a source of information about these therapies and encourage disclosure of CAM use by cancer patients, resulting in safe and holistic treatment outcomes for this population group.

Chapter 5 – Knowledge, Attitudes and Practices of Australian Oncology Health Professionals on Complementary Medicines

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Authorship Statement

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Sabe Sabesan: Conceptualization, Supervision, Writing - Review & Editing.

Beverley Glass: Conceptualization, Methodology, Funding Acquisition, Supervision, Writing - Review & Editing

Abstract

Background: Approximately half of people with cancer are using Complementary and Alternative Medicines (CAM), presenting safety concerns due to potential interactions with conventional cancer treatment. Since oncology staff have a role to play in ensuring safe use of CAMs, this study aimed to assess the knowledge, attitudes, and practices of Australian doctors, nurses and pharmacists regarding CAM in oncology.

Method: Members of three national oncology professional associations took part in an online questionnaire, which determined their knowledge, attitudes, and practices regarding CAM.

Results: 99 completed surveys were obtained from 9 doctors, 70 nurses and 20 pharmacists. Most respondents (68.4%) felt that they did not have adequate knowledge of CAMs to respond to patients' questions. Assessment of attitudes found respondents generally believed that CAMs have a complementary role in oncology but indicated their concerns for safety of patients. Respondents indicated in practice they would discuss CAMs with less than half of patients (40.6%), with a lack of scientific data and guidelines for CAM use as significant barriers to these discussions.

Conclusion: Our study suggests that oncology health professionals' knowledge of CAMs potentially leads to lack of confidence in providing advice and a concern over patient safety. This impacts their discussion of CAMs and lack of disclosure from patients. Education on CAMs in oncology would assist in increasing professional's confidence in discussing these therapies, leading to increased patient disclosure of CAMs and safer treatment decision making for people with cancer.

5.1 – Introduction

Complementary and alternative medicine (CAM) use in people with cancer has been on the rise in the past few decades. Prior to the 1990s, these therapies were found to be used in 25% of people with cancer ^[10], while in the last decade CAM use has increased to an average of 51% of patients ^[98], with this use found to be more prominent in people with cancer than the general population ^[24].

Given this prominence, there are safety concerns for patients receiving conventional anti-cancer treatment. Biologically based CAMs can affect bleeding risk, such as antiplatelet activity found in garlic and turmeric ^[17], and may alter the pharmacokinetics of chemotherapy agents. In the latter case this could potentially lead to reduced therapeutic effect or increased side effects and toxicity ^[7, 31]. Additionally around half of people with cancer are not disclosing CAM use to their doctors, citing an assumed lack of interest, and knowledge or approval of these therapies ^[18].

This prominence necessitates an understanding of the current perspectives of oncology health professionals regarding CAMs. To date, two systematic reviews of the knowledge, attitudes and practices (KAP) of doctors, nurses and pharmacists ^[136] or nurses alone ^[101] regarding CAMs in oncology have been published. Generally, health professionals were found to have poor knowledge of CAMs. While nurses were found to be more positive and supportive toward their patients' CAM use ^[101, 136], oncologists and other doctors have been found to be more inclined to discourage CAM use, and pharmacists were more neutral; with both all 3 professions agreeing about concerns regarding the safety of combining CAMs with conventional treatment ^[136]. However, both reviews also stated that heterogeneity in design of KAP studies made direct comparison of the findings difficult ^[101, 136].

Additionally, prior individual studies in the last decade have either combined professions and assessed their KAPs as a group ^[137] or focussed on the KAPs of one particular profession ^[136, 138, 139]. The only study identified to assess and contrast the KAPs of different health professionals was by Stub *et al*, published in 2018, which compared KAPs of Norwegian physicians, nurses, and CAM practitioners regarding CAM use in oncology ^[112]. This study found that doctors and nurses with no formal CAM training were generally concerned about the safety of combining CAMs with conventional cancer therapy as well as being hesitant toward their patients' use of CAMs or discussions regarding CAMs. This was found to oppose the findings of CAM practitioners and health professionals with formal training in CAM treatments ^[112], suggesting a potential influence of CAM knowledge on attitudes and practices regarding these therapies.

This study thus aims to be the first to investigate the KAPs of doctors, nurses, and pharmacists in oncology regarding CAM use by people with cancer in Australia and will provide insight into the comparative perspectives of each profession.

5.2 – Methods

5.2.1 – Study Population

The population for this research was members from professional oncology association groups in Australia. Specifically, these were the Clinical Oncology Society of Australia (COSA), the Cancer Nurses Society of Australia (CNSA) and the Oncology and Haematology special interest group of the Society of Hospital Pharmacists of Australia (SHPA). According to annual reports from the COSA and CNSA, and the Specialty Practice manager of the SHPA, the combined membership of the groups is 2923 members. Inclusion criteria for participants were doctors, nurses, and pharmacists who are members of professional societies and currently working in oncology. Oncology experience or years in oncology practice were not used as inclusion criteria to maximise engagement with health professionals.

5.2.2 – Study Tool Design

The definition of CAMs used in this study is taken from the National Centre for Complementary and Integrative Health (NCCIH). They classify CAMs into 3 categories: Natural Products, which contains herbs and vitamins, which can be taken orally; Mind and Body Practices, which include physical therapies and mindfulness techniques such as meditation and yoga; and Other Complementary Health approaches, which comprises traditional health systems and those not in the other categories, such as Ayurveda, Traditional Chinese Medicine and Homeopathy ^[6].

The data collection tool was an online questionnaire to determine respondent's knowledge attitudes and practices toward CAM in cancer care. The questionnaire design was primarily based, with permission, on the survey developed by Lee and colleagues in their 2014 paper that investigated the KAPs of oncologists in the United States of America regarding herbal supplements in oncology ^[23]. To assess knowledge, the first section of the paper asked 10 multiple choice questions regarding interactions between CAMs and cancer therapies and indications for CAMs in oncology.

To assess attitudes, respondents were first given statements relating to CAM use in oncology and asked them to indicate their agreement to each statement using a 4-point Likert scale, ranging from strongly agree to strongly disagree. They were also asked to indicate the importance of patient and treatment factors in discussing CAMs with their patients

The third section, assessing practices, asked the respondent to indicate the percentage of their patients that they believed were using CAMs, the percentage of their patients with whom they had discussed

CAMs, and percentage of those conversations that had been initiated by them. They were also asked to indicate on a 4 point Likert scale how supportive they have been of their patients' CAM use, from 'Often to 'Never'. Lastly they were asked to indicate the perceived barriers to CAM discussions with their patients. For questions that used Likert scales, the majority of responses on the scale were taken as the general attitude or practice of respondents.

The fourth section asked respondents whether they received CAM education in their undergraduate degree. This was followed by questions about their demographics; specifically, age, which gender they identify as, the highest level of education they have obtained and current profession. The questionnaire was pilot tested with 21 health professionals at the Townsville University Hospital to ensure readability and validity. Responses from the pilot test were not included in the final analysis.

Questionnaire distribution was through the online survey platform SurveyMonkey^[140]. Through the respective individuals in charge of survey distribution to members of the COSA and CNSA and the SHPA oncology and haematology special interest group online forum, interested members were invited to participate in the research through a provided link. This link was to an introductory information page which explained the research and the survey. Consenting participants were taken to the online questionnaire to complete. Members of each group were sent a reminder after two months. This questionnaire was available between February to October 2021.

This project was approved through the James Cook University Human Research Ethics Committee (Reference number H8279).

5.2.3 – Data Collection and Statistics

Data from the SurveyMonkey website were downloaded into a Microsoft Excel spreadsheet and transposed into SPSS^[35] for statistical analysis. Chi-squared tests and independent t-tests were performed comparing the general responses as well as between the doctors, nurses, and pharmacists to determine statistical significance.

5.3 – Results

During recruitment a total of 127 people consented to participate. Seventeen respondents did not complete any questions. A further 11 respondents partially completed the questionnaire and did not indicate their profession. This resulted in 99 questionnaires used in the analysis. Based on the combined memberships of surveyed professional groups, this would allow findings to be stated at a 95% confidence level with a 9.68% margin of error.”

From this cohort there were 9 doctors, 70 nurses and 20 pharmacists. Responses to demographic questions can be seen in Table 11. Respondents mostly identified as female and possessed a health-related postgraduate qualification. When comparing the different professions, doctors were more evenly split regarding gender (55.6% male, 44.4% female), which was statistically significant compared to nurses (2.9% male, 97.1% female - $p < 0.001$).

Table 11 – Participant demographic data

	Frequency (%)	Doctors – Frequency (%)	Nurses – Frequency (%)	Pharmacists – Frequency (%)
Gender				
Male	14 (14.1%)	5 (55.6%)	2 (2.9%)	7 (35%)
Female	84 (84.8%)	4 (44.4%)	68 (97.1%)	12 (60%)
Prefer Not to Say	1 (1%)	0	0	1 (5%)
Highest Education Level				
Health-related Postgraduate Degree	48 (48.5%)	4 (44.4%)	34 (48.6%)	10 (50%)
Research-related Postgraduate Degree	8 (8.1%)	3 (33.3%)	4 (5.7%)	1 (5%)
Graduate Diploma and Graduate Certificate	27 (27.3%)	0	24 (34.3%)	3 (15%)
Bachelor's degree	16 (16.2%)	2 (22.2%)	8 (11.4%)	6 (30%)

5.3.1 – Knowledge

Knowledge was assessed by 10 multiple choice questions regarding interactions of CAMs with conventional cancer treatment and indications for CAMs in cancer care. Most respondents scored 3 or 4 out of 10. When separated into professions doctors obtained a mean score of 4.6, nurses a mean score of 3.4 and pharmacists a mean score of 5.8. The pharmacists' score was found to be statistically higher compared to nurses ($p < 0.001$ – data not shown).

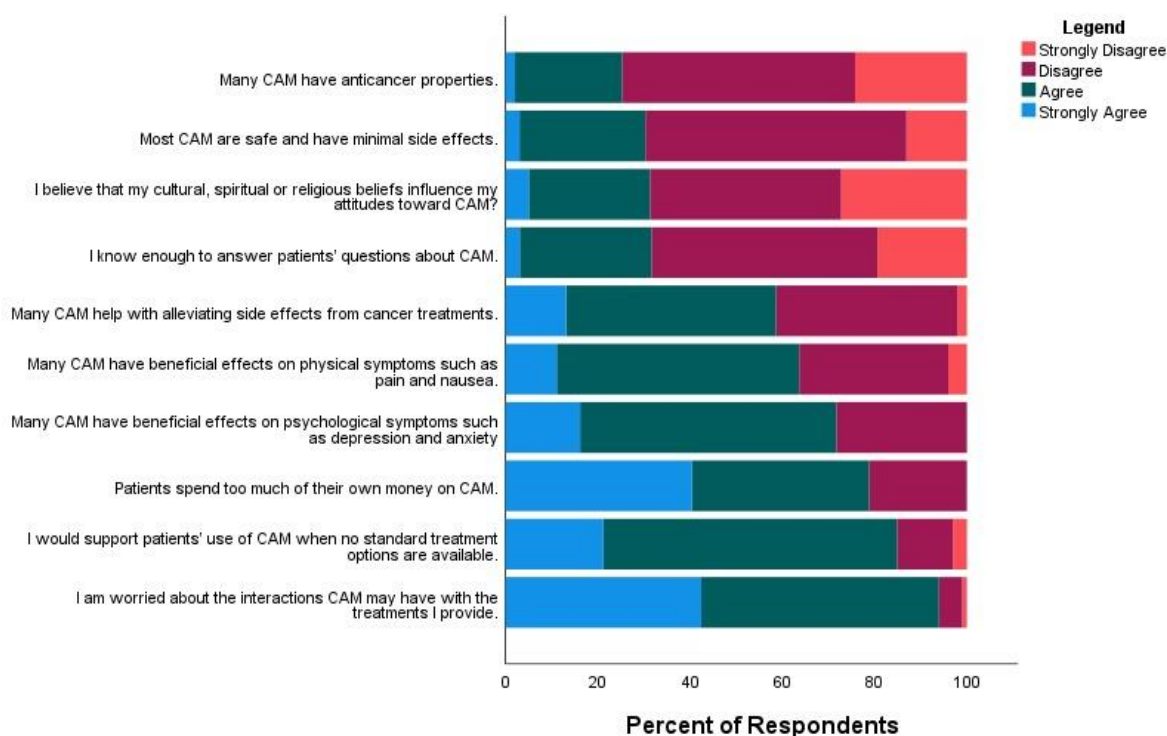
5.3.2 – Attitudes

To assess attitudes, respondents were asked to indicate their agreement statements about CAM in oncology, which is shown in

Figure 7. Most respondents disagreed that CAMs have anticancer properties (74.4%), that most CAMs are safe and free of side effects (69.7%) and that their cultural or religious beliefs influenced their attitudes toward CAMs (68.7%). Just over two-thirds of respondents (68.4%) disagreed that they

had enough knowledge about CAMs to answer questions. Most agreed that CAMs could help with side-effects of cancer treatment (58.6%), and that CAMs have beneficial effects on psychological (71.8%) and physical symptoms (63.6%). More than three-quarters of respondents (78.8%) agreed that patients spend too much money on CAMs, but that they would support their patient's use of CAMs if no other options were available (84.8%). Lastly, almost all respondents (92.9%) agreed that they were concerned about interactions between CAM and anti-cancer treatments.

Figure 7 – Responses to attitude-related statements



When comparing professions, pharmacists were statistically more likely to indicate that they knew enough to answer patients' questions on CAMs (75%) compared to nurses (20.2%, $p < 0.001$) and doctors (22%, $p = 0.004$). Compared to pharmacists, nurses were more positive about CAMs helping to alleviate side-effects (71.4% nurses vs 20% pharmacists - $p < 0.001$), having beneficial effects on psychological symptoms (78.5% nurses vs 40% pharmacists - $p < 0.001$) and physical symptoms (76.3% nurses vs 25% pharmacists - $p < 0.001$).

The last part of this section asked respondents to indicate the importance of certain factors when discussing CAMs with patients. The most prominent was the safety of CAMs, with all respondents classing this as 'most important' or 'very important'. This was followed by the efficacy of CAMs (94.9% selecting as 'most' or 'very important'), patient preferences (93.4%) and clinical experience (85.8% - data not shown).

5.3.3 – Practices

Practices were firstly assessed by asking respondents to estimate their patient's use of CAMs and with how many patients they discuss these therapies, summarised in Table 12. The mean number of patients health professionals believed to be using CAMs and the mean number of patients with whom they had discussed CAMs were similar. However, slightly over one-third of discussions regarding CAMs had been initiated by health professionals.

Table 12 – Self-estimated Practice patterns of respondents

	Mean	Standard Deviation
In the past 12 months what is the percentage of your patients or customers with a diagnosis of cancer that currently use CAM (98 respondents)	41.8	20.6
In the past 12 months, with approximately what percentage of your patients or customers with a diagnosis of cancer have you discussed the topic of CAM? (97 respondents)	40.6	26.8
Please estimate what percentage of these discussions about CAM were initiated by you. (90 respondents)	35.9	31.0

When asked how they would respond during CAM discussions with patients., respondents indicated they would be most inclined to support their patients' CAM use (82.8% would often or sometimes support) than discourage (70.4%) or remain neutral (63.9%). Recommending CAMs was close to evenly divided among all health professionals (52.5% would often or sometimes recommend – data not shown).

Table 13 shows barriers health professionals perceived to discussing CAMs with their patients. The two most prominent barriers were a lack of scientific data on safety and efficacy (79.6%) and lack of professional or hospital guidelines (64.3%).

Table 13 – Barriers to discussion of CAM use with people with cancer by all health professionals

	Frequency	Percent
Do not believe in CAMs	14	14.3%
Limited time during consultation	32	32.7%
No interest in using CAMs	12	12.2%
Lack of scientific data on safety and efficacy	78	79.6%
Lack of professional/hospital guidelines	63	64.3%
OTHER	18	18.4%

5.3.4 – Education

When respondents were asked about education on CAM, almost three quarters of participants (71.7%) indicated they had not received any in their undergraduate degree. More pharmacists indicated that they had received CAM education (65.0%), which was found to be statistically significant compared to nurses (18.6% - $p < 0.001$ – data not shown).

5.4 – Discussion

This study assessed the knowledge, attitudes and practices of Australian doctors, nurses and pharmacist working in oncology regarding CAM in cancer care. Generally, health professionals scored under 50% on the knowledge assessment and felt that they did not know enough about CAMs to answer patient's questions. Assessment of their attitudes showed belief that CAMs could have a role complementary to conventional therapy. However, they also indicated concern about the safety of CAMs. In their practice, most health professionals said they would be inclined to support their patient's CAM use but would discuss CAMs with less than half of their patients. They identified the main barrier to discussing these therapies with their patients was a lack of scientific data on safety and efficacy.

5.4.1 – Knowledge, Education and Training

Respondents achieved a general mean knowledge score of 40%, with pharmacists scoring above this average and significantly higher than the nurses. This aligns with other findings in the study, that significantly more pharmacists received education on CAMs in undergraduate degrees compared to

nurses. These observations indicate a fundamental need for training on CAMs to increase practitioners' knowledge.

Lee and colleagues conducted an online questionnaire of oncologists in the United States of America regarding herbal supplements in their 2014 paper and found an average score of 1.8 out of 4 (45%) from questions regarding interactions with conventional cancer treatment [23]. This is consistent with our findings of an average of 46% from the doctors. However, Harnett and colleagues in their 2018 paper surveying Australian community and hospital pharmacists regarding their KAPs toward CAM in cancer reported an average score of 10 out of 16 (63%) [104], which is slightly higher than our finding of an average of 58% from pharmacists. This discrepancy could be due to the difference in question schedule. As identified in the systematic KAP review of health professionals, the lack of standardisation in questionnaires and mode of knowledge assessment (self-assessment vs testing) compromises the comparison between studies [136].

5.4.2 – Influence of Knowledge on Attitudes

Despite knowledge scores, over two thirds of respondents felt that they did not know enough about CAMs to answer patients' questions. This suggests that most of the health professionals are not comfortable in their knowledge of CAMs, which may influence their confidence to have discussions with their patients.

The safety of CAM use in oncology appeared to be a prominent concern from respondents and thus has the potential to affect professional attitudes. Over 90% of respondents agreed to being concerned about interactions and 69.7% disagreed that CAMs are safe. Most respondents also believed that safety of CAM is the most important factor when discussing CAMs. Lastly, a lack of data on safety and efficacy were the most identified barriers to CAM discussions. Similar findings were reported in the review of health professions, showing that doctors, nurses, and pharmacists were all concerned about the safety of CAM therapies and their potential interactions with conventional treatment [136]. These findings highlight that safety of CAMs for people with cancer is a major concern for these professions and therefore should be a focus of future education. Moreover, it suggests a causal relationship with the findings of the knowledge section. Given that most respondents felt they lacked sufficient knowledge to discuss CAMs with their patients, this could reasonably translate into a conservative view regarding safety. Broom and colleagues in 2009 conducted qualitative interviews with oncologists and oncology nurses in Australia regarding discussing CAMs with their patients. They noted a lack of knowledge tended to result in a conservative view of CAM, due to a perceived potential for interactions [141], which supports our suggestions.

Conservative views were also found regarding the prevalence of CAMs, as our respondents' average estimation of CAM usage was 41.8% of their patients. This was slightly higher than the estimation range of 25%-40% of patients by doctors in the review of the three professions ^[136]. However, a systematic review in 2019 looking at the use of CAMs by oncology patients in the previous decade found an average global use of 51% ^[98]. This suggests that health professionals tend to underestimate how many of their patients are using CAMs.

Regarding attitudes toward the place of CAM in oncology, nurses were significantly more inclined to agree that CAMs were effective in treating side effects of cancer treatment, and physical and psychological symptoms of cancer, compared to pharmacists who were overall inclined to be divided. This is similar to the findings of the health professionals review, where nurses generally showed support for CAMs in the treatment of symptoms and side-effects, while half of doctors supported CAM use complementary to conventional treatment and pharmacists were neutral regarding the use of CAMs for symptomatic relief and improvement in quality of life ^[136].

Doctors from our study were mostly divided regarding the role of CAM in oncology, except for the psychological benefits of CAMs, where they were mostly positive. This is similar to the findings from Beretta and colleagues in their 2020 paper, which surveyed different specialists from Italian hospitals. They found only half of oncologists agreed that CAMs had a role in cancer medicine ^[138]. Conversely, the 2021 article by Yang and colleagues, who surveyed oncologists in China, reported that 95.3% of oncologists were positive toward integrative oncology or the incorporation of CAM into conventional treatment ^[139]. It should be noted, however, that over half of the respondents of this survey identified as integrative physicians, which may have influenced this outcome.

Our comparative findings between doctors and nurses is further supported by Broom and colleagues', who's interviews suggested that nurses may be inclined to have a more holistic and patient-centric approach to care regarding CAMs ^[141]. Respondents expressed views that nurses were inclined to support a patient's CAM use compared to doctors.

5.4.3 – Influence on Practices

Responses to the practice section showed a general trend to be less inclined to engage with patients' CAM use, with discussion on CAMs occurring on average with 40.6% of their patients. This result aligns with findings of Powers-James and colleagues in their 2020 online survey of oncologists in the United States of America, who stated that respondents talked to an average of 41% of patients about CAMs ^[142]. Alternatively, the Italian study by Berretta and colleagues found that responding oncologists talked to an average of 49.2% of their patients about CAMs ^[138]. The reason for the

higher percentage in the latter study is not immediately clear, as this was an initial study of KAPs in Italian physicians regarding CAM use by people with cancer.

An average of 36% CAM discussions were initiated by respondents, when taking all three professions together. This is slightly higher than the result from Powers-James and colleagues who found that 25% of responding oncologists were initiating discussions on CAMs ^[142]. This suggests that oncology health professionals may be reluctant to engage regarding CAMs, relying on patients to broach the subject. This also confirms a previously identified gap in communications between health professional and patients in a systematic review of communication of CAMs in cancer care, where a major reason for patients not disclosing CAMs to their health professionals was that they had not been asked ^[18].

The review of health professionals found that doctors and nurses were inclined to support patients who choose to use CAMs, with between 63% and 93% of doctors saying they would support a patient's CAM use. Our results are within this range, with 82.8% of all respondents saying they would often or sometimes support CAM use. However, it should be noted that the next most likely practice from our health professionals would be to discourage or remain neutral regarding combining CAMs with conventional therapy, which suggests that responses given by health professionals could be quite variable. This is further illustrated by respondents being divided on their practice of recommending CAMs, which was almost split in half regarding recommending these therapies. The study by Berretta and colleague did show that 57.6% of oncologists would recommend CAMs ^[138], while the review of health professionals suggested that a minority of doctors and nurses would recommend CAMs to their patients ^[136]. It should also be noted that 84.8% of respondents in our study agreed that they would support a patient's CAM use when no standard treatment options are available, which suggests that their support in cancer care may vary depending on patient circumstances. This high variability suggests that more research needs to be undertaken to understand how health professional react to people with cancer using CAMs.

5.4.4 – Study Limitations

As with any research, there were limitations to the study. Some of the professions included in this study, namely doctors, were underrepresented compared to others. This may have influenced the findings for this profession and skewed the comparison between groups. Due to the COSA and CNSA survey distribution policies, members were only given one reminder to the questionnaire. This may have limited the potential engagement in our study and subsequently reduced our number of participants.

5.5 – Conclusion

This is the first study, in our knowledge, to compare the knowledge, attitudes and practices of doctors, nurses and pharmacists regarding CAM use in oncology, giving a unique perspective of the three professions, which play major roles in contemporary cancer care.

Our findings suggest a link between the knowledge, attitudes, and practices of oncology health professionals regarding CAMs. Poor knowledge or perceived lack of knowledge of CAMs could be attributed to the lack of confidence in discussing CAMs. This would lead to conservative attitudes toward these therapies, driven by concerns over the safety when combined with conventional therapy. As a result, this leads to a hesitation to discuss CAMs with patients in practice and varied responses in support of patients' choice to use these therapies. Addressing the knowledge gap for CAMs could have a positive influence of subsequent attitudes and practices. Development of accessible, high quality evidenced-based information on CAM in oncology could improve health professional's confidence in discussions with patients and potentially improve better health outcomes.

Chapter 6 – Complementary and Alternative Medicine in Cancer in Australia: Do patients and health professionals agree?

(This commentary is currently being drafted for submission to a journal in the future)

Authorship Statement

Martin Keene: Conceptualization, Methodology, Formal analysis, Writing - Original Draft, Writing - Review & Editing.

Ian Heslop: Conceptualization, Supervision, Writing - Review & Editing.

Sabe Sabesan: Conceptualization, Supervision, Writing - Review & Editing.

Beverley Glass: Conceptualization, Methodology, Funding Acquisition, Supervision, Writing - Review & Editing

Abstract

Objective: To synthesise stakeholder, including cancer patients, pharmacist, doctor and nurse perspectives of complementary and alternative medicine use in Australia.

Methods: Comparison of the perspectives of people with cancer receiving treatment at a regional Australian hospital, and doctors, nurses and pharmacists working in oncology across Australia on complementary and alternative medicines has highlighted some of the potential challenges associated with CAM use in cancer care. Aligning these two studies has identified priority focus areas, where health professionals have both the opportunity to support their patients as well as ensure their safety.

Key findings: Complementary and alternative medicines are being used by a significant proportion of people with cancer, which appears to be regardless of health professional approval, with these health professionals neither commonly being consulted for information, nor initiating conversation with their patients on complementary and alternative medicine. Only 68 % of complementary and alternative medicine users had discussed these therapies with their treating healthcare team. Health professionals being unaware of this complementary and alternative medicine use by their patients presents a significant safety concern given the potential for interactions with conventional cancer therapy. These same patients and health professionals have, however, declared that both the safety of complementary and alternative medicine and these potential interactions are a concern to them.

Conclusion: Conventional cancer care could benefit from a more holistic approach by health professionals, with them taking the lead in the safe integration of these therapies with conventional cancer treatment.

Complementary and Alternative Medicines (CAM) use in cancer care, including herbs and vitamins as well as mind and body therapies, such as meditation and yoga, is often seen as controversial in conventional healthcare practice ^[6]. A lack of scientific data on the safety and potential interactions with conventional chemotherapy, especially regarding biological CAMs, has caused many health professionals trained in westernised medicine to have a cautious view regarding their use in this high risk population ^[7]. This has resulted in most health professionals avoiding a discussion of CAM with their patients ^[136]. Additionally, literature has shown that a majority of patients are not disclosing their CAM use to their treating health professional, attributed to never being asked, and fear of disapproval, causing the health professional to recommend that they cease taking the CAM ^[18].

Understanding the perspectives of stakeholders on CAM use in cancer, including people with cancer receiving treatment at a regional hospital in Australia (102 patients) ^[143], and the health professionals (9 doctors, 70 nurses and 20 pharmacists) working in oncology treating these people ^[144] is important. This commentary paper presents the convergent and divergent perspectives on the current view of these Australian patients and health professionals towards CAM use in oncology.

Who are these stakeholders?

The most used CAMs by people with cancer attending the day oncology unit at the Townsville University Hospital in Queensland, Australia, were cannabis, massage, and magnesium. Major reasons for CAM use were to treat side-effects of therapy, symptoms of cancer or to improve general health. These CAM users also had lower emotional wellbeing scores when assessed for their quality-of-life ^[143] and were seeking therapies to meet needs not being satisfied by their conventional therapy alone.

Australian health professionals including doctors, nurses and pharmacists were found wanting in terms of their knowledge (scoring 3-4 out of 10) on CAM use in oncology or interactions with cancer treatments, and this low score was supported by their own reflection (>65%) of not having enough knowledge about CAM to answer their patients' questions. However, most of these health professionals believed that CAM had a complementary role to conventional treatment, benefitting physical and psychological symptoms of both the cancer and conventional treatments ^[144].

How do the perspectives of these stakeholders compare?

Comparative perspectives between the stakeholders in cancer care are presented in Table 14.

Table 14 – Comparing cancer patients ^[143] and Australian health professionals perspectives ^[144] regarding CAM use

	Patients	Health Professionals
CAM Use	- 40.2% of patients using CAM	- Estimated 41.2% of patients using CAM
Health professional-initiated CAM discussions	- 34% of CAM users asked about their CAM use	- Estimated initiating CAM discussions with 36% of patients
Safety of CAM	- CAM users asked health professionals about CAM - concerns over interactions - Non-users of CAM did not use CAM -concerns over interactions	- Felt safety of CAM and interactions with cancer treatments were the largest concerns in making recommendations and their discussions with patients
Discussions of CAM information	- Family and friends and internet were main source of CAM recommendation - Internet was main source of CAM <i>information</i>	- Health professionals felt they did not have enough knowledge of CAM to provide <i>information</i>

Findings on these cancer patients receiving treatment was that 40.2% of respondents were using CAM ^[143]. While this was found to be below the average use of CAM by cancer patients from recent systematic reviews ^[9, 10, 98], this finding aligns the average estimation of CAM use by Australian oncology health professionals (41.8%) ^[144]. This suggests that Australian oncology health professionals have a realistic understanding of how many of their patients are using CAM.

Regarding discussions of CAM, 68% of the cancer patients said they had discussed CAM with their health professionals, with only one-in-three of these discussions initiated by the health professional ^[143]. This also aligns with perspectives of the health professionals, who predicted that they initiated 36% of CAM discussions ^[144]. This also converges with the concern that almost half of the patients who did not disclose their CAM use said it was because they were never asked ^[143], suggesting lack of engagement from health professionals.

Safety of CAM was found to be a shared concern of both patients and health professionals. Patients that disclosed their CAM use to health professionals did so mostly due to a concern over safety or to get a professional opinion ^[143]. On the matter of safety, the non-users and the users agreed, with non-users' decision against CAM use due to concerns regarding safety when combining with anti-cancer treatments ^[143]. Most health professionals indicated that they were concerned about interactions with conventional therapy and disagreed that CAM was safe, with the safety of CAM believed to be the most

important factor when discussing these therapies with patients. A lack of data on the safety and efficacy of these therapies was highlighted as the largest barrier to these discussions [144]. Patients and health professionals agree on safety of CAM indicating that this should be a priority issue proceeding forward.

CAM users who disclosed their use of these therapies to get a professional opinion showed a desire to seek reputable information. However this contradicts the fact that the main sources of recommendations for CAM were friends and family or their own research, while the most popular source of information on CAM was the internet [143].

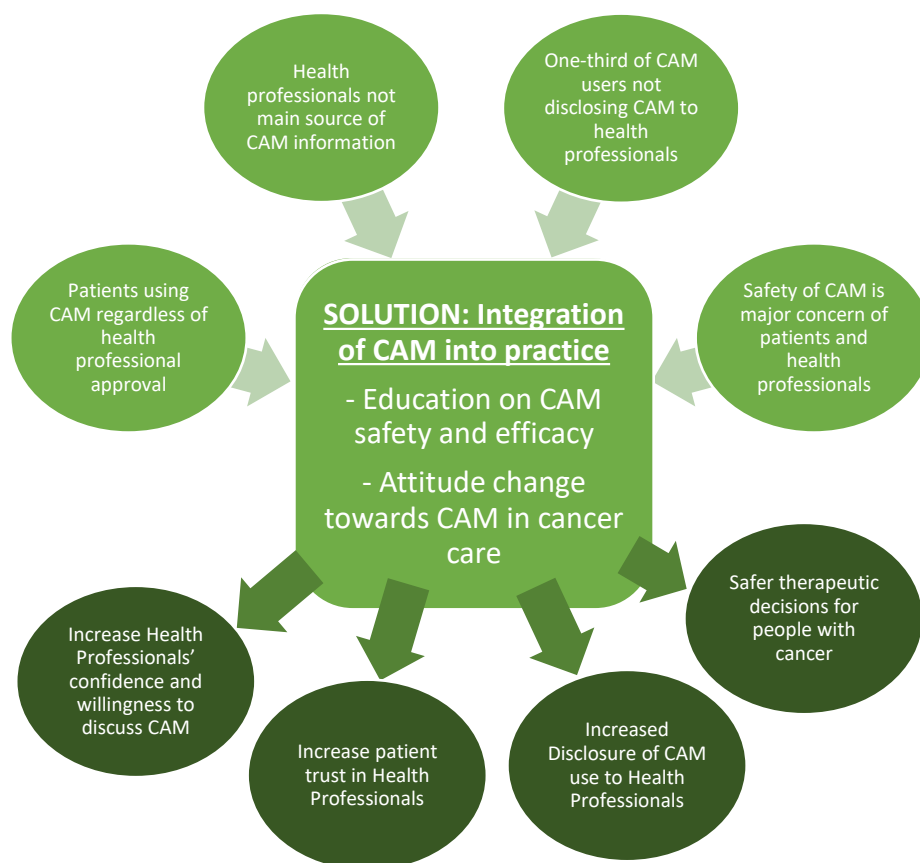
Current Status of CAM in Cancer Care

These comparisons show that CAM is being used by a significant number of cancer patients receiving treatment. These treatments are generally being taken of the patient's own volition or on advice outside of conventional healthcare. Additionally, health professionals are not the primary sources of information regarding these therapies, to the point of not always being sought as a source to disclose the use of these therapies, nor are they knowledgeable or confident enough to respond to their patients' queries. Given the potential for interactions of CAM with conventional cancer treatments, this lack of disclosure and education places a significant proportion of this vulnerable patient population at a safety risk.

Where to now?

Even though CAM use in cancer appears to be at odds with conventional healthcare, the comparative perspectives of these stakeholders hinted at a desire for change. Patients using CAM who disclosed their use wanted conventional health professional input, especially regarding the potential for interactions with their therapy. Meanwhile, health professionals showed support of CAM use complementary to conventional cancer treatment but felt that they needed more information and to improve their knowledge to be able to confidently discuss CAM with their patients. A summary of the concerns of CAM in oncology and solutions to these issues are illustrated in Table 8.

Figure 8 – Concerns around CAM in cancer care, solutions to address them and expected outcomes



The main theme emerging from both studies is the safety of these therapies when taken concomitantly with conventional cancer treatments. Clearly, this is an area of major focus for future education and training for oncology health professionals. This would give health professionals more confidence in their knowledge to discuss these therapies and, subsequently, increased willingness to initiate discussions of CAM to be included in the holistic approach to the care of their patients. Additionally, this would lead to an increase in patients' faith in their treating team as a trusted source to confide their CAM use. With this trust obtained, this would expectedly lead to increased disclosure of these therapies and honest and productive discussions regarding therapies that are important to the patient as well as their health. Overall, the result would be safer and more enriching clinical decision making for the patients as well as a more meaningful relationship with the treating team.

However, it should be noted that this increase in patient confidence in health professionals would require more than just education on interactions and safety. While there have been several recent attempts to provide education to health professionals regarding CAM, it has been highlighted that simply adopting a knowledge base for integration of CAM may not be enough ^[145]. Education and training, including focusing on efficacy of CAMs, are needed to incorporate attitudinal change to increase advocacy and patient support to utilise these therapies. Furthermore, mind and body therapies

do not pose safety issues to patients receiving conventional treatment but have been demonstrated to have positive effects on the stress, mental health and quality-of-life of people with cancer ^[146, 147]. The inclusion of these practices into conventional practice would allow a more patient-centred approach to treatment. A shift from paternal healthcare towards a more holistic approach with open discussions about all treatment options and their merits will increase patients' engagement and willingness to disclose CAM use to oncology health professionals.

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Appendices

Appendix 1 – Supplementary Materials from Chapter 2

Table 15 – Percentage of respondents using CAM between different cancer types

Cancer Type	Mean percentage of CAM use	Number of articles	Standard Deviation
Breast Cancer	54.02%	10	12.5%
Glioma	28.3%	1	.
Haematological	43.35%	2	37.97%
Head and Neck Cancer	21.7%	1	.
Lung Cancer	41%	1	.
Melanoma	40.6%	1	.
Multiple Cancer Types	52.21%	42	20.62%
Orthopaedic Cancer	61.3%	1	.
Thoracic Cancer	41.7%	1	.
Urologic Cancer	54%	1	.
Total	50.95%	61	19.29%

Table 16 – ANOVA test comparing means of prevalence of CAM use between different cancer types (calculated using IBM SPSS for Windows, version 25.0).

		Sum of Squares	df	Mean Square	F	Sig.
CAM prevalence mean percentage by Cancer Type	Between Groups (Combined)	2052.843	9	228.094	.573	.812
	Within Groups	20284.429	51	397.734		
	Total	22337.271	60			

Table 17 – Percentage of respondents using CAM between different countries

Country of surveyed population	Mean percentage of CAM use	Number of Articles	Standard Deviation
Australia	56.64%	5	18.43%
China	84.25%	2	12.94%
Croatia	60.3%	1	.
England	28.9%	1	.
Ethiopia	79%	1	.
France	37.5%	1	.
Germany	41.11%	9	16.41%
India	38.7%	1	.
Ireland	35.93%	3	18.62%
Israel	39.6%	1	.
Italy	30.33%	4	15.72%
Lebanon	40.8%	2	0.28%
Malaysia	61.94%	5	15.79%
Mongolia	47.9%	1	.
Morocco	46%	1	.
Netherlands	57.2%	1	.
Nigeria	66.3%	1	.
Palestine	63.77%	3	3.74%
Saudi Arabia	80.2%	2	14.56%
Singapore	56.3%	1	.
South Korea	57.4%	1	.
Sri Lanka	67.4%	1	.
Switzerland	51.9%	1	.
Thailand	60.9%	1	.
Trinidad and Tobago	39.1%	1	.
Turkey	39.93%	6	20.31%
USA	60.1%	4	22.39%
Total	50.95%	61	19.29%

Table 18 – ANOVA test results comparing means of prevalence of CAM use between different countries (calculated using IBM SPSS for Windows, version 25.0).

		Sum of Squares	df	Mean Square	F	Sig.
CAM prevalence mean percentage by Country of Survey	Between (Combined) Groups	12415.779	26	477.530	1.636	.089
	Within Groups	9921.492	34	291.809		
	Total	22337.271	60			

Appendix 2 – Supplementary Materials for Chapter 3

QualSyst Checklist adapted from Standard Quality Assessment Criteria For Evaluating Primary Research Papers From A Variety Of Fields ^[34]

Al-Omari et al 2013 ^[108]

Table 1. Checklist for assessing the quality of quantitative studies

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Subject (and comparison group, if applicable) characteristics sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	If interventional and random allocation was possible, was it described?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	If interventional and blinding of investigators was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	If interventional and blinding of subjects was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Sample size appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Analytic methods described/justified and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	20			4
	Total percentage score = score / (28 – (N/A x 2))	1			

Bocock et al 2011 ^[109]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Subject (and comparison group, if applicable) characteristics sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	If interventional and random allocation was possible, was it described?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	If interventional and blinding of investigators was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	If interventional and blinding of subjects was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Sample size appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Analytic methods described/justified and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	20			4
	Total percentage score = score / (28 – (N/A x 2))	1			

Gok-Metin et al 2018 ^[110]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Subject (and comparison group, if applicable) characteristics sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	If interventional and random allocation was possible, was it described?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	If interventional and blinding of investigators was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	If interventional and blinding of subjects was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Sample size appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Analytic methods described/justified and appropriate?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	18	1		4
	Total percentage score = score / (28 – (N/A x 2))	0.95			

Harnett et al 2018 ^[104]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Subject (and comparison group, if applicable) characteristics sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	If interventional and random allocation was possible, was it described?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	If interventional and blinding of investigators was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	If interventional and blinding of subjects was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Sample size appropriate?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Analytic methods described/justified and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	18	1		4
	Total percentage score = score / (28 – (N/A x 2))	0.95			

Kamizato et al 2013 ^[111]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Subject (and comparison group, if applicable) characteristics sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	If interventional and random allocation was possible, was it described?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	If interventional and blinding of investigators was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	If interventional and blinding of subjects was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Sample size appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Analytic methods described/justified and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	18	1		4
	Total percentage score = score / (28 – (N/A x 2))	0.95			

Lee et al 2014 [23]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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5	If interventional and random allocation was possible, was it described?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	If interventional and blinding of investigators was possible, was it reported?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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9	Sample size appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Analytic methods described/justified and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	20			4
	Total percentage score = score / (28 – (N/A x 2))	1			

Lee et al 2008 [107]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Subject (and comparison group, if applicable) characteristics sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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9	Sample size appropriate?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Analytic methods described/justified and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	18	1		4
	Total percentage score = score / (28 - (N/A x 2))	0.95			

Rojas-Cooley et al 2009 ^[106]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	Sample size appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Analytic methods described/justified and appropriate?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	18	1		4
	Total percentage score = score / (28 - (N/A x 2))	0.95			

Stub et al 2018 ^[112]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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10	Analytic methods described/justified and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	18	1		4
	Total percentage score = score / (28 – (N/A x 2))	0.95			

Yang et al 2017 [105]**Table 1. Checklist for assessing the quality of quantitative studies**

	Criteria	Yes (2)	Partial (1)	No (0)	N/A
1	Question / objective sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Study design evident and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Method of subject/comparison group selection <i>or</i> source of information/input variables described and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Subject (and comparison group, if applicable) characteristics sufficiently described?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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10	Analytic methods described/justified and appropriate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Some estimate of variance is reported for the main results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	Controlled for confounding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13	Results reported in sufficient detail?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	Conclusions supported by the results?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Subtotal	20			4
	Total percentage score = score / (28 – (N/A x 2))	1			

Survey of Complementary and Alternative Medicine Use

To understand the use and beliefs of complementary and alternative
medicines in Townsville oncology patients



Information:

This survey is part of a research project between James Cook University and the Townsville Hospital. This project will provide us with appropriate information to develop training that will improve the knowledge of hospital staff about complementary and alternative medicines in cancer care. The results of this research will contribute toward a PhD degree for Martin Keene, the primary researcher.

The survey will ask whether you are using complementary and alternative medicines and include some questions about your beliefs and any discussions that you may have had with oncology staff about these therapies. It will also ask general questions about you and ask about your quality of life to help us determine behavior patterns in relation to the use of complementary and alternative medicines. The questionnaire should take around 10 minutes to complete.

The survey is for you to complete while you are waiting in the oncology clinic reception, in the day unit reception area or while receiving treatment in the day oncology unit. However, taking part is **completely voluntary**. You do not have to take part in this survey and can stop filling in the survey at any time. It will not affect your treatment in any way if you decide not to take part in the survey. Once you have finished the survey just put it into the envelope provided and then put the envelope in the collection box at either the oncology clinic reception or the Day Unit Reception.

On the other hand, if you do not want to fill in the survey or participate in this research, you can hand it back to the Administrative Officers or you can put the unfinished survey in the envelope and again place the envelope in the collection box at the oncology clinic reception or the Day Unit reception. If you have filled out part of the survey and decide you do not want to participate in the research, there is a check box on the back page that can be ticked to indicate you do not want your answers recorded in the research.

All data obtained from this questionnaire will be anonymous and remain confidential. All completed questionnaires will be kept in a locked filing cabinet in the pharmacy school at James Cook University. Electronic data will be stored on password protected devices, with access being limited to members of the research team. All data will be kept for a period of 5 years and then destroyed. It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified.

The person you may need to contact will depend on the nature of your query. If you want any further information concerning this project or if you have any problems which may be related to your involvement in the project, you can contact Martin Keene, the primary researcher on 07 4781 3440 or at martin.keene@jcu.edu.au.

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about being a research participant in general, then you may contact:

Reviewing HREC approving this research and HREC Executive Officer details

Reviewing HREC name	The Townsville Hospital and Health Service
Telephone	07 4433 1440
Email	TSV-Ethics-Committee@health.qld.gov.au

You may be asking, what are complementary and alternative medicines?

Complementary and Alternative Medicines are health practices that are outside conventional or westernised medicine. Examples of the various types of complementary and alternative medicines include:

- **Natural Products**
 - Herbs
 - Vitamins
 - Minerals

- **Mind & Body Practices**
 - Massage
 - Yoga
 - Chiropractic
 - Meditation
 - Acupuncture
 - Hypnotherapy
 - Tai Chi
 - Prayer for Health

- **Other Health Approaches**
 - Traditional Chinese Medicine
 - Ayurveda
 - Naturopathy
 - Homeopathy

Section 1: Complementary and Alternative Medicine (CAM) Use

A. Current Complementary and Alternative Medicine Use

1. Are you currently taking or using Complementary and Alternative Medicine?

- Yes Please enter the names of your complementary and alternative medicines and reasons for their use on page 4 (please use a separate box for individual medicines).
- No **Skip to Part B (page 7)**

i) Complementary and Alternative Medicine: _____

Intended Benefit of this CAM: _____

Is it effective? Yes Somewhat No

Who recommended this CAM?: _____

Where did you get your information about this CAM?: _____

ii) Complementary and Alternative Medicine: _____

Intended Benefit of this CAM: _____

Is it effective? Yes Somewhat No

Who recommended this CAM?: _____

Where did you get your information about this CAM?: _____

iii) Complementary and Alternative Medicine: _____

Intended Benefit of this CAM: _____

Is it effective? Yes Somewhat No

Who recommended this CAM?: _____

Where did you get your information about this CAM?: _____

iv) Complementary and Alternative Medicine: _____

Intended Benefit of this CAM: _____

Is it effective? Yes Somewhat No

Who recommended this CAM?: _____

Where did you get your information about this CAM?: _____

- If you are using more than 4 different CAM, please provide details on the back of this page

2. Where did you buy or obtain your complementary and alternative medicine? (tick all that apply)

- Doctor
- CAM Practitioner (e.g. Naturopath, acupuncturist) → Specify: _____
- Pharmacy
- Health Food/ Nutrition Store
- Internet
- Other person, please specify: _____
- PREFER NOT TO ANSWER
-

3. Complementary and alternative medicines are used for a variety of reasons. Some of these reasons are mentioned below. Why have you chosen to use complementary and alternative medicine? (tick all that apply)

- To manage or treat my cancer
- To reduce the side effects/symptoms of medical treatment
- To help in relaxation and reduce emotional distress
- To improve your general health
- To feel more in control over your health
- To try every treatment option
- To provide energy
- Lack of faith in medical treatment
- Belief in advantages of CAM
- Family tradition/ Culture/religion
- It is more natural
- Curiosity
- Other reason, please specify: _____

4. Have any health professionals asked you about your complementary and alternative medicine use?

Yes

No **Skip to question 5 (below)**

4a. If Yes, who has asked you about complementary and alternative medicine? (tick all that apply)

Oncologist

Nurse

Pharmacist

GP (Doctor)

Other, please specify: _____

5. Have you asked a health professional about your complementary and alternative medicine use?

Yes

No **Skip to question 6 (page 7)**

5a. If Yes, who did you speak to about complementary and alternative medicine? (tick all that apply)

Oncologist

Nurse

Pharmacist

GP (Doctor)

Other, please specify: _____

5b. Why did you mention your complementary and alternative medicine to a health professional? (tick all that apply)

Part of medication history

Concern about interactions

Concern about side-effects

Getting their professional opinion

Other, please specify: _____

5c. How did they respond?Encouraged me to continue Advised me to stop Neither encouraged nor discouraged me

Others, please specify _____

- **Please proceed to part C (page 8)**

6. If no, why did you not talk to health professionals about complementary and alternative medicines? (tick all that apply)I was never asked They might disapprove They might not be interested They were busy or did not have time Not important for health professionals to know about CAM use

Other, please specify: _____

- **Please proceed to part C (page 8)**

B. Decisions against Complementary and Alternative Medicine Use (Please only complete if you are not using CAM)**1. Why are you not using complementary and alternative medicines? (tick all that apply)**Many CAMs are not based on scientific research May interfere with medical treatments CAMs have side effects CAMs cost too much money / not covered by insurance or PBS I'm not interested in CAM I don't have knowledge about CAM Some treatments are against my religious / cultural beliefs My doctor or oncologist would not approve

Others, please specify _____

C. Past Complementary and Alternative Medicine Use

1. Did you use complementary and alternative medicines prior to your diagnosis?

Yes

No

D. Future Discussions About Complementary and Alternative Medicine

1. Would you be interested in discussions more focused on complementary and alternative medicines with oncology staff at the Townsville Hospital?

Yes

No

Section 2: Demographic Data

1. What type of cancer have you been diagnosed with?

2. What medical treatments have you received?

Chemotherapy

Radiotherapy

Surgery

Hormone Therapy

Other



Please specify:

3. What is your age?

PREFER NOT TO SAY

4. Which gender do you identify as?

Male

Female

Other

PREFER NOT TO SAY

5. What is the highest education level you have obtained?

Postgraduate Qualification

Bachelor's degree

Trade Certificate

Year 12 or equivalent

Year 10 or below

PREFER NOT TO SAY

6. What is your marital status?

- Married
- De-facto
- Separated
- Divorced
- Widowed
- Never married
- PREFER NOT TO SAY

7. Do you identify with a particular religion?

- Yes
- No
- PREFER NOT TO SAY

→

Please specify:

8. What is your monthly income group (to the nearest \$100)?

- PREFER NOT TO SAY

9. Are you currently working?

- Yes
- No
- PREFER NOT TO SAY

→

Please specify your job:

10. What was your country of birth?

- PREFER NOT TO SAY

11. Where do you live?

State/Country:

- PREFER NOT TO SAY

Section 3: Quality of Life Survey

Below is a list of statements that other people with your illness have said are important. **Please circle or mark one number per line to indicate your response as it applies to the past 7 days.**

(Survey taken from the FACT-G questionnaire; created by FACIT, 2007, see <http://www.facit.org/FACITOrg>.)

PHYSICAL WELL-BEING

		Not at all	A little bit	Some-what	Quite a bit	Very much
GP1	I have a lack of energy	0	1	2	3	4
GP2	I have nausea	0	1	2	3	4
GP3	Because of my physical condition, I have trouble meeting the needs of my family	0	1	2	3	4
GP4	I have pain	0	1	2	3	4
GP5	I am bothered by side effects of treatment	0	1	2	3	4
GP6	I feel ill	0	1	2	3	4
GP7	I am forced to spend time in bed	0	1	2	3	4
.....						

SOCIAL/FAMILY WELL-BEING

		Not at all	A little bit	Some-what	Quite a bit	Very much
GS1	I feel close to my friends	0	1	2	3	4
GS2	I get emotional support from my family	0	1	2	3	4
GS3	I get support from my friends	0	1	2	3	4
GS4	My family has accepted my illness	0	1	2	3	4
GS5	I am satisfied with family communication about my illness	0	1	2	3	4
GS6	I feel close to my partner (or the person who is my main support)	0	1	2	3	4
Q1	<i>Regardless of your current level of sexual activity, please answer the following question. If you prefer not to answer it, please mark this box <input type="checkbox"/> and go to the next section.</i>					
GS7	I am satisfied with my sex life	0	1	2	3	4
.....						

Please circle or mark one number per line to indicate your response as it applies to the past 7 days.

(Survey taken from the FACT-G questionnaire; created by FACIT, 2007, see <http://www.facit.org/FACITOrg>.)

EMOTIONAL WELL-BEING

		Not at all	A little bit	Some- what	Quite a bit	Very much
GE1	I feel sad	0	1	2	3	4
GE2	I am satisfied with how I am coping with my illness	0	1	2	3	4
GE3	I am losing hope in the fight against my illness	0	1	2	3	4
GE4	I feel nervous	0	1	2	3	4
GE5	I worry about dying	0	1	2	3	4
GE6	I worry that my condition will get worse	0	1	2	3	4

FUNCTIONAL WELL-BEING

		Not at all	A little bit	Some- what	Quite a bit	Very much
GF1	I am able to work (include work at home)	0	1	2	3	4
GF2	My work (include work at home) is fulfilling	0	1	2	3	4
GF3	I am able to enjoy life	0	1	2	3	4
GF4	I have accepted my illness	0	1	2	3	4
GF5	I am sleeping well	0	1	2	3	4
GF6	I am enjoying the things I usually do for fun	0	1	2	3	4
GF7	I am content with the quality of my life right now	0	1	2	3	4

Knowledge, Attitudes and Practices Survey schedule for Oncology Staff

**To understand the knowledge, attitudes and practices of oncology health
professionals regarding complementary and alternative medicine in cancer
care**

(This is a survey schedule and will be presented as an online survey)



Participant Information and Consent

The term complementary and alternative medicine (CAM) refers to any treatments that are outside conventional medicine, ranging from biological medicines, such as herbs and vitamins, to mind and body practices, such as meditation and acupuncture. Research has shown that over half of people with a diagnosis of cancer use CAM [98]. However, it has also been shown on average that half of these people have not disclosed the use of this therapy to their doctors [18].

Potentially this is a safety concern as some CAMs can interact with anti-cancer therapies, potentially increasing the risk of side effects or decreasing the effectiveness of these therapies [7]. If oncology staff are unaware that these therapies are being used, treatment cannot be adjusted to reduce the risks of these interactions.

This project that this survey is part of aims to determine what are the most common CAMs being used by people with a diagnosis of cancer. This information will then be used to develop education materials on the safety of these common CAM in cancer care. This educational material is hoped to increase discussion of CAM with cancer patients, increase disclosure of these therapies and allow safer therapeutic decision making. The results of this research will also contribute toward a PhD degree for Martin Keene, the primary researcher.

You are invited to take part in this research by completing an online survey which is being distributed Australian doctors, nurses and pharmacists working in oncology. The survey will contain questions to determine your knowledge, attitudes and practices regarding CAM in cancer care. It will also ask questions about your preferences for future educational material on CAM use in oncology. The survey should take around 10-15 minutes to complete.

Taking part in this research is **completely voluntary**. You do not have to take part in this survey and can stop filling it in and close the browser window at any time. All data obtained from this survey will be anonymous. Electronic data will be stored on password protected devices, with access being limited to members of the research team. The results of this research will be used in future publications and presentations. However, the data will be provided in such a way that you cannot be identified.

If you have any questions about the study, please contact:

Principal Investigator:
Martin Keene
 Pharmacy
 College of Medicine and Dentistry
 James Cook University
 Phone: 4781 3440
 Email: Martin.Keene@jcu.edu.au

Supervisors:
Prof Beverley Glass/ A/Prof Ian Heslop
 Pharmacy
 College of Medicine and Dentistry
 James Cook University
 Phone: 4781 6423 / 6891
 Email: Beverley.Glass@jcu.edu.au /
Ian.Heslop@jcu.edu.au

If you have any concerns regarding the ethical conduct of the study, please contact:

*Human Ethics, Research Office
 James Cook University, Townsville, Qld, 4811
 Phone: (07) 4781 5011 (ethics@jcu.edu.au)*

- I agree to complete the online survey and consent to participate in the research as described above.
- I do not agree to complete the survey. (Selecting this option will take you to the final page and terminate the survey)
- I am not a doctor, nurse or pharmacist working in oncology in Australia and am ineligible to participate.

You may be asking, what are complementary and alternative medicines?

Complementary and Alternative Medicines are health practices that are outside conventional or westernised medicine. Examples of the various types of complementary and alternative medicines include:

- **Natural Products**
 - Herbs
 - Vitamins
 - Minerals

- **Mind & Body Practices**
 - Massage
 - Yoga
 - Chiropractic
 - Meditation
 - Acupuncture
 - Hypnotherapy
 - Tai Chi
 - Prayer for Health

- **Other Health Approaches**
 - Traditional Chinese Medicine
 - Ayurveda
 - Naturopathy
 - Homeopathy

Section 1: Knowledge regarding CAM

This section asks questions regarding your knowledge of CAM and its potential uses and safety in an oncology setting.

The following are scenarios regarding herbs, vitamins and minerals in cancer care. Please answer the questions to the best of your ability at this time. (Please do not look up information to answer these questions.)

1. A cancer patient is suffering from chemotherapy-induced nausea. Which CAM might they use to treat this symptom? (Mark all that apply)

- | | |
|-------------------|--------------------------|
| Ginger | <input type="checkbox"/> |
| St John's Wort | <input type="checkbox"/> |
| Vitamin E | <input type="checkbox"/> |
| Ginseng | <input type="checkbox"/> |
| None of the above | <input type="checkbox"/> |
| I don't know | <input type="checkbox"/> |

2. A male patient has begun to feel depressed and anxious after receiving a recent diagnosis of prostate cancer. Which CAM might they use to treat their depression and anxiety? (Mark all that apply)

Ginger	<input type="checkbox"/>
Milk Thistle	<input type="checkbox"/>
St John's Wort	<input type="checkbox"/>
Vitamin E	<input type="checkbox"/>
None of the above	<input type="checkbox"/>
I don't know	<input type="checkbox"/>

3. A woman with metastatic colorectal cancer is being treated with capecitabine and oxaliplatin. She is concerned about the hepatotoxic effects of her therapy. Which CAM might she use to alleviate these potential effects (Mark all that apply)

Milk Thistle	<input type="checkbox"/>
St John's Wort	<input type="checkbox"/>
Vitamin E	<input type="checkbox"/>
Ginseng	<input type="checkbox"/>
None of the above	<input type="checkbox"/>
I don't know	<input type="checkbox"/>

4. A man diagnosed with urothelial cancer is being treated with cisplatin and gemcitabine. He wishes to reduce the peripheral neuropathy associated with his therapy. Which CAM might they use to reduce this side effect? (Mark all that apply)

Ginger	<input type="checkbox"/>
Milk Thistle	<input type="checkbox"/>
Vitamin E	<input type="checkbox"/>
Ginseng	<input type="checkbox"/>
None of the above	<input type="checkbox"/>
I don't know	<input type="checkbox"/>

5. A woman with lung cancer wishes to take a natural product that will improve her immunity. Which CAM might be used to modulate their immunity? (Mark all that apply)

Ginger	<input type="checkbox"/>
Milk Thistle	<input type="checkbox"/>
St John's Wort	<input type="checkbox"/>
Ginseng	<input type="checkbox"/>
None of the above	<input type="checkbox"/>
I don't know	<input type="checkbox"/>

6. A man with metastatic colon cancer is being treated with irinotecan. Which CAM should he avoid? (Mark all that apply)

- St. John's Wort
- Soy Isoflavones
- Gingko Biloba
- Vitamin E
- None of the above
- I don't know

7. A cancer patient on warfarin for a deep vein thrombosis develops frequent nose bleeds. Which of the following CAM should the patient avoid? (Mark all that apply)

- Echinacea
- Soy Isoflavones
- Gingko Biloba
- Valerian
- None of the above
- I don't know

8. A woman with breast cancer (stage II, ER positive, HER2 negative) has finished 10 years of adjuvant hormonal therapy. Which of the following CAM should she avoid? (Mark all that apply)

- St. John's Wort
- Echinacea
- Soy Isoflavones
- Vitamin E
- None of the above
- I don't know

9. A man with alcoholic cirrhosis and metastatic hepatocellular cancer is receiving sorafenib. Which of the following CAM should he avoid? (Mark all that apply)

- St. John's Wort
- Gingko Biloba
- Valerian
- Vitamin E
- None of the above
- I don't know

10. A woman with cervical cancer is due to receive radiotherapy as part of her treatment. Which of the following CAM should she avoid? (Mark all that apply)

- Soy Isoflavones
- Gingko Biloba
- Valerian
- Vitamin E
- None of the above
- I don't know

11. Which resources do you use for information on Complementary and Alternative Medicine?

- Medline or Pubmed
- Online Resources
- Online search engines
- Colleague
- Textbook
- Other _____

12. Complementary and alternative medicines are regulated in Australia by the Therapeutic Goods Administration (TGA). They are either Listed (AUST-L) or Registered (AUST- R). What is essentially the difference between a listed and a registered product?

AUST-L (listed): _____

AUST-R (registered): _____

Section 2: Attitudes regarding CAM

This section contains questions that ask about your personal and professional attitudes regarding CAM as well as its use in cancer care.

1. Mark responses for each of the following statements:

		Strongly Agree	Agree	Disagree	Strongly Disagree
A.	Many CAM have anticancer properties.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
B.	I know enough to answer patients' questions about CAM.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
C.	Many CAM help with alleviating side effects from cancer treatments.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
D.	I am worried about the interactions CAM may have with the treatments I provide.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
E.	Many CAM have beneficial effects on psychological symptoms such as depression and anxiety.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
F.	Many CAM have beneficial effects on physical symptoms such as pain and nausea.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
G.	Patients spend too much of their own money on CAM.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
H.	I would support patients' use of CAM when no standard treatment options are available.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
I.	Most CAM are safe and have minimal side effects.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
J.	I believe that my cultural, spiritual or religious beliefs influence my attitudes toward CAM.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

2. In the past 12 months, which of the following types of CAM have you used for yourself.

Natural Products

- Herbs
- Vitamins (excluding multivitamins)
- Minerals (excluding those commonly prescribed for chronic conditions such as renal disease, osteoporosis and rheumatoid arthritis)

Mind and body Practices

- Massage
- Yoga
- Chiropractic
- Meditation
- Acupuncture
- Hypnotherapy
- Tai Chi

Other Complementary Health Approaches

- Traditional Chinese Medicine
- Ayurveda
- Naturopathy
- Hypnotherapy
- Homeopathy

3. When recommending or discussing CAM with patients, how important are the following factors:

		<i>Most important</i>	<i>Very important</i>	<i>Low importance</i>	<i>Not important</i>
A.	<i>Patient preferences</i>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
B.	<i>Your clinical experience</i>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
C.	<i>Published research regarding efficacy of CAM</i>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
D.	<i>Published research regarding safety of CAM</i>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

Section 3: Practices regarding CAM

This section asks questions regarding your professional practice toward CAM in cancer care

- 1. In the past 12 months, have you ever prescribed or administered chemotherapy to a patient who you knew was also taking CAM?**

Yes Continue to question part below
 No Continue to question 2

If yes, approximately how many patients?

- 1) 1-10 patients. 1
 2) 11-20 patients. 2
 3) 21-30 patients. 3
 4) 31-40 patients. 4
 5) 41-50 patients. 5
 6) >50 patients. 6

- 2. Please indicate whether you have ever recommended to patients the following CAM therapies?**

Natural Products

- Herbs
- Vitamins (excluding multivitamins)
- Minerals (excluding those commonly prescribed for chronic conditions such as renal disease, osteoporosis and rheumatoid arthritis)

Mind and body Practices

- Massage
- Yoga
- Chiropractic
- Meditation
- Acupuncture
- Hypnotherapy
- Tai Chi

Other Complementary Health Approaches

- Traditional Chinese Medicine
- Ayurveda
- Naturopathy
- Hypnotherapy
- Homeopathy

3. Please estimate the percentage of your patients that currently use CAM (not including standard doses of vitamins and minerals such as those in a multivitamin)?

None
 10%
 20%
 30%
 40%
 50%
 60%
 70%
 80%
 90%
 100%

4. In the past 12 months, with approximately what percentage of your patients have you discussed the topic of CAM?

None
 10%
 20%
 30%
 40%
 50%
 60%
 70%
 80%
 90%
 100%

5. Please estimate what percentage of these discussions about CAM were initiated by you.

None
 10%
 20%
 30%
 40%
 50%
 60%
 70%
 80%
 90%
 100%

6. Regarding these discussions with your patients about CAM, how often did you do the following:

		<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>
A.	Support the use of CAM	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
B.	Recommend the use of CAM	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
C.	Discourage the use of CAM	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
D.	Neither recommended nor discouraged the use of CAM	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

7. Overall, do you think talking about the use of CAM has strengthened or weakened your relationship with patients?

Strengthened
 Weakened
 Neutral/no effect
 Other _____

8. Do you find there are any barriers to discussion and utilisation of CAM with your patients?

Do not believe in CAM

Limited time during consultation

No interest in using CAM

Lack of scientific data on safety and efficacy

Lack of professional/hospital guidelines

Other: _____

Section 4: CAM education

This section asks about your past education on CAM and your preferences for future education in the oncology services.

- 1. Do you feel that you and your professional practice would benefit from more education and training regarding CAM?**

Yes
No

- 2. Did you receive any education on complementary and alternative medicine in your undergraduate degree?**

Yes
No

- 3. What areas of complementary and alternative medicine do you feel should be covered education?**

Interactions of CAM with cancer therapy
Efficacy of CAM
Evidence-Based resources for CAM information
Information resources for patients
Other: _____

- 4. Which forms of education do you feel would be most effective to deliver knowledge related to complementary and alternative medicine in cancer care to oncology health professionals?**

Information leaflets
Online modules
Workshops
Other: _____

Section 5: Demographic Data

This section asks questions regarding demographic characteristics about yourself and your work.

What is your age?	<input type="checkbox"/> PREFER NOT TO SAY
Which gender do you identify as?	<input type="checkbox"/> Male
	<input type="checkbox"/> Female
	<input type="checkbox"/> Other
	<input type="checkbox"/> PREFER NOT TO SAY
What is the highest education level you have obtained?	<input type="checkbox"/> Health-related Postgraduate Degree
	<input type="checkbox"/> Research-related Postgraduate Degree
	<input type="checkbox"/> Graduate Diploma and Graduate Certificate
	<input type="checkbox"/> Bachelor Degree
	<input type="checkbox"/> Advanced Diploma and Diploma
	<input type="checkbox"/> PREFER NOT TO SAY
What was your country of birth?	<input type="checkbox"/> PREFER NOT TO SAY
What is your current profession?	<input type="checkbox"/> Doctor
	<input type="checkbox"/> Nurse
	<input type="checkbox"/> Pharmacist
	<input type="checkbox"/> Other: _____
How long have you been working in the speciality of Oncology?	

Thank you for talking the time to complete this survey. Your responses are very valuable and will assist us in the development and delivery of education on CAM use in cancer care.

Appendix 5 – Ethics Approval from the Townsville Hospital and Health Service Human Research Ethics Committee for Patient Surveys (Chapter 4)

This administrative form
has been removed

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has been removed

Appendix 6 – Approval from the Townsville Hospital and Health Service Research Governance Office Patient Surveys (Chapter 4)

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has been removed

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has been removed

Appendix 7 – Ethics Approval from the James Cook University Human Research Ethics Committee for Patient Surveys (Chapter 4)

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has been removed

Appendix 8 – Ethics Approval from the James Cook University Human Research Ethics Committee for Health Professional Surveys (Chapter 5)

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has been removed

Appendix 9 – Unpublished data from Chapter 4 – Perspectives of Complementary and Alternative Medicine Use by Cancer Patients in a Regional Hospital in North Queensland, Australia

A. Current Complementary and Alternative Medicine Use

Numbers of CAM Used per person

Number of CAM Used	Number of Respondents	Percent of Respondents
1	16	40%
2	8	20%
3	8	20%
4	4	10%
6	3	7.5%
9	1	2.5%

CAM CLASSIFICATION	Number Used	Different Agents Used
Natural Products	79	38
Mind & Body Practices	25	12
Other CAM	5	5

Who Recommended CAM

Recommended By	Number	Percentage
Friend and Family	23	21.10%
Own Research	21	19.27%
Missing	25	22.94%
Doctor	14	12.84%
Reading Books;	8	7.34%
Oncologist;	6	5.50%
Pharmacist	3	2.75%
General Ongoing Practice	2	1.83%
Physio	1	0.92%
General public understanding of wide benefits of Yoga	1	0.92%
Have been aware of it for years after seeing a psychologist as a student;	1	0.92%
Chemotherapy Support Group	1	0.92%
CAM Practitioner;	1	0.92%
Internet (Google)	1	0.92%
Breast care nurse	1	0.92%

Source of Information of CAM

Source	Frequency	
Online (Mayo, Tahitian Noni Int., JCU Site, Google)	22	20.18%
Missing	30	27.52%
Multiple Sources (Books, Online, Journals {6}; Intenet, GP; General knowledge, shops, other people; Community Centre, Google; Books, Internet, Friends {2}; Books, Web, Practitioner; Internet , Friends; Google/Friend {2}; GP and Friend)	16	14.68%
Doctor (incl Oncologist)	12	11.01%
Friends & Family (mother, daughter)	9	8.26%
CAM Practitioner (Biochemist/Naturopath/Nutritionist, Spouse (Reiki Practitioner), Spouse (Indigenous Healer); Oil Provider)	5	4.59%
Books (Book from Percy Westow, books on herbal medicine)	4	3.67%
Allied Health (Physio, Psychologist)	3	2.75%
General Ongoing Practice	2	1.83%
Life over 70 years;	1	0.92%
Health Shop	1	0.92%
The Bottle	2	1.83%
Personal Research;	1	0.92%
Pharmacist	1	0.92%

2. Where did you buy or obtain your complementary and alternative medicine?

Responses = 26 (multiple responses allowed)

	Frequency	Percentage	Percentage of People
Purchase from Pharmacy	13	23.2%	31.7%
Purchase from the Internet	11	19.6%	26.8%
Purchase from Health Foo/Nutrition Store	9	16.1%	22%
Purchase from CAM Practitioner	8	14.3%	19.5%
Purchase from Doctor	1	1.8%	2.4%
PREFER NOT TO SAY	5	8.9%	12.2%
Other	9	16.1%	22%

4. Have any health professionals asked you about your complementary and alternative medicine use?

	Frequency	Percentage
Yes	14	34.1%
No	27	65.9%

4a. If Yes, who has asked you about complementary and alternative medicine? (tick all that apply)

Responses = 14 (Multiple Responses allowed)

	Frequency	Percent of responses	Percentage (of people)
Asked by Oncologist	8	36.4%	57.1%
Asked by GP	5	22.7%	35.7%
Asked by Pharmacist	4	18.2%	28.6%
Asked by Nurse	3	13.6%	21.4%
Other - Physiotherapist	1	4.45%	7.15%
Family Member	1	4.45%	7.15%

5. Have you asked a health professional about your complementary and alternative medicine use?

	Frequency	Percentage
Yes	28	68.3%
No	13	31.7%

5a. If Yes, who did you speak to about complementary and alternative medicine?

Responses = 28 (Multiple Responses allowed)

	Frequency	Percentage of responses	Percentage (of people)
Disclosed to GP	19	39.6%	67.9%
Disclosed to Oncologist	15	31.3%	53.6%
Disclosed to Nurse	7	14.6%	25%
Disclosed to Pharmacist	5	10.4%	17.9%
Other	2	4.2%	7.1%
Palliative care doctors	1		
Physiotherapist	1		

5b. Why did you mention your complementary and alternative medicine to a health professional?

Responses = 27 (Multiple Responses allowed)

	Frequency	Percentage of responses	Percentage (of people)
Concern about interactions	21	25.5%	44.4%
Getting their professional opinion	18	38.3%	66.7%
Part of medication history	10	21.3%	37%
Concern about side-effects	8	12.8%	22.2%
Full Disclosure	1	2.4%	2.4%

5c. How did they respond?

Responses – 26

	Frequency	Percentage
Neither encouraged nor discouraged me	13	50%
Encouraged me to continue	10	38.5%
Advised me to stop	3	11.5%

6. If no, why did you not talk to health professionals about complementary and alternative medicines?

Responses = 11 (multiple responses allowed) – 2 missing

	Frequency	Percentage of responses	Percentage of people
I was never asked	5	33.3%	45.5%
They Might Disapprove	3	20%	27.3%
They might not be interested	2	6.7%	9.1%
Not important for health professionals to know about CAM use	2	13.3%	18.2%
Other	4	26.7%	36.4%
I know there is no risk to yoga and mindfulness	1		
I found most did not know about the support they offer our immune system	1		
I trust them to tell me	1		
I try not to draw attention to the use of illicit substances	1		

Section 2: Demographic Data

3. What is your age?

	CAM Users (38) – 3 missing	Non Users (60) – 1 missing	Sig (Independent t-test)
Range	30-79	27-82	.095
Mean	60.13	58.88	
Standard Deviation	13.06	11.69	

9. Are you currently working?

	CAM Users (40) – 2 missing		Non Users (59) – 1 missing		Sig (Chi-squared test)
Yes	11	27.5%	10	16.9%	.305
No	27	67.5%	46	80%	
PREFER NOT TO SAY	0	0	3	5.1%	

11. Where do you live?

All answered Queensland, Australia

Appendix 10 – Unpublished data from Chapter 5 - Knowledge, Attitudes and Practices of Australian Oncology Health Professionals on Complementary Medicines

Section 1: Knowledge Regarding CAM

1. A cancer patient is suffering from chemotherapy-induced nausea. Which CAM might they use to treat this symptom? (Mark all that apply)

Correct Answer – Ginger

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fischer's exact)
TOTAL	96	99	97%	
Doctors	8	9	88.9%	0.166
Nurses	69	70	98.6%	
Pharmacists	19	20	95%	

2. A male patient has begun to feel depressed and anxious after receiving a recent diagnosis of prostate cancer. Which CAM might they use to treat their depression and anxiety? (Mark all that apply)

Correct Answer – St. John's Wort

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fischer's exact)
TOTAL	59	99	59.6%	
Doctors	6	9	66.7%	<0.001
Nurses	34	70	48.6%	
Pharmacists	19	20	95%	

3. A woman with metastatic colorectal cancer is being treated with capecitabine and oxaliplatin. She is concerned about the hepatotoxic effects of her therapy. Which CAM might she use to alleviate these potential effects (Mark all that apply)

Correct Answer – Milk Thistle

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fischer's exact)
TOTAL	38	99	38.4%	
Doctors	5	9	55.6%	<0.001
Nurses	17	70	24.3%	
Pharmacists	16	20	80%	

4. A man diagnosed with urothelial cancer is being treated with cisplatin and gemcitabine. He wishes to reduce the peripheral neuropathy associated with his therapy. Which CAM might they use to reduce this side effect? (Mark all that apply)

Correct Answer – Vitamin E

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fischer's exact)
TOTAL	22	99	22.2%	
Doctors	2	9	22.2%	.844
Nurses	16	70	22.9%	
Pharmacists	4	20	20%	

5. A woman with lung cancer wishes to take a natural product that will improve her immunity. Which CAM might be used to modulate their immunity? (Mark all that apply)

Correct Answer – Ginseng

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fisher's exact)
TOTAL	19	99	19.2%	
Doctors	2	9	22.2%	.099
Nurses	17	70	24.2%	
Pharmacists	10	20	50%	

6. A man with metastatic colon cancer is being treated with irinotecan. Which CAM should he avoid? (Mark all that apply)

Correct Answer – St. John's Wort

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fisher's exact)
TOTAL	44	99	44.4%	
Doctors	6	9	66.7%	.058
Nurses	25	70	35.7%	
Pharmacists	13	20	65%	

7. A cancer patient on warfarin for a deep vein thrombosis develops frequent nose bleeds. Which of the following CAM should the patient avoid? (Mark all that apply)

Correct Answer – Gingko Biloba

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fisher's exact)
TOTAL	10	99	10.1%	
Doctors	1	9	11.1%	0.06
Nurses	4	70	5.7%	
Pharmacists	5	20	25%	

8. A woman with breast cancer (stage II, ER positive, HER2 negative) has finished 10 years of adjuvant hormonal therapy. Which of the following CAM should she avoid? (Mark all that apply)

Correct Answer – Soy Isoflavones

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fisher's exact)
TOTAL	63	99	63.6%	
Doctors	6	9	66.7%	<0.001
Nurses	38	70	54.3%	
Pharmacists	19	20	95%	

9. A man with alcoholic cirrhosis and metastatic hepatocellular cancer is receiving sorafenib. Which of the following CAM should he avoid? (Mark all that apply)

Correct Answer – Valerian

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fisher's exact)
TOTAL	16	99	16.2%	
Doctors	1	9	11.1%	0.516
Nurses	10	70	14.3%	
Pharmacists	5	20	25%	

10. A woman with cervical cancer is due to receive radiotherapy as part of her treatment. Which of the following CAM should she avoid? (Mark all that apply)

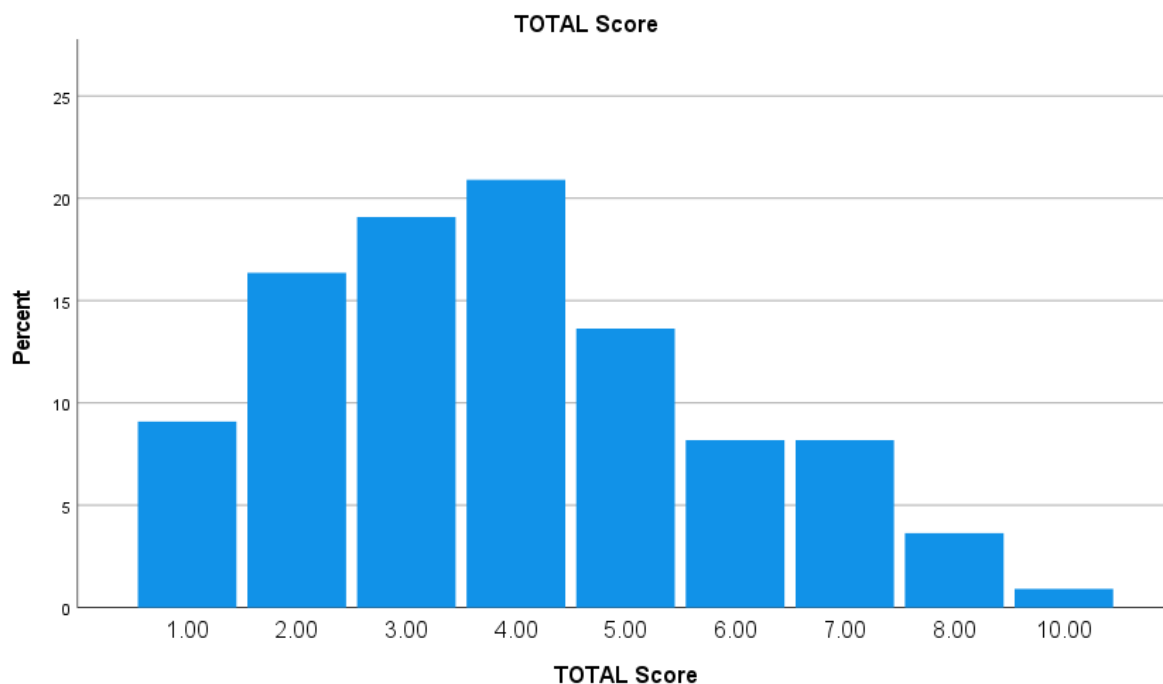
Correct Answer – Vitamin E

Profession Breakdown

Profession	Correct	Number	Percentage	Significance (Fisher's exact)
TOTAL	21	99	21.2%	
Doctors	3	9	33.3%	0.044
Nurses	11	70	15.7%	
Pharmacists	7	20	35%	

Total Score

Score	Number of Respondents	Percentage of Respondents
1	10	9.1%
2	18	16.4%
3	21	19.1%
4	23	20.9%
5	15	13.6%
6	9	8.2%
7	9	8.2%
8	4	3.6%
10	1	0.9%



Between Professions

Profession	Mean Score	Standard Deviation
Doctors	4.6	2.65
Nurses	3.4	1.5
Pharmacists	5.8	1.6

Doctors vs nurses – (Independent t test – 2 sided) – 0.058

Pharmacists vs nurses – (Independent t test – 2 sided) – <0.001

Doctors vs Pharmacists – (Independent t test – 2 sided) – 0.128

11. Which resources do you use for information on Complementary and Alternative Medicine?

Source of Information	Number of Respondents	Percent of Respondents	ANOVA significance between groups
Medline or PubMed	45	40.9%	0.356
Online Resources	81	73.6%	0.062
Online Search Engines	33	30.0%	0.440
Colleague	33	30.0%	.622
Textbook	11	10.0%	.479
OTHER	35	31.8%	.13

Other:

About Herbs MSKCC	11
Pharmacist	6
Cancer Council Booklet	4
Natural Medicines Database	3
Journal Articles	1
Hospital Brochure	1
Cancer Websites	1
Professional resource (AMH etc)	1
NLM	1
Peter Mac	1
EviQ	1

Section 2 – Attitudes:**DOCTORS****1. Mark responses for each of the following statements:**

		Strongly Agree	Agree	Disagree	Strongly Disagree
A.	Many CAM have anticancer properties. (9)	0%	22%	33%	44%
B.	I know enough to answer patients' questions about CAM. (9)	0%	22%	67%	11%
C.	Many CAM help with alleviating side effects from cancer treatments. (9)	22%	22%	44%	11%
D.	I am worried about the interactions CAM may have with the treatments I provide. (9)	33%	67%	0%	0%
E.	Many CAM have beneficial effects on psychological symptoms such as depression and anxiety. (9)	11%	78%	11%	0
F.	Many CAM have beneficial effects on physical symptoms such as pain and nausea. (9)	22%	22%	33%	22%
G.	Patients spend too much of their own money on CAM. (9)	67%	11%	22%	0
H.	I would support patients' use of CAM when no standard treatment options are available. (9)	22%	56%	22%	0
I.	Most CAM are safe and have minimal side effects. (9)	0	22%	67%	11%
J.	I believe that my cultural, spiritual or religious beliefs influence my attitudes toward CAM? (9)	11%	44%	11%	33%

NURSES

1. Mark responses for each of the following statements:

		Strongly Agree	Agree	Disagree	Strongly Disagree
A.	Many CAM have anticancer properties. (70)	2.9%	27.1%	51.4%	18.6%
B.	I know enough to answer patients' questions about CAM. (69)	1.4%	18.8%	53.6%	26.1%
C.	Many CAM help with alleviating side effects from cancer treatments. (70)	15.7%	55.7%	28.6%	0
D.	I am worried about the interactions CAM may have with the treatments I provide. (70)	37.1%	55.7%	5.7%	1.4%
E.	Many CAM have beneficial effects on psychological symptoms such as depression and anxiety. (70)	21.4%	57.1%	21.4%	0
F.	Many CAM have beneficial effects on physical symptoms such as pain and nausea. (70)	12.9%	64.3%	22.9%	0
G.	Patients spend too much of their own money on CAM. (70)	30%	45.7%	24.3%	0
H.	I would support patients' use of CAM when no standard treatment options are available. (70)	22.9%	62.9%	10%	4.3%
I.	Most CAM are safe and have minimal side effects. (70)	3%	28.6%	58.6%	8.6%
J.	I believe that my cultural, spiritual or religious beliefs influence my attitudes toward CAM? (70)	4.3%	25.7%	48.6%	21.4%

PHARMACISTS

1. Mark responses for each of the following statements:

		Strongly Agree	Agree	Disagree	Strongly Disagree
A.	Many CAM have anticancer properties. (20)	0	10%	55%	35%
B.	I know enough to answer patients' questions about CAM. (20)	10%	65%	25%	0
C.	Many CAM help with alleviating side effects from cancer treatments. (20)	0	20%	75%	5%
D.	I am worried about the interactions CAM may have with the treatments I provide. (20)	65%	30%	5%	1%
E.	Many CAM have beneficial effects on psychological symptoms such as depression and anxiety. (20)	0	40%	60%	0
F.	Many CAM have beneficial effects on physical symptoms such as pain and nausea. (20)	0	25%	65%	10%
G.	Patients spend too much of their own money on CAM. (20)	65%	25%	10%	0
H.	I would support patients' use of CAM when no standard treatment options are available. (20)	15%	70%	15%	0
I.	Most CAM are safe and have minimal side effects. (20)	0	25%	45%	30%
J.	I believe that my cultural, spiritual or religious beliefs influence my attitudes toward CAM? (20)	5%	20%	30%	45%

Comparison Between Professions (Independent Samples t-test)**Doctors v Nurses**

A - .177

B - .538

C - .208

D - .831

E - 1

F - .058

G - .152

H - .865

I - .468

J - .491

Nurses v Pharmacists

A - .035

B - **<0.001**C - **<0.001**

D - 0.53

E - **<0.001**F - **<0.001**

G - 0.009

H - 0.805

I - 0.062

J - 0.188

Doctors v Pharmacists

A - 0.922

B - **0.004**

C - 0.153

D - 0.255

E - 0.006

F - 0.360

G - 0.728

H - 1

I - 0.580

J - 0.235

2. In the past 12 months, which of the following types of CAM have you used for yourself.

Total Respondents

CAM Category	Number of Respondents	Percent of Respondents
Natural Products	61	67.8%
Mind and body Practices	76	84.4%
Other Complementary Health Approaches	16	17.8%

Doctors

CAM Category	Number of Doctors	Percent of Doctors
Natural Products	4	66.7%
Mind and body Practices	5	83.3%
Other Complementary Health Approaches	2	33.3%

Nurses

CAM Category	Number of Nurses	Percent of Nurses
Natural Products	45	68.2%
Mind and body Practices	57	86.4%
Other Complementary Health Approaches	11	16.7%

Pharmacists

CAM Category	Number of Pharmacists	Percent of Pharmacists
Natural Products	10	66.7%
Mind and body Practices	12	80.0%
Other Complementary Health Approaches	1	6.7%

Doctors v Nurses – Natural Products – 0.254 (Independent t-test – 2-sided)

Mind & Body Practices – 0.077 (Independent t-test – 2-sided)

Other – 0.625 (Independent t-test – 2-sided)

Nurses v Pharmacists- Natural Products – 0.253 (Independent t-test – 2-sided)

Mind & Body Practices – 0.046 (Independent t-test – 2-sided)

Other – 0.218 (Independent t-test – 2-sided)

Pharmacists v Doctors- Natural Products – 0.791 (Independent t-test – 2-sided)

Mind & Body Practices – 0.83 (Independent t-test – 2-sided)

Other – 0.17 (Independent t-test – 2-sided)

3. When recommending or discussing CAM with patients, how important are the following factors:

Total Respondents

		Most important	Very important	Somewhat important	Not very important
A.	<i>Patient preferences (95)</i>	29.5%	64.2%	0	6.3%
B.	<i>Your clinical experience (99)</i>	14.6%	71.8%	11.7%	2%
C.	<i>Published research regarding efficacy of CAM (99)</i>	60.2%	35%	4.9%	0
D	<i>Published research regarding safety of CAM (99)</i>	76.7%	23.3%	0	0

Doctors

		Most important	Very important	Somewhat important	Not very important
A.	<i>Patient preferences (9)</i>	22.7%	77.8%	0	0
B.	<i>Your clinical experience (9)</i>	33.3%	33.3%	22.2%	11.1%
C.	<i>Published research regarding efficacy of CAM (9)</i>	66.7%	22.2%	11.1%	0
D	<i>Published research regarding safety of CAM (9)</i>	77.8%	22.2%	0	0

Nurses

		Most important	Very important	Somewhat important	Not very important
A.	<i>Patient preferences (62)</i>	34%	61%	5%	0
B.	<i>Your clinical experience (70)</i>	12.9%	72.9%	12.9%	1.4%
C.	<i>Published research regarding efficacy of CAM (70)</i>	62.9%	32.9%	4.3%	0
D	<i>Published research regarding safety of CAM (70)</i>	77.1%	22.9%	0	0

Pharmacists

		Most important	Very important	Somewhat important	Not very important
<i>A.</i>	<i>Patient preferences (20)</i>	20%	65%	15%	0
<i>B.</i>	<i>Your clinical experience (20)</i>	10%	85%	5%	0
<i>C.</i>	<i>Published research regarding efficacy of CAM (20)</i>	50%	45%	5%	0
<i>D</i>	<i>Published research regarding safety of CAM (20)</i>	75%	25%	0	0

Comparison Between Professions (Independent Samples t-test)

	Doctors v Nurses	Nurses v Pharmacists	Doctors v Pharmacists
A	0.294	0.124	0.451
B	0.714	0.562	0.549
C	0.886	0.361	0.686
D	0.966	0.844	0.877

Section 3 – Practices

1. In the past 12 months, have you ever prescribed or administered chemotherapy to a patient who you knew was also taking CAM?

Response	Number of Respondents	Percent	Number of Doctors	Percent	Number of Nurses	Percent	Number of Pharmacists	Percent
Yes	60	60.6%	7	77.8%	36	51.4%	17	85%
No	39	39.3%	2	22.2%	34	48.6%	3	15%

Comparison Between Professions (Two-sided t-test)

Doctors v Nurses – 0.139

Nurses v Pharmacists – **0.007**

Doctors v Pharmacists – 0.648

If yes, approximately how many patients?

Response	Number of Respondents	Percent	Number of Doctors	Percent	Number of Nurses	Percent	Number of Pharmacists	Percent
1-10 patients	25	41.7%	1	11.1%	20	55.6%	4	23.5%
11-20 patients	15	25%	1	11.1%	7	19.4%	7	41.2%
21-30 patients	6	10%	2	22.2%	3	8.3%	1	5.9%
31-40 patients	4	6.7%	2	22.2%	0	0	2	11.8%
41-50 patients	1	1.7%	0	0	1	2.8%	0	0
>50 patients	9	15%	1	11.1%	5	13.9%	3	17.6%

2. Please indicate whether you have ever recommended to patients the following CAM therapies?

Response	Number of Respondents	Percent	Number of Doctors	Percent	Number of Nurses	Percent	Number of Pharmacists	Percent
Natural Products	47	59.5%	6	66.7%	31	44.3%	10	50%
Mind and Body Practices	70	88.6%	7	77.8%	57	81.4%	6	30%
Other Complementary Health Approaches	19	24.1%	3	33.3%	14	20%	2	10%

Doctors v Nurses – Natural – 0.210 (Independent t-test – 2-sided)

Mind & Body – 0.796 (Independent t-test – 2-sided)

Other – 0.366 (Independent t-test – 2-sided)

Nurses v Pharmacists- Natural – 0.655 (Independent t-test – 2-sided)

Mind & Body – **<0.001** (Independent t-test – 2-sided)

Other – 0.308 (Independent t-test – 2-sided)

Pharmacists v Doctors- Natural – 0.422 (Independent t-test – 2-sided)

Mind & Body – 0.016 (Independent t-test – 2-sided)

Other – 0.133 (Independent t-test – 2-sided)

3. Please estimate the percentage of your patients that currently use CAM (not including standard doses of vitamins and minerals such as those in a multivitamin)?

	Number of Respondents	Minimum	Maximum	Mean	Standard Deviation
Doctors	9	28	93	50.56	22.361
Nurses	69	5	88	42.09	21.270
Pharmacists	20	8	75	36.95	16.327

Doctors v Nurses – 0.267 (Independent t-test – 2-sided)

Nurses v Pharmacists- 0.322 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.075 (Independent t-test – 2-sided)

4. In the past 12 months, with approximately what percentage of your patients have you discussed the topic of CAM?

	Number of Respondents	Minimum	Maximum	Mean	Standard Deviation
Doctors	9	13	100	44.78	28.986
Nurses	68	0	100	37.06	25.175
Pharmacists	20	6	100	50.55	29.892

Doctors v Nurses – 0.398 (Independent t-test – 2-sided)

Nurses v Pharmacists- 0.047 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.631 (Independent t-test – 2-sided)

5. Please estimate what percentage of these discussions about CAM were initiated by you.

	Number of Respondents	Minimum	Maximum	Mean	Standard Deviation
Doctors	8	0	73	35.12	24.753
Nurses	64	0	100	32.36	31.220
Pharmacists	18	0	100	48.94	30.510

Doctors v Nurses – 0.81 (Independent t-test – 2-sided)

Nurses v Pharmacists- 0.049 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.272 (Independent t-test – 2-sided)

6. Regarding these discussions with your patients about CAM, how often did you do the following:

Total Respondents

		<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>
<i>A.</i>	<i>Support the use of CAM (99)</i>	18.2%	64.6%	15.2%	2%
<i>B.</i>	<i>Recommend the use of CAM (99)</i>	6%	46.5%	24.2%	23.2%
<i>C.</i>	<i>Discourage the use of CAM (98)</i>	23.5%	46.9%	28.6%	1%
<i>D.</i>	<i>Neither recommended nor discouraged the use of CAM (97)</i>	17.5%	46.4%	26.8%	9.3%

Doctors:

		<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>
<i>A.</i>	<i>Support the use of CAM (9)</i>	0	66.7%	33.3%	0
<i>B.</i>	<i>Recommend the use of CAM (9)</i>	0	44.4%	22.2%	33.3%
<i>C.</i>	<i>Discourage the use of CAM (9)</i>	33.3%	33.3%	33.3%	0
<i>D.</i>	<i>Neither recommended nor discouraged the use of CAM (9)</i>	22.2%	55.6%	11.1%	11.1%

Nurses:

		<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>
<i>A.</i>	<i>Support the use of CAM (70)</i>	25.7%	62.9%	10%	1.4%
<i>B.</i>	<i>Recommend the use of CAM (70)</i>	8.6%	52.9%	22.9%	15.7%
<i>C.</i>	<i>Discourage the use of CAM (69)</i>	11.6%	50.7%	36.2%	1.4%
<i>D.</i>	<i>Neither recommended nor discouraged the use of CAM (69)</i>	18.8%	49.3%	24.6%	7.2%

Pharmacists:

		<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>
<i>A.</i>	<i>Support the use of CAM (20)</i>	0	70%	25%	5%
<i>B.</i>	<i>Recommend the use of CAM (20)</i>	0	25%	30%	45%
<i>C.</i>	<i>Discourage the use of CAM (20)</i>	60%	40%	0	0
<i>D.</i>	<i>Neither recommended nor discouraged the use of CAM (19)</i>	10.5%	31.6%	42.1%	15.8%

Comparison Between Professions (Independent Samples t-test)

	Doctors v Nurses	Nurses v Pharmacists	Doctors v Pharmacists
A	0.039	0.003	0.942
B	0.165	<0.001	0.377
C	0.671	0.388	0.026
D	0.706	0.291	0.469

7. Overall, do you think talking about the use of CAM has strengthened or weakened your relationship with patients?

Total Respondents

Response	Number of Respondents	Percent of Respondents
Strengthened	63	57.3%
Weakened	1	0.9%
Neutral/no effect	30	27.3%
Other	5	4.5%

Doctors:

Response	Number of Doctors	Percent of Doctors
Strengthened	6	66.7%
Neutral/no effect	3	33.3%

Nurses:

Response	Number of Nurses	Percent of Nurses
Strengthened	43	61.4%
Weakened	1	1.4%
Neutral/no effect	22	31.4%
Other	4	5.7%

Pharmacists:

Response	Number of Pharmacists	Percent of Pharmacists
Strengthened	14	70%
Neutral/no effect	5	25%
Other	1	5%

Doctors v Nurses – 0.81 (Independent t-test – 2-sided)

Nurses v Pharmacists- 0.049 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.272 (Independent t-test – 2-sided)

8. Do you find there are any barriers to discussion and utilisation of CAM with your patients?

Doctors:

Response	Number of Doctors	Percent of Doctors
Do not believe in CAM	2	8.3%
Limited time during consultation	2	8.3%
No interest in using CAM	3	12.5%
Lack of scientific data on safety and efficacy	8	33.3%
Lack of professional/hospital guidelines	6	25.0%

Nurses:

Response	Number of Doctors	Percent of Doctors
Do not believe in CAM	8	5.3%
Limited time during consultation	24	15.8%
No interest in using CAM	7	4.6%
Lack of scientific data on safety and efficacy	52	34.2%
Lack of professional/hospital guidelines	48	31.6%

Pharmacists:

Response	Number of Doctors	Percent of Doctors
Do not believe in CAM	4	9.8%
Limited time during consultation	6	14.6%
No interest in using CAM	2	4.9%
Lack of scientific data on safety and efficacy	18	43.9%
Lack of professional/hospital guidelines	9	22.0%

Comparison of Professions (Independent t-test – 2-sided)

	Doctors v Nurses	Nurses v Pharmacists	Doctors v Pharmacists
Do not believe in CAM	0.366	0.325	0.896
Limited time during consultation	0.475	0.724	0.678
No interest in using CAM	0.048	1	0.133
Lack of scientific data on safety and efficacy	0.341	0.139	0.931
Lack of professional/hospital guidelines	0.909	0.055	0.297

Section 4 – Education

1. Do you feel that you and your professional practice would benefit from more education and training regarding CAM?

Response	Number of Respondents	Percent	Number of Doctors	Percent	Number of Nurses	Percent	Number of Pharmacists	Percent
Yes	92	92.9%	7	77.8%	67	95.7%	18	90%
No	7	7.1%	2	22.2%	3	4.3%	2	10%

Doctors v Nurses – 0.38 (Independent t-test – 2-sided)

Nurses v Pharmacists- 0.331 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.395 (Independent t-test – 2-sided)

2. Did you receive any education on complementary and alternative medicine in your undergraduate degree?

Response	Number of Respondents	Percent	Number of Doctors	Percent	Number of Nurses	Percent	Number of Pharmacists	Percent
Yes	28	28.3%	2	22.2%	13	18.6%	13	65%
No	71	71.7%	7	77.8%	57	81.4%	7	35%

Doctors v Nurses – 0.76 (Independent t-test – 2-sided)

Nurses v Pharmacists- <0.001 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.033 (Independent t-test – 2-sided)

3. What areas of complementary and alternative medicine do you feel should be covered in future education?

Response	Number of Respondents	Percent of Respondents
Interactions of CAM with cancer therapy	96	26.4%
Efficacy of CAM	89	24.5%
Evidence-Based resources for CAM information	89	24.5%
Information resources for patients	85	23.4%

4. Which forms of education do you feel would be most effective to deliver knowledge related to complementary and alternative medicine in cancer care to staff in oncology services?

Response	Number of Respondents	Percent of Respondents
Information leaflets	57	28.1%
Online modules	88	43.3%
Workshops	50	24.6%

Section 5: Demographic Data

1. What is your age?

Number of Respondents	Range	Minimum	Maximum	Mean	Standard Deviation
91	39	29	68	46.80	10.206

Doctors:

Number of Respondents	Range	Minimum	Maximum	Mean	Standard Deviation
9	38	68	47.56	9.964	9

Nurses:

Number of Respondents	Range	Minimum	Maximum	Mean	Standard Deviation
66	29	64	48.11	9.969	66

Pharmacists:

Number of Respondents	Range	Minimum	Maximum	Mean	Standard Deviation
16	29	65	41.00	9.879	16

Doctors v Nurses – 0.877 (Independent t-test – 2-sided)

Nurses v Pharmacists- 0.012 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.272 (Independent t-test – 2-sided)

2. Which gender do you identify as?

Response	Number of Respondents	Percent	Number of Doctors	Percent	Number of Nurses	Percent	Number of Pharmacists	Percent
Male	14	14.1%	5	55.6%	2	2.9%	7	35%
Female	84	84.8%	4	44.4%	68	97.1%	12	60%
Prefer not to say	1	1%	0	0	0		1	5%

Doctors v Nurses – <0.001 (Independent t-test – 2-sided)

Nurses v Pharmacists- 0.019 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.272 (Independent t-test – 2-sided)

3. What is the highest education level you have obtained?

Response	Number of Respondents	Percent	Number of Doctors	Percent	Number of Nurses	Percent	Number of Pharmacists	Percent
Health-related Postgraduate Degree	48	48.5%	4	44.4%	34	48.6%	10	50%
Research-related Postgraduate Degree	8	8.1%	3	33.3%	4	5.7%	1	5%
Graduate Diploma and Graduate Certificate	27	27.3%	0	0	24	34.3%	3	15%
Bachelor Degree	16	16.2%	2	22.2%	8	11.4%	6	30%

Doctors v Nurses – 0.834 (Independent t-test – 2-sided)

Nurses v Pharmacists- 0.588 (Independent t-test – 2-sided)

Pharmacists v Doctors- 0.272 (Independent t-test – 2-sided)

4. What was your country of birth? (19)

13 – Australia

2 – England

4 – PREFER NOT TO SAY

6. How long have you been working in the Oncology Services

Number of Respondents	Range	Minimum	Maximum	Mean	Standard Deviation
99	37	1	37	16.27	9.373