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
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. Nursing staff distributed the survey to patients in their beds during their daytime shifts and were available to answer questions. To avoid response 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 variables 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 ± 13 years and most (68%) were born in Australia. Further patient information is presented in Table 1.

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

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>% a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>61</td>
</tr>
<tr>
<td>Female</td>
<td>38.5</td>
</tr>
<tr>
<td>Missing</td>
<td>0.5</td>
</tr>
<tr>
<td>Highest level of education attained</td>
<td></td>
</tr>
<tr>
<td>Did not complete high school</td>
<td>18</td>
</tr>
<tr>
<td>Completed high school</td>
<td>28.5</td>
</tr>
<tr>
<td>Completed technical studies/apprenticeship</td>
<td>21.5</td>
</tr>
<tr>
<td>Completed university studies</td>
<td>32</td>
</tr>
<tr>
<td>Place of birth</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>68</td>
</tr>
<tr>
<td>Elsewhere</td>
<td>32</td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
</tr>
<tr>
<td>Current-smoker</td>
<td>1</td>
</tr>
<tr>
<td>Past smoker</td>
<td>48</td>
</tr>
<tr>
<td>Non-smoker</td>
<td>51</td>
</tr>
<tr>
<td>Medication used in the previous 2 weeks</td>
<td></td>
</tr>
<tr>
<td>Prescription medicines</td>
<td>92</td>
</tr>
<tr>
<td>Complementary medicines</td>
<td>51</td>
</tr>
<tr>
<td>Annual household income</td>
<td></td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>19</td>
</tr>
<tr>
<td>$20,000–$40,000</td>
<td>52</td>
</tr>
<tr>
<td>$40,001–$100,000</td>
<td>22</td>
</tr>
<tr>
<td>Over $100,000</td>
<td>7</td>
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</table>

* % of total respondents.

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

<table>
<thead>
<tr>
<th>Supplement</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish oil</td>
<td>18 (25)</td>
</tr>
<tr>
<td>Multivitamins</td>
<td>18 (25)</td>
</tr>
<tr>
<td>Glucosamine</td>
<td>16 (22)</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>15 (21)</td>
</tr>
<tr>
<td>Vitamin B complex</td>
<td>12 (17)</td>
</tr>
<tr>
<td>Calcium</td>
<td>11 (15)</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>9 (12.5)</td>
</tr>
<tr>
<td>Magnesium</td>
<td>8 (11)</td>
</tr>
<tr>
<td>Coenzyme Q10</td>
<td>6 (8)</td>
</tr>
<tr>
<td>Evening primrose Oil</td>
<td>4 (6)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Herbal medicine</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echinacea</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Ginkgo biloba</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Ginger</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Guarana</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Garlic (or more than 1 clove daily)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Celery</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>

**Table 4. Prescribers of CM products taken by respondents.**

<table>
<thead>
<tr>
<th>Prescriber</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical practitioners (general practitioners, physicians and surgeons)</td>
<td>52 (56.5)</td>
</tr>
<tr>
<td>Self-prescribed</td>
<td>19 (21)</td>
</tr>
<tr>
<td>CM practitioner</td>
<td>15 (16)</td>
</tr>
<tr>
<td>Friends or family</td>
<td>14 (15)</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>6 (6.5)</td>
</tr>
<tr>
<td>Health food store staff</td>
<td>3 (3)</td>
</tr>
</tbody>
</table>

**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%).

**Discussion**

These results confirm the acceptance of complementary medicine in the cardiac surgery population and their willingness to incorporate diet, lifestyle and complementary...
Cardiac surgery patients interest in hospital based therapies

Dietary Advice
Massage
Exercise
Consultation
Chiropractic
Meditation
Stress management
Acupuncture
Herbal medicine
Naturopathy
Chinese Herbal medicine
Homoeopathy
Yo ga
Osteopathy
Hypnosis
Aromatherapy
Ayurvedic Medicine
Unsure about therapy

Diet, lifestyle and complementary therapies

Cardiac surgery patients interest in hospital based therapies

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 John’s 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
because they are not asked or do not think it is important on patient disclosure and suggests that patients do not routinely ask surgery patients [17,18,20]. This study extends the literature about CMs between hospital medical staff and cardiac surgery 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 routinely ask about 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 disclosure 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 preferences.

**Open communication between hospital based health care professionals and patients**

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 disclosure 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.

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acceptance of these approaches. Surgeons and anaesthesiologists 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.

Acknowledgements

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References

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