

# Use of Complementary Medicines by Cardiac Surgery Patients; Undisclosed and Undetected

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**Background:** Some complementary medicines (CMs) confer benefits in people with cardiovascular disease, yet they also pose risks such as drug interactions and haemorrhage.

**Objectives:** To determine cardiac surgery patients' perioperative use of CMs, disclosure about their use and interest in hospitals providing access to complementary therapies.

**Method:** An anonymous survey of 205 elective cardiac surgery inpatients at Cabrini Hospital, Victoria.

**Results:** Of the 161 respondents (78% response rate), 51% took CMs and 92% took prescription medicines in the two weeks before admission. Of those taking CMs, 42% intended to continue this use in hospital. Medical doctors were the main prescribers and 25% of patients were taking fish oils and 25% multivitamins. Use was not significantly associated with gender, education or income. In hospital, the main reason for non-disclosure about CM use was not being asked. Of those asked about their use, 52% reported being asked by a nurse, 12% a surgeon, 12% a pharmacist and 8% an anaesthetist. Most (85%) of the total sample would consider using complementary therapies if offered by hospitals.

**Conclusions:** CMs are used by cardiac surgery patients but communication with surgeons and anaesthetists is poor. There is substantial patient interest in hospital-based complementary therapies.

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**Keywords.** Complementary medicines; Safety; Herb–drug interactions; Surgery; Communication

## Introduction

Herbal medicines, nutritional and dietary supplements, also known as complementary medicines (CMs), have become increasingly popular in the United States, United Kingdom, Canada and Australia, with self-medication making up the majority of use [1–5]. In Australia, it was found that up to 69% of the adult population had used complementary therapies in a 12 month period [2] and the total money spent on this sector is estimated at between AU\$800 million and at AU\$1.86 billion dollars annually [2,6]. In Australia, over-the-counter (OTC) complementary medicine products are regulated by the Therapeutic Goods Administration (TGA) and are considered to contain low-risk ingredients which are safe for use by the general population. Despite these measures, no therapeutic substance is entirely risk free. In general, people do not discuss their use of complemen-

tary medicine with their medical practitioners [7]. This can lead to adverse consequences whereby side effects due to use of CMs remain undetected and drug interactions can ensue.

Reviews on the role of CMs in the management of cardiovascular disease indicate that some agents confer significant benefits in hyperlipidaemia, hypertension and congestive heart failure [8,9] with evidence to support the use of supplements such as fish oils [10], coenzyme Q10 and the herb Hawthorn [11]. Despite providing health benefits, there are also potential risks. Of relevance to the patient with cardiovascular disease, some CMs have sympathomimetic effects, raise blood pressure, alter platelet function or induce interactions with drugs commonly used by this population [8,12–15]. Safety concerns have particular relevance to patients undergoing cardiothoracic surgery, those of advanced age and/or taking multiple medications as they are at increased risk of adverse events and interactions.

Research conducted in the United States suggests complementary therapies are used by surgical patients, although few disclose this use to hospital staff [16–19]. One Australian study in 2004 found that 20% of surgical patients

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used vitamin supplements in the six weeks before surgery and 14% had used herbal medicines [20]. Of these patients, only 28% had disclosed their use to hospital doctors. Use amongst cardiac surgery patients in Australia has not yet been explored.

The main purpose of this study was to investigate the use of CMs by cardiac surgery patients prior to surgery, the specific medicines being used, whether patients disclosed their use to hospital staff and perceived barriers to disclosure. Secondary aims were to determine prescribers of CMs to this population, information sources used by patients, their perceptions about the safety of CMs and interest in hospital based diet, lifestyle and complementary therapies.

## Methods

From September to December 2004, an anonymous survey was distributed to all patients presenting for non-emergency cardiothoracic surgery at Cabrini Hospital, a 460-bed private hospital in Melbourne, Australia. Patients were considered eligible to participate if they were aged over 18 years and able to fill out the questionnaire unassisted before their surgery. Patients were excluded if they were non-English speaking, admitted to the ward on the weekends, had already undergone surgery or unable to fill out the survey unassisted. Nursing staff distributed the surveys to patients in their beds during their daytime shifts and were available to answer questions. To avoid responder bias, the questionnaire was presented in a blank envelope and introduced as a general medication survey. The study received ethics approval from RMIT and Cabrini Hospital (Malvern) HRECs before commencement.

A questionnaire was developed on the basis of published literature and after consultation with hospital doctors and nurses. A provisional questionnaire was pretested by a convenience sample of 10 patients to validate the survey tool. The final questionnaire consisted of 25 core questions regarding participant characteristics, use of prescription and complementary medicines and interest in utilising hospital-based diet, lifestyle and complementary therapies. Additional questions were asked of patients who reported using complementary medicines which were defined on the first page of the questionnaire as 'herbal medicines, vitamin and mineral supplements and food supplements which can be bought in a supermarket, pharmacy, health-food store, on the internet, from a mail order company or from a practitioner'. Additional questions focused specifically on issues relating to their previous and current use of complementary medicines including names of products used, reasons for use, disclosure to hospital staff, method of obtaining supplements in hospital, prescribers of their complementary medicines, perception of the safety of CMs and information sources used. Response options varied depending on the type of question asked and included multiple choice, open-ended free text and Likert-scaled responses.

Data were analysed with the use of SPSS 13.0 (Statistical Package for the Social Sciences, SPSS Inc., Chicago, IL). Chi-square tests were used to analyse categorical vari-

**Table 1.** Participant characteristics (n = 161).

Characteristic	% <sup>a</sup>
Gender	
Male	61
Female	38.5
Missing	0.5
Highest level of education attained	
Did not complete high school	18
Completed high school	28.5
Completed technical studies/apprenticeship	21.5
Completed university studies	32
Place of birth	
Australia	68
Elsewhere	32
Smoking status	
Current smoker	1
Past smoker	48
Non-smoker	51
Medication used in the previous 2 weeks	
Prescription medicines	92
Complementary medicines	51
Annual household income	
Less than \$20,000	19
\$20,001–\$60,000	52
\$60,001–\$100,000	22
Over \$100,000	7

<sup>a</sup> % of total respondents.

ables and ANOVA and Student's *t*-test was used to analyse continuous variables. Significance level was accepted at  $p < 0.05$ .

## Results

During the study period, 205 cardiac surgery patients met the inclusion criteria and 161 completed and returned the questionnaire (78% response rate). Participants had a mean age of  $70 \pm 13$  years and most (68%) were born in Australia. Further patient information is presented in Table 1.

### Use of CMs

During the two weeks before admission, 51% of patients had taken complementary medicines. There were no significant differences in gender, age, income or level of education between patients using CMs and non-users. The number of CMs taken by cardiac surgery patients is presented in Fig. 1. Nutritional supplements were the most commonly used CMs, in particular fish oils and multivitamin supplements (Table 2). The most popular herbal medicines used were ginkgo biloba and echinacea whereas no patient reported using ginseng, St Johns wort or valerian (Table 3). Most (75%) patients using CMs spent up to AUD\$50 each month purchasing these products. Respondents reported multiple reasons for using complementary medicines; 71% to maximise health and wellbeing, 30% to treat a disease and 20% to prevent a disease. Forty-two percent of patients using CMs in the pre-admission period intended to continue use them in hospital. Once in hospital, 71% of patients taking CMs supplied their own products whereas 21% asked family and friends to deliver their supplements and 8% received them from the hospital pharmacy.

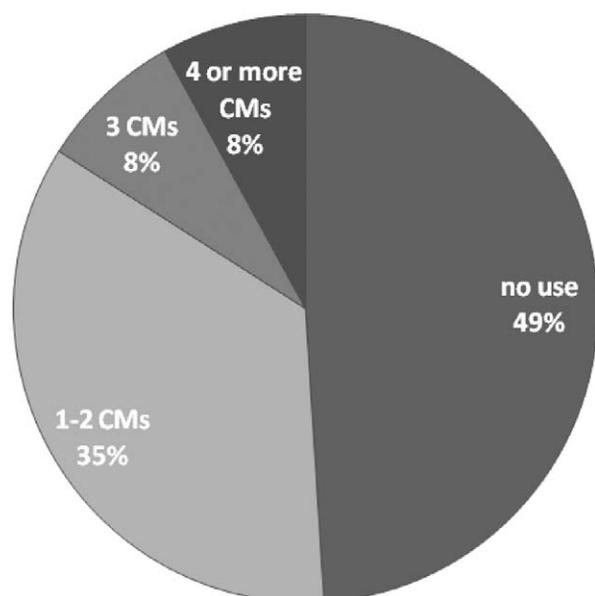


Fig. 1. The percentage of cardiac surgery patients taking CMs ( $n = 161$ ).

Table 2. The 10 most commonly used supplements amongst patients using CMs ( $n = 72$ ).

Supplement	$n$ (%)
Fish oil	18 (25)
Multivitamins	18 (25)
Glucosamine	16 (22)
Vitamin C	15 (21)
Vitamin B complex	12 (17)
Calcium	11 (15)
Vitamin E	9 (12.5)
Magnesium	8 (11)
Coenzyme Q10	6 (8)
Evening primrose Oil	4 (6)

% of total respondents taking CMs.

Respondent's perception of the safety of complementary medicines was explored. Few (7%) indicated they believed all CMs are safe, 49% thought some are safe, 6% thought they were safer than pharmaceutical medicines and 38% were unsure about their safety. When asked who had prescribed their complementary medicines, medical practitioners were most commonly cited (Table 4). A gender comparison revealed that more women were taking medically prescribed CMs than men (58% compared to

Table 3. Specific herbal medicines used by patients using CMs ( $n = 72$ ).

Herbal medicine	$n$ (%)
Echinacea	2 (3)
Ginkgo biloba	2 (3)
Ginger	1 (1)
Guarana	1 (1)
Garlic (or more than 1 clove daily)	1 (1)
Celery	1 (1)

% of total respondents taking CMs.

Table 4. Prescribers of CM products taken by respondents.

Prescriber	$n$ (%)
Medical practitioners (general practitioners, physicians and surgeons)	52 (56.5)
Self-prescribed	19 (21)
CM practitioner	15 (16)
Friend or family	14 (15)
Pharmacist	6 (6.5)
Health food store staff	3 (3)

% of total respondents.

52%;  $p = 0.049$ ) whereas no differences were found for age. The CMs most frequently recommended by medical practitioners were fish oil and glucosamine supplements and some patients reported being prescribed CMs by several people.

Patient's disclosure to hospital staff about their use of CMs was also queried. Overall, 56% of people that had been using CMs prior to admission did not tell any hospital staff member. When asked for the main reasons for non-disclosure, 67% reported it was because they were not asked, 54% thought it was unimportant, 5% thought their doctor would not understand and 5% did not want to be judged negatively. When patients were asked about their use, 52% of patients reported it was by a nurse, 12% a surgeon, 12% a pharmacist and 8% an anaesthetist. Few (12%) of the patients using CMs had disclosed this use in writing on a hospital form and only 16% told their surgeon, 16% their pharmacist and 7% their anaesthetist.

#### Sources of information

Cardiac surgery patients referred to a variety of sources for general and safety information about complementary medicines. The five most commonly reported sources of general information about CMs were pharmacists (44%), medical doctors (41%), health food stores (23%), natural therapists (22%) and books or magazines (22%). There was a non-significant trend for females more often than males to have consulted natural therapists (29% compared to 16%) or health food store staff (29% compared to 16%) for information. For safety information about CMs, the five most popular sources were pharmacists (50%), medical doctors (45%), followed by a natural therapist (17%), health food store staff (16%) and books or magazines (13%).

#### Hospital-based complementary therapies

Of the total sample, 137 patients (85%) reported they would be willing to use some type of diet, lifestyle and complementary therapies if offered by hospitals (Fig. 2). Willingness to use these approaches did not differ based on gender, income or education; however, greater interest was identified for younger patients ( $p = 0.005$ ) and those that had previously used CMs ( $p = 0.005$ ).

#### Discussion

These results confirm the acceptance of complementary medicine in the cardiac surgery population and their willingness to incorporate diet, lifestyle and complementary

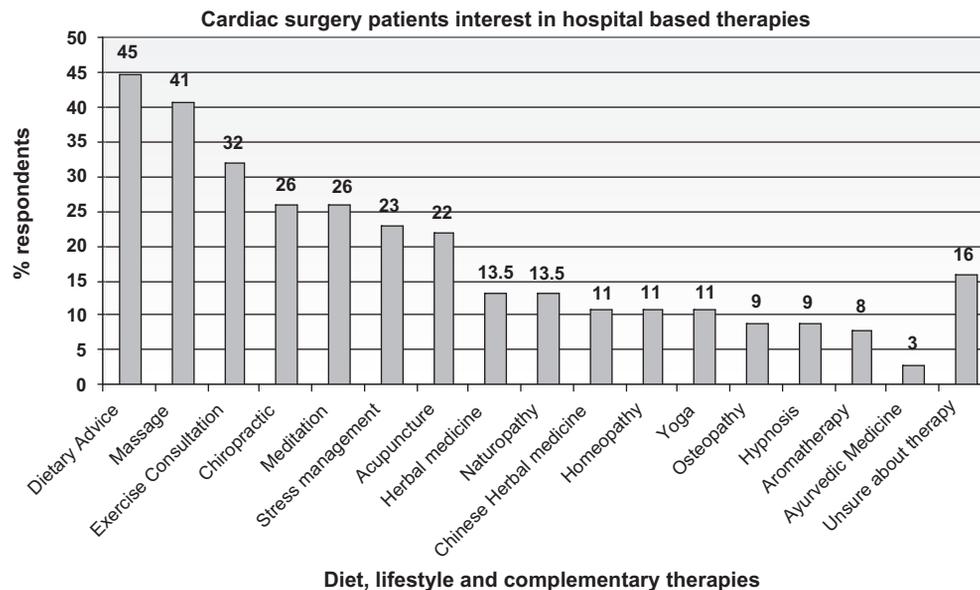


Fig. 2. Patient's interest in hospital based therapies (n = 161).

therapies into their healthcare. Cardiothoracic surgical patients, like the general public, use CMs to maximise their health and as adjuncts to standard treatments and appear to have them frequently prescribed by medical practitioners. Unlike the general public who tend to self-select, this population commonly have CMs prescribed by medical practitioners suggesting a level of acceptance by doctors. Whilst most patients recognise that not all CMs are safe, many do not volunteer information about their CM use unless asked directly by hospital staff. As a result, perioperative CM use is not identified by most surgeons, anaesthetists and pharmacists and therefore products with the potential to induce adverse outcomes or drug interactions are unmanaged placing patients at risk. Complementary medicine usage detected in this study population was greater than previously reported in another Australian study of surgical patients and disclosure was worse with 56% of patients not telling any hospital staff about their use [20]. In comparison to a survey of people with cardiovascular disease in the United States, our study population had greater use of fish oil supplements (25% compared to 12%) and substantially less use of the herbal medicines echinacea (3% vs 34%), garlic (1% vs 23%), ginseng (0% vs 22%) and ginkgo biloba (3% vs 22%) suggesting a cultural difference in usage patterns [21].

#### Safety issues

The safety of a medicine relates to the properties of the medicine itself, the quality of the medicinal product, how the medicine is used and the individual patient taking it. For example, St Johns wort is an effective and well tolerated treatment for mild to moderate depression and is generally safe as stand-alone treatment, however, it can induce adverse outcomes when used together with medications such as digoxin, warfarin or midazolam due to

pharmacokinetic interactions [22]. It can also induce phototoxic skin reactions when used in high doses due to the presence of a naturally occurring pigment, hypericin [23].

The quality control regulation of complementary medicine products varies considerably around the world. For instance, since 1994 in the United States of America, complementary medicine products have been regulated by the Dietary Supplement Health and Education Act which does not require burden of proof to demonstrate safety and efficacy studies [24]. In contrast, the TGA regulates the complementary medicines industry in Australia so all therapeutic products must have evidence of safety and be produced according to the code of Good Manufacturing Practice thereby providing the general public and product prescribers with a measure of confidence in their safety [25]. Whilst the complementary medicines used by patients are available over the counter, cardiac surgery patients may be at particular risk of adverse outcomes from CMs in the perioperative period due to their high intake of prescription medicines, older age and increased risk of haemorrhage or unwanted cardiovascular effects. In addition, some patients were using CMs based on self-selection or advice from family and friends and therefore had not received professional advice about safe and appropriate use in conjunction with their other medications.

Nutritional supplements were most popular amongst cardiac surgery patients, in particular multivitamins, vitamin C supplements, glucosamine and fish oils. Herbal medicines were also used, although to a lesser extent, and included ginger, garlic, ginkgo biloba, guarana, echinacea and celery. Multivitamins and vitamin C supplements are unlikely to pose a risk to cardiac surgery patients when used as directed. In contrast, ginger and garlic have the potential to induce bleeding when taken in sufficient quantities [22] and guarana seeds are a rich source of caffeine and therefore likely to exert sympathomimetic effects [26]. Ginkgo biloba is generally considered safe and

well tolerated in the general population, however, it may induce drug interactions [22]. Human studies have found no significant effect for ginkgo biloba on cytochromes 2B6, 2C19 or 2C9 and a study of elderly volunteers found no significant effect on CYP3A4 although the herb does appear to induce CYP3A in young volunteers [37–41]. Several case reports have suggested a link between ginkgo biloba ingestion and haemorrhage, however, the reliability of these cases is questionable as several clinical studies found no significant effects on bleeding with ginkgo ingestion [27–36].

Echinacea is a popular herbal medicine which demonstrates immune modulation, antiviral and anti-inflammatory activities in a variety of experimental models [22]. It is generally considered safe and well tolerated but contraindicated in autoimmune diseases [42]. Currently, the evidence suggesting echinacea may induce pharmacokinetic interactions with cytochrome 3A substrates such as midazolam is unclear as some research indicates a modest induction effect whereas other studies show no effect. It is suspected that the inconsistent results relate to differences in chemical composition between echinacea extracts and if a pharmacokinetic interaction occurs, it is likely to be subtle [43–45].

The use of fish oil supplements by cardiac surgery patients could be beneficial and reduce the risk of post-operative atrial fibrillation [46]. It also appears to be safe in this population and to have no effect on bleeding risk. One review of 19 trials involving patients undergoing major vascular surgery (coronary artery bypass grafting, endarterectomy) or femoral artery puncture found the concurrent use of fish oils in doses varying from 1 g/day to 21 g/day did not increase the risk of haemorrhage [47]. Of note, patients were also taking aspirin in 16 studies and heparin in three studies.

Glucosamine is a popular supplement used for the symptomatic relief of knee osteoarthritis and to delay progression of the disease, for which there is some supportive evidence in the literature [49]. Case reports of a raised INR in patients using both warfarin and glucosamine suggest that concomitant use may have adverse clinical outcomes, however, no clinical studies have confirmed the association [50]. Until the safety of glucosamine can be confirmed, suspending use of glucosamine in patients taking warfarin or before major surgery seems prudent.

### Communication

Open communication between hospital based health care professionals and patients is an essential part of providing safe and effective health care and ensuring the best possible surgical outcomes. Consistent with findings from studies of general surgical patients, there is little discussion about CMs between hospital medical staff and cardiac surgery patients [17,18,20]. This study extends the literature on patient disclosure and suggests that patients do not tell hospital staff about their use of CMs primarily because they are not asked or do not think it is important and not because they fear a negative response. This is contrast to other studies which report fear of disap-

proval as a major reason for non-disclosure to medical doctors [7]. Patients need to be aware that full disclosure of all medicines, those prescribed and those purchased over the counter, can have a significant impact on their health and wellbeing and discussing their use is important. In addition, surgeons, anaesthetists and pharmacists should become familiar with CMs commonly used by their patients and identify, prevent, treat and report adverse outcomes should they arise. Whilst there will be instances when patients should be advised to suspend their use of CMs before surgery, this still does not guarantee all risks will be removed and suspension of CMs may itself pose risks when patients are withdrawn from effective therapies.

### Health promotion and patient preferences

A large proportion of cardiac surgery patients, regardless of gender, income or education, indicated they would be willing to use diet, lifestyle or complementary therapies if provided by hospitals. Unexpectedly, only 45% were interested in receiving diet advice and 32% exercise consultations, despite good nutrition and physical activity being widely promoted as beneficial in cardiovascular disease. It is notable that 41% of cardiac surgery patients were interested in massage therapy and may reflect an unmet need for greater intimacy in the hospital setting. To date, randomised studies of cardiothoracic patients receiving massage therapy have yielded encouraging but inconsistent results and are worthy of further investigation due to the low risk nature of the intervention and patient interest [51–53].

### Limitations

The findings of this study are prone to sample bias as the population is limited to private hospital patients willing and able to complete a written, self-administered survey conducted in English. Further research is required to determine whether similar results would be obtained from a public hospital sample. Whilst this study establishes substantial use of CM products amongst cardiac surgery patients, it is possible usage has grown recently as suggested by a survey of the general Australian population [54]. Despite the high response rate and the fact that several measures were taken to minimise recall bias, the data is also prone to response bias and the validity and reliability of the self-reported data is subject to recall bias.

### Conclusion

A significant proportion of patients presenting for cardiac surgery have been taking CMs prior to admission but they are not routinely asked about use by hospital staff and do not necessarily volunteer the information unless directly asked. This has potential safety implications as adverse outcomes such as increased risk of haemorrhage and drug interactions are unlikely to be prevented, identified or adequately managed. A substantial number of cardiac surgery patients are interested in hospitals offering diet, lifestyle and complementary therapies indicating their

acceptance of these approaches. Surgeons and anaesthetists are encouraged to become familiar with the CMs commonly used by this population and initiate a discussion about CM use and patients should be encouraged to disclose their CM use to all their health care providers so that this use can be effectively managed and clinical outcomes and safety can be enhanced.

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