**Title:** Use of complementary and alternative medicine in women with heart disease, hypertension and diabetes: findings from the Australian Longitudinal Study on Women’s Health (ALSWH)

**Running Title:** Use ofCAM for cardiovascular disease

**Abstract**

***Background:*** The uptake of complementary and alternative medicine (CAM) is common, especially amongst those with chronic illness. However, the use of CAM by women with cardiovascular disease and how this influences the interface with conventional medicine is poorly understood.

***Aim:*** To examine the relationship between heart disease, hypertension and diabetes and use of CAM and conventional medicine in a cohort of women.

***Method:*** Data were taken from a survey (*n*=9748) of the 1946-51 cohort of the Australian Longitudinal Study on Women’s Health, conducted in 2010. Analyses focused on women who had been diagnosed or treated for heart disease, diabetes, and/or hypertension. The main outcome measures were use of conventional or CAM treatments in the previous year.

***Results:*** The majority of women had hypertension only (*n*=2335) and a minority (*n*=78) reported having heart disease, hypertension and diabetes. Women with hypertension were 0.82 (95% CI: 0.74, 0.91) times less likely to consult with a CAM practitioner and 0.86 (95% CI: 0.77, 0.97) times less likely to use self-prescribed CAM, while women with diabetes were 0.66 (95% CI: 0.54, 0.81) times less likely to consult with a CAM practitioner and 0.68 (95% CI: 0.55, 0.83) times less likely to use self-prescribed CAM. Women with hypertension, diabetes, and/or heart disease were more likely to consult with conventional health care practitioners.

***Conclusions:*** Compared with other chronic illness groups, the use of CAM by women with heart disease, hypertension and/or diabetes is lower. Future research needs to explore a number of related issues in more depth including an examination of patients’ perceptions of cardiovascular risk and the role of CAM in their self-management in the community.

**Key words:** heart disease, hypertension, diabetes, complementary medicine, women, health services.

**Introduction**

Globally, there has been a paradoxical shift from communicable to non-communicable diseases.1  This change in epidemiological profile requires an increased focus on chronic conditions from the perspective of those managing the health care system, as well as providers and patients.2 Chronic conditions such as hypertension, diabetes and heart diseases are an increasing burden on the individual and society.3 In the United States (US) and Australia, 1 in 3 deaths are due to cardiovascular diseases.4,5 In 2010, cardiovascular disease was estimated to cost the US $316.4 billion in health care services, medications and lost productivity.6 In Australia, it has been estimated that 48% of hospitalisations are due to cardiovascular diseases.5 Despite the recent improved outcomes of coronary heart disease (CHD) and decreases in smoking rates, these improvements are threatened by the rising prevalence of diabetes and obesity which also underscore the importance of self-management in decreasing disease burden.7 Apart from being costly to society, living with chronic conditions places considerable burden on the individual and their family (REF). Individuals with a chronic illness often live for a long period of time, with multiple conditions and a high symptom burden.22 This requires demands on self-management resources and also empowerment of individuals to manage their condition.2 Self-management - the skills and behaviours that a person requires to maintain functioning in the context of their lives - and facilitating positive self-care behaviours is of particular importance in managing a chronic illness.23

Chronic disease models emphasise the importance of person-centred care in optimising health outcomes2 and understanding health seeking behaviours, including the use of complementary and alternative medicine (CAM), is one important strategy in the management of chronic conditions.8 A number of studies have looked at patterns of CAM use. Saydeh and Eberhardt have shown that adults with chronic conditions are more likely to use CAM. Approximately 32% of US adults with a chronic condition and 24% of Australian adults with a chronic condition use CAM 16,17 and most often in combination with conventional medicine17 and for the management of arthritis and osteoporosis amongst other conditions.

The reported substantial use of CAM in the community has attracted increasing research9,10 but there remains relatively sparse data on CAM use in cardiovascular disease.11,12,13,14,15 Fewer than 10% of Australian adults with diabetes or a heart or circulatory condition specifically use CAM for their condition 17, 18 most preferring conventional medicine. 17 Regular CAM users are more likely to be of an older age, female, have a secondary school education and live in households with lower incomes than non-users.17, 19, 20, 21

Available data suggests individuals may incorporate CAM use as part of their self-management strategy.15 Accruing accurate data on use is difficult due to non-disclosure and ambiguity in defining CAM.24 In spite of these challenges, a number of studies have examined patterns of CAM use across clinical conditions and socio-demographic groups.17 In a recent Norwegian study, Kristoffeson and colleagues found no differences in use between individuals with cancer and CHD.12 A systematic review by Grant and colleagues of 27 studies has shown that the prevalence of CAM use in individuals with heart disease ranged from 4% to 61%; biologically-based therapy use ranged from 22% to 68% and herbal medicines were used by between 2% and 46% of individuals. A striking feature of this review was that many patients did not discuss CAM use with their physicians and up to and up to 90% of physicians did not discuss CAM use with their patients.15

The Australian health care system providing universal health care coverage enables greater access to conventional medical services. Nevertheless, a sentinel feature of living with a chronic illness is seeing multiple health providers.2 Issues of treatment adherence are complex and a large focus of contemporary health care interventions is on promoting self-management and care coordination across health care settings.22 As such, nderstanding the relationship between CAM and broader health-seeking behaviours and health care utilisation is important in understanding patients’ approaches to the *full range* of self-management techniques available.

Although there is debate and discussion on gender-based differences regarding cardiovascular disease, there is certainly evidence to demonstrate that gender influences health-seeking behaviours and as a consequence health care outcomes.25 Failing to prioritise their own health issues 26 can hinder women’s effective health seeking behaviours for example obesity, an issue following the menopause, is often exacerbated by social changes, aging and functional impairment of living with a chronic illness.27, 28

A failure to examine and address the issue of CAM use within cardiovascular care is a lost opportunity on several fronts. Most importantly, failing to discuss this significant health service issue places the patient at heightened risk of drug interactions between CAM and conventional treatments. It is also a lost opportunity to identify *all* health seeking behaviour critical to successfully coordinating self-management strategies. The variable use of CAM amongst particular ethnic, cultural groups and between genders emphasises the importance of investigating CAM use within health care systems and socio-demographic groups.

Unfortunately, to date, we still know relatively little about the use of CAM amongst cardiovascular patients. In response to this important research gap, this paper - presenting findings from a large, nationally representative cohort study of Australian women aged 59-64 years - provides a detailed examination of conventional and CAM practitioner consultations as well as the use of self-prescribed CAM among women who have been diagnosed with heart disease, diabetes, and hypertension.

**Methods**

***Sample***

This research was conducted as part of the Australian Longitudinal Study on Women’s Health (ALSWH) which was designed to investigate multiple factors affecting the health and well-being of women over a 20-year period. Women in three age groups (“young” 18-23, “mid age” 45-50 and “older” 70-75 years) were randomly selected from the national Medicare database.29 The focus of the present analysis is women from the mid-age cohort. The baseline survey, comprising 14,099 women, was conducted in 1996 and the respondents have been shown to be broadly representative of the national population of women in the target age groups.30 Analyses for this research are focused upon the most recent survey, which was conducted in 2010 when the women were aged 59-64 years.

Measures of demographic characteristics

Postcode of residence at the time of the baseline survey was used to classify area of residence as urban or non-urban. Women were asked about their current marital status and the highest educational qualification they had completed. The women were also asked about income and whether or not they had private health insurance with ancillary cover.

Measures of health status

Women were asked how often they experienced a list of symptoms in the previous twelve months. The list included: allergies or hay fever or sinusitis, indigestion, chest pain, headaches or migraines, severe tiredness, stiff or painful joints, back pain, haemorrhoids, other bowel problems, hot flushes, night sweats, and leaking urine. Women were also asked whether a doctor had ever told them that they had any of the chronic medical conditions, including arthritis, diabetes, heart disease, hypertension, low iron, asthma, anxiety disorder, depression, and cancer (not skin cancer). Responses to questions about history of smoking and alcohol use were also included.

***Measures of health service use and self-prescribed treatments***

The women were asked about their frequency of use in the previous twelve months of a GP and a specialist doctor. In addition, they were asked if they had consulted with a range of conventional providers (ie. physiotherapist, counsellor, nurse, optometrist, dietician, podiatrist) and CAM practitioners (ie. massage therapist, naturopath/herbalist, chiropractor, osteopath, acupuncturist, other alternative health (AH) practitioner), as well as their consumption of self-prescribed CAM (ie. vitamins/minerals, yoga/meditation, herbal medicines, aromatherapy oils, Chinese medicine, other alternative therapies) in the previous twelve months.

***Statistical Analyses***

Chi-square tests were used to examine the association between categorical variables. Logistic regression models were used to examine the association between health care utilisation (ie. CAM practitioners, allied health care practitioners, self-prescribed CAM use) and heart disease status, hypertension status and diabetes status. For each logistic regression model, the odds ratios were adjusted for all the demographic, symptoms and diagnoses variables listed above. Poisson regression models were used to examine the association between consultations with a doctor (ie. GP, specialist) and heart disease status, hypertension status and diabetes status. For each poisson regression model, the risk ratios were adjusted for all the demographic, symptoms and diagnoses variables listed above. In response to the large sample size, a p-value < 0.005 was adopted for statistical significance. All analyses were conducted using statistical program SAS.

**Results**

In 2010 (ie. survey 6), 9748 women returned completed questionnaires. In terms of area of residence, 60% of the women resided in a rural area and 40% in an urban area. The majority (77%) of the women were married or in a de facto relationship, with 20% being separated, divorced or widowed, and 3% single. A university degree was attained by 15% of the women, while 21% gained a diploma or certificate, 49% a high school education only, with 15% having no formal education. In terms of managing on their available income, 13% found it impossible or difficult always, 24% found it difficult sometimes, and 63% found it not too bad or easy. Private ancillary health insurance was held by 61% of the women.

There were 428 (4.4%) women who had been diagnosed or treated for heart disease (ie. heart attack or angina), 750 (7.7%) women who had been diagnosed or treated for diabetes, and 2945 (30.2%) women who had been diagnosed or treated for hypertension. A minority (n=78, 0.8%) reported having heart disease, hypertension and diabetes. In addition to these conditions, the women had been diagnosed or treated for, on average, 0.9 (SD=1.1) other conditions and had experienced an average of 3.6 (SD=2.3) different symptoms. The majority of the women were non-smokers (91.1%), with 8.9% being current smokers. In terms of alcohol consumption, 8.4% of women were non-drinkers, 84.5% low-risk drinkers, and 7.2% risky or high risk drinkers.

Table 1 shows the distribution of consultations with CAM practitioners amongst women with heart disease, hypertension and diabetes. There are statistically significant associations between diabetes and consultations with massage therapists, chiropractors, osteopaths, and total CAM. Specifically, women with diabetes are: 0.82 (95% CI: 0.65, 1.04) times less likely to consult with a massage therapist; 0.68 (95% CI: 0.50, 0.92) times less likely to consult with a chiropractor; 0.36 (95% CI: 0.21, 0.70) times less likely to consult with an osteopath; and 0.66 (95% CI: 0.54, 0.81) times less likely to consult with a CAM practitioner in general. There are statistically significant associations between hypertension and consultations with massage therapists, naturopaths/herbalists, and total CAM. Specifically, women with hypertension are: 0.79 (95% CI: 0.70, 0.89) times less likely to consult with a massage therapist; 0.79 (95% CI: 0.65, 0.95) times less likely to consult with a naturopaths/herbalists; and 0.82 (95% CI: 0.74, 0.91) times less likely to consult with a CAM practitioner in general. There were no statistically significant associations between heart disease and any of the CAM practitioner groups.

The distribution of self-prescribed CAM amongst women with heart disease, hypertension and diabetes are presented in Table 2. There are statistically significant associations between diabetes and use of vitamins/minerals, yoga/meditation, and total CAM. Specifically, women with diabetes are: 0.68 (95% CI: 0.55, 0.82) times less likely to consume vitamins-minerals; 0.59 (95% CI: 0.43, 0.79) times less likely to use yoga/meditation; and 0.68 (95% CI: 0.55, 0.83) times less likely to use CAM in general. There are statistically significant associations between hypertension and use of yoga/meditation, herbal medicines, and other alternative therapies. Specifically, women with hypertension are: 0.78 (95% CI: 0.68, 0.90) times less likely to use yoga/meditation; 0.87 (95% CI: 0.78, 0.98) times less likely to use herbal medicines; and 0.67 (95% CI: 0.55, 0.82) times less likely to use other alternative therapies. There were no statistically significant (adjusted) associations between heart disease and any of the self-prescribed CAM.

Table 3 shows the distribution of consultations with doctors amongst women with heart disease, hypertension and diabetes. Women with diabetes are 1.13 (95% CI: 1.06, 1.20) times more likely to consult with a GP and 1.14 (95% CI: 1.03, 1.25) times more likely to consult with a specialist. Women with hypertension are 1.22 (95% CI: 1.18, 1.27) times more likely to consult with a GP and 1.10 (95% CI: 1.04, 1.17) times more likely to consult with a specialist. Women with heart disease are 1.13 (95% CI: 1.05, 1.21) times more likely to consult with a GP and 1.35 (95% CI: 1.22, 1.51) times more likely to consult with a specialist.

The distribution of consultations with allied health care practitioners amongst women with heart disease, hypertension and diabetes is presented in Table 4. It can be seen that women with diabetes are: 2.16 (95% CI: 1.71, 2.72) times more likely to consult with a nurse; 1.81 (95% CI: 1.46, 2.24) times more likely to consult with an optometrist; 5.08 (95% CI: 3.92, 6.58) times more likely to consult with a dietician; and 3.31 (95% CI: 2.69, 4.07) times more likely to consult with a podiatrist. Women with hypertension are: 1.24 (95% CI: 1.01, 1.53) times more likely to consult with a counsellor; 1.53 (95% CI: 1.32, 1.78) times more likely to consult with a nurse; 1.42 (95% CI: 1.15, 1.77) times more likely to consult with a dietician; and 1.21 (95% CI: 1.06, 1.39) times more likely to consult with a podiatrist. Women with heart disease are: 1.50 (95% CI: 1.15, 1.96) times more likely to consult with a physiotherapist; and 1.73 (95% CI: 1.08, 2.72) times more likely to consult with a counsellor.

There were statistically significant associations between BMI categories and diabetes, hypertension and heart disease status (all p<0.005). Specifically, obesity occurred in 42% of women with heart disease, compared to 28% of women without heart disease being obese. Similarly, 44% of women with hypertension were obese, compared to 22% of women without hypertension, while 57% of women with diabetes were obese, compared to 26% of women without diabetes (data not shown).

**Discussion**

This is the first study to date to provide a detailed examination of CAM use – distinguishing practitioner consultations and self-prescribed CAM – by women with heart disease, diabetes and/or hypertension. The findings highlight a number of key issues that impact on the care provided by conventional health providers.

Our data show that women with diabetes were less likely to consult with CAM practitioners in general (specifically massage, chiropractor, osteopath) and less likely to use self-prescribed CAM in general (specifically yoga/mediation). These findings were similar to a recent study by Lui *et al.* in Queensland, Australia, which showed that 7.7% of people with diabetes used CAM practitioners alongside or as a complement to conventional health care services during a 12 month period. This observation may be related to lower self-efficacy for physical activity as shown in cardiac rehabilitation.31 Issues such as incontinence are commonly neglected in health care interventions for women and may act as barriers to such engagement.32 Moreover, regular exposure to health care professionals in relation to medical management of diabetes may increase patients’ scepticism towards CAM providers. Further, the increased use of mainstream services may decrease the patients’ threshold to explore other treatment and care options. Such higher conventional health care utilisation likely reflects increased incentives to access conventional cardiovascular care via government funded payments (e.g. for providing services for individuals with diabetes).33

Women with hypertension were less likely to consult with CAM practitioners in general (specifically massage, naturopath/herbalist) and less likely to use self-prescribed CAM in general (specifically yoga/mediation, herbal medicines). This finding contrasts Gohar et al’s identified prevalence of CAM use in hypertensive patients as higher than in the general UK population.34 Bell and colleagues found higher CAM use in adults older than 65 years with hypertension compared to those without diagnosed hypertension (69.5% versus 65.6%). Yet, just 7.8% of these CAM users reported using CAM to manage their hypertension.38

The lower use in our study sample may be related to fears of adverse events or sociocultural factors influencing CAM use (REF). Alternatively, there were a high number of women in our study with lone hypertension and as a consequence low symptom burden. A lower symptom burden may explain the low level of CAM use identified in our study. Treatment adherence in hypertension is noted to be low, mainly due to the ‘asymptomatic’ nature of the condition,35 therefore exploring the relationship between CAM use and adherence to conventional medications would be of interest in future studies, as well as understanding cardiovascular patients’ decision-making regarding using or not using CAM.

An interesting hypothesis to be explored in future studies is the role of body image and size in relation to CAM use, as women with diabetes, heart disease and hypertension are more likely to be obese. Consequently, these women may feel uncomfortable with treatments requiring the body to be exposed or manipulated by a practitioner or they may be physically unable to undertake activities such as yoga. It is well known that body image issues are prevalent in women and data suggests that these issues do not diminish over time.40, 41 The higher rates of obesity in our sample of women with heart disease and diabetes underscores the importance of gender-tailored programs to decrease the burden of disease.42

In the current study, self-reported heart disease was not associated with any CAM use (self-prescribed or consultations). This is an interesting observation which may be associated with a higher perception of risk of CAM use, a lower perception of efficacy of CAM, or potentially a lesser engagement in self-management. The lower CAM use shown in our analysis parallels the findings of Armstrong *et al.* who identified less than 10% of individuals with a heart or circulatory condition as using CAM with the vast majority of their sample preferring conventionally medically prescribed treatments. 17 Steinsbekk *et al.*  also reported that adults with cardiovascular disease were less likely to consult with a CAM practitioner, instead preferring to consult with a general practitioner.11

Our study and disparate rates and patterns across illness groups and countries suggest that as well as investigating CAM use within a socio-cultural context, considering funding models and drivers in the health care system are likely important. Studies from the US have shown that the use of CAM is influenced by high costs in accessing mainstream services and also perceptions of intervention efficacy.36 In particular, one study showed that the increases in relative cost of conventional health care was a factor in adults being more likely to use CAM when not getting or delaying needed medical care. In patients with heart disease, higher proportions of individuals who used CAM were non-Caucasian (31% vs 12%), uninsured (12% vs 7%), experienced socioeconomic deprivation (58% vs 29%), and had depression (13% vs 6%).21 Yet, a recent study from the US suggests that rates of CAM use are plateauing.39

Alternatively, access to universal health care coverage in Australia may moderate CAM use which is predominantly practised outside the public health care system and can attract significant out-of-pocket expenses (REF). Low prevalence of CAM use identified in our study may reflect the potential saturation of consultations with ‘*conventional*’ practitioners (e.g. general, medical, and allied health practitioners) and subsequent financial restrictions for women in *also* consulting CAM practitioners. Lui et al found that being of younger age, female, having a higher education or private health insurance, and engaging in preventive health behaviours were all found to be predictors of higher CAM use in an Australian sample.37 Therefore, in contrast to US CAM users who may be seeking healthcare options that are less expensive than conventional medicine, Australian CAM users may be those who have more financial resources, as the universal health care model makes conventional medicine the less expensive option.

The interpretation of our findings is limited by some survey design issues. Issues in reporting and characterising CAM may be subject to interpretation and also issues of responder bias and self- report. Despite these limitations, these data provide an important snapshot into the health-seeking behaviours of women living with a chronic illness around CAM. As the burden of chronic conditions continues to grow, understanding these patterns in health care utilisation is of critical importance. In particular, examining the interface of CAM use and patterns of self-management may be useful in exploring issues of adherence and management of chronic conditions.

**Conclusion**

The analysis presented in this paper identifies CAM use by women with cardiovascular conditions as relatively low compared with other chronic illnesses. Nevertheless, there is a need for further research to examine the decision-making of those women with cardiovascular conditions who do choose to use CAM in order to fully inform conventional health providers and aid their attempts to avoid possible drug interactions and provide effective, coordinated care for all their cardiovascular patients. Moreover, the different pattern of CAM use identified in our study when compared with other studies underscores the importance of considering funding models and health service factors in predicting and understanding CAM use amongst cardiovascular patients. Exploring issues such as perception of cardiovascular risk and body image and the relationship of self-management to CAM use should be undertaken in prospective studies.

**Acknowledgement**

The research on which this paper is based was conducted as part of the Australian Longitudinal Study on Women’s Health, The University of Newcastle and The University of Queensland. We are grateful to the Australian Government Department of Health and Ageing (DOHA) for funding and to the women who provided the survey data.

**References**

1. Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P, et al. Priority actions for the non-communicable disease crisis. The Lancet. 2011;377(9775):1438-47.

2. Wagner EH, Austin BT, Davis C, Hindmarsh M, Schaefer J, Bonomi A. Improving chronic illness care: translating evidence into action. Health Affairs. 2001;20(6):64-78.

3. Murray CJL, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. The Lancet. 2013;380(9859):2197-223.

4. Heidenreich PA, Trogdon JG, Khavjou OA, et. al. Forecasting the future of cardiovascular disease in the United States: a ploicy statement from the American Heart Foundation. *Circulation* 2011; 123(8): 933-944.

# 5. AIHW. 2012. Australian Institute of Health and Welfare. http://www.aihw.gov.au/cardiovascular-health/

6. Greer SA, Nwaise IA, Casper ML. *Atlas of Heart Disease Hospitalizations Among Medicare Beneficiaries*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2010.

7. Anandacoomarasamy A, Caterson ID, Leibman S, Smith GS, Sambrook PN, Fransen M, et al. Influence of BMI on Health‐related Quality of Life: Comparison Between an Obese Adult Cohort and Age‐matched Population Norms. Obesity. 2012;17(11):2114-8.

8. Chang H-YA, Wallis M, Tiralongo E, Wang HL. Decision-making related to complementary and alternative medicine use by people with Type 2 diabetes: a qualitative study. Journal of Clinical Nursing. 2012 Nov;21(21-22):3205-15.

9. Sibbritt D, Adams J, Lui CW, Broom A, Wardle J. Who Uses Glucosamine and Why? A Study of 266,848 Australians Aged 45 Years and Older. PloS one. 2012;7(7):e41540.

10. Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. *National Health Statistics Report* 2008 10(12):1-23.

11. Steinsbekk A, Adams J, Sibbritt D, Jacobsen G, Johnsen R. The profiles of adults who consult alternative health practitioners and/or general practitioners*. Scandinavian Journal of Primary Health Care* 2007; 25(2): 86-92.

12. Kristoffersen AE, Norheim AJ, Fønnebø VM. Any difference? Use of a CAM provider among cancer patients, coronary heart disease (CHD) patients and individuals with no cancer/CHD. BMC complementary and alternative medicine. 2012;12(1):1.

13. Davidson P, Hancock K, Leung D, Ang E, Chang E, Thompson DR, et al. Traditional Chinese Medicine and heart disease: what does Western medicine and nursing science know about it? European Journal of Cardiovascular Nursing. 2003;2(3):171-81.

14. Greenfield S, Pattison H, Jolly K. Use of complementary and alternative medicine and self-tests by coronary heart disease patients. BMC complementary and alternative medicine. 2008;8(1):47.

15. Grant SJ, Bin YS, Kiat H, Chang DHT. The use of complementary and alternative medicine by people with cardiovascular disease: a systematic. BMC Public Health. 2012;12:299.

16. Saydah S, Eberhardt M. Use of complementary and alternative medicine among adults with chronic diseases: United States 2002. J Altern Complement Med 2006;12(8):805-12.

17. Armstrong AR, Thiébaut SP, Brown LJ, Nepal B. Australian adults use complementary and alternative medicine in the treatment of chronic illness: a national study. Australian and New Zealand journal of public health. 2011;35(4):384-90.

18. Yeh GY, Davis RB, Phillips RS. Use of complementary therapies in patients with cardiovascular disease. *American Journal of Cardiology* 2006 98(5): 673-680.

19. Steinsbekk A, Adams J, Sibbritt D, Johnsen R, Jacobsen G, Holmen J.Socio-demographic characteristics and health perceptions among male and female CAM users in a Norwegian total population study (HUNT 2). *Forschende Komplementärmedizin* 2008; 15: 146-151.

20. Adams J, Sibbritt D, Easthope G, Young A. The profile of women who consult alternative health practitioner in Australia. *Medical Journal of Australia* 2003; 179(6): 297-300.

21. Decker C, Huddleston J, Kosiborod M, Buchanan D, Stoner C, Jones A, et al. Self-reported use of complementary and alternative medicine in patients with previous acute coronary syndrome. American Journal of Cardiology. 2007;99(7):930-3.

22. Coleman K, Austin BT, Brach C, Wagner EH. Evidence on the Chronic Care Model in the new millennium. Health Affairs. 2009;28(1):75-85.

23. Warsi A, Wang PS, LaValley MP, Avorn J, Solomon DH. Self-management education programs in chronic disease: a systematic review and methodological critique of the literature. Archives of Internal Medicine. 2004;164(15):1641.

24. Alherbish A, Charrois TL, Ackman ML, Tsuyuki RT, Ezekowitz JA. The prevalence of natural health product use in patients with acute cardiovascular disease. PloS one. 2011;6(5):e19623.

25. Davidson PM, McGrath SJ, Meleis AI, Stern P, DiGiacomo M, Dharmendra T, et al. The health of women and girls determines the health and well-being of our modern world: A white paper from the International Council on Women's Health Issues. Health Care for Women International. 2011;32(10):870-86.

26. DiGiacomo M, Davidson PM, Zecchin R, Lamb K, Daly J. Caring for Others, but Not Themselves: Implications for Health Care Interventions in Women with Cardiovascular Disease. Nursing research and practice. 2011;2011(doi:10.1155/2011/376020.

27. Doll HA, Petersen SEK, Stewart‐Brown SL. Obesity and physical and emotional well‐being: associations between body mass index, chronic illness, and the physical and mental components of the SF‐36 questionnaire. Obesity Research. 2012;8(2):160-70.

28. Davidson PM, Meleis AI, McGrath SJ, DiGiacomo M, Dharmendra T, Puzantian HV, et al. Improving Women's Cardiovascular Health: A Position Statement From the International Council on Women's Health Issues. Health Care for Women International. 2012;33(10):943-55.

29. Brown W, Bryson L, Byles J, Dobson A, Lee C, Mishra G, et al. Women's Health Australia: Recruitment for a national longitudinal cohort study. Women Health. 1998;28:23-40.

30. Brown W, Dobson A, Bryson L, Byles JE. Women's Health Australia: on the progress of the main study cohorts. J Womens Health Gend Based Med 1999;8(661-688).

31. Davidson PM, Mitchell JA, DiGiacomo M, Inglis SC, Newton PJ, Harman J, et al. Cardiovascular disease in women: Implications for improving health outcomes. Collegian: Journal of the Royal College of Nursing Australia. 2012;19(1):5-13.

32. Tak ECPM, van Hespen A, van Dommelen P, Hopman-Rock M. Does improved functional performance help to reduce urinary incontinence in institutionalized older women? a multicenter randomized clinical trial. BMC Geriatrics. [Research Support, Non-U.S. Gov't]. 2012;12:51.

33. Australia M. Practice Incentives Program (PIP). 2012.

34. Gohar F, Greenfield SM, Beevers DG, Lip GYH, Jolly K. Self-care and adherence to medication: a survey in the hypertension outpatient clinic. BMC complementary and alternative medicine. 2008;8(1):4.

35. Marshall IJ, Wolf D, McKevitt C. Lay perspectives on hypertension and drug adherence: systematic review of qualitative research. British Medical Journal. 2012;345 e3953.

36. Shah SH, Engelhardt R, Ovbiagele B. Patterns of complementary and alternative medicine use among United States stroke survivors. Journal of the neurological sciences. 2008;271(1):180-5.

37. Lui CW, Dower J, Donald M, Coll JR. Patterns and Determinants of Complementary and Alternative Medicine Practitioner Use among Adults with Diabetes in Queensland, Australia. Evidence-Based Complementary and Alternative Medicine. 2012;2012(doi:10.1155/2012/659419).

38. Bell R, Suerken C, Grzywacz J, Lang W, Quandt S, Arcury T. CAM use among older adults age 65 or older with hypertension in the United States: general use and disease treatment. J Altern Complement Med 2006;2(9):903-9.

39. Davis MA, Martin BI, Coulter ID, Weeks WB. US Spending On Complementary And Alternative Medicine During 2002-08 Plateaued, Suggesting Role In Reformed Health System. Health Affairs. 2013 Jan;32(1):45-52.

40. Chrisler JC, Ghiz L. Body image issues of older women. Women & Therapy. 1993;14(1-2):67-75.

41. Janelli LM. The Impact of Health Status on Body Image in Older Women. Rehabilitation Nursing. 2012;13(4):178-80.

42. Anderson LA, Eyler AA, Galuska DA, Brown DR, Brownson RC. Relationship of satisfaction with body size and trying to lose weight in a national survey of overweight and obese women aged 40 and older, United States. Preventive Medicine. 2002;35(4):390-6.

43. Davidson P, DiGiacomo M, Zecchin R, Clarke M, Paul G, Lamb K, et al. A cardiac rehabilitation program to improve psychosocial outcomes of women with heart disease. Journal of Women's Health. 2008;17(1):123-34.

**Table 1 The distribution of consultations with complementary and alternative medicine (CAM) practitioners amongst women with heart disease, hypertension and/or diabetes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Consultations With CAM Practitioners in the previous 12 months** | | | | | | | | | | | | | |
| **Condition** | | **Massage**  **Therapist** | | **Naturopath /**  **Herbalist** | | **Chiropractor** | | **Osteopath** | | **Acupuncturist** | | **Other AH**  **Practitioner** | | **Total**  **CAM** | |
| Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
|  |  | n=2454 | n=7014 | n=858 | n=8516 | n=1489 | n=7941 | n=408 | n=8954 | n=546 | n=8833 | n=583 | n=8650 | n=3934 | n=5634 |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** |
| **Heart** | Yes | 4 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 4 | 5 | 4 | 4 | 4 | 5 |
| **Disease** | No | 96 | 96 | 96 | 95 | 96 | 96 | 96 | 95 | 96 | 95 | 96 | 96 | 96 | 95 |
|  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 1.00 | | 0.79 | | 1.05 | | 0.65 | | 0.65 | | 0.86 | | 0.93 | |
| (95% CI) | | (0.76, 1.32) | | (0.51, 1.24) | | (0.76, 1.47) | | (0.32, 1.31) | | (0.37, 1.15) | | (0.51, 1.44) | | (0.73, 1.19) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** |
| **Hypertension** | Yes | 28 | 32 | 26 | 32 | 30 | 31 | 28 | 31 | 29 | 31 | 28 | 31 | 29 | 32 |
| 1, 2, 7 | No | 72 | 68 | 74 | 68 | 70 | 69 | 72 | 69 | 71 | 69 | 72 | 69 | 71 | 68 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 0.79 | | 0.79 | | 0.95 | | 0.80 | | 0.88 | | 0.81 | | 0.82 | |
| (95% CI) | | (0.70, 0.89) | | (0.65, 0.95) | | (0.82, 1.10) | | (0.601, 1.06) | | (0.70, 1.11) | | (0.65, 1.02) | | (0.74, 0.91) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** |
| **Diabetes** | Yes | 6 | 9 | 6 | 8 | 6 | 8 | 4 | 8 | 8 | 8 | 5 | 8 | 6 | 9 |
| 1, 3, 4, 7 | No | 94 | 91 | 94 | 92 | 94 | 92 | 96 | 92 | 92 | 92 | 95 | 92 | 94 | 91 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 0.82 | | 0.61 | | 0.68 | | 0.36 | | 0.92 | | 0.60 | | 0.66 | |
| (95% CI) | | (0.65, 1.04) | | (0.41, 0.92) | | (0.50, 0.92) | | (0.21, 0.70) | | (0.60, 1.42) | | (0.37, 0.96) | | (0.54, 0.81) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1 statistically significant association with massage therapist (p<0.005)

2 statistically significant association with naturopaths/herbalists (p<0.005)

3 statistically significant association with chiropractors (p<0.005)

4 statistically significant association with osteopaths (p<0.005)

5 statistically significant association with acupuncturists (p<0.005)

6 statistically significant association with other AH practitioners (p<0.005)

7 statistically significant association with Total CAM (p<0.005)

\* adjusted for level of education, area of residence, marital status, income, health insurance, comorbidities, symptoms, smoking status, and alcohol consumption.

**Table 2 The distribution of use of self-prescribed complementary and alternative medicines (CAM) amongst women with heart disease, hypertension and/or diabetes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Use of self-prescribed CAM treatments in the previous 12 months** | | | | | | | | | | | | | |
| **Condition** | | **Vitamins /**  **Minerals** | | **Yoga /**  **Meditation** | | **Herbal**  **Medicines** | | **Aroma-**  **therapy Oils** | | **Chinese**  **Medicine** | | **Other Alter.**  **Therapies** | | **Total**  **CAM** | |
| Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
|  |  | n=6681 | n=2981 | n=1702 | n=7775 | n=2606 | n=6898 | n=1434 | n=8045 | n=365 | n=9088 | n=813 | n=8585 | n=7332 | n=2385 |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** |
| **Heart** | Yes | 5 | 4 | 5 | 4 | 4 | 5 | 6 | 4 | 4 | 5 | 5 | 4 | 5 | 4 |
| **Disease** 4 | No | 95 | 96 | 95 | 96 | 96 | 95 | 94 | 96 | 96 | 95 | 95 | 96 | 95 | 96 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 1.05 | | 1.08 | | 0.84 | | 1.25 | | 0.72 | | 0.93 | | 1.08 | |
| (95% CI) | | (0.80, 1.37) | | (0.79, 1.47) | | (0.64, 1.10) | | (0.92, 1.68) | | (0.36, 1.45) | | (0.61, 1.43) | | (0.81, 1.45) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** |
| **Hypertension** | Yes | 30 | 32 | 26 | 32 | 29 | 31 | 32 | 31 | 27 | 31 | 25 | 32 | 30 | 32 |
| 2, 3, 6 | No | 70 | 68 | 74 | 68 | 71 | 69 | 68 | 69 | 73 | 69 | 75 | 68 | 70 | 68 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 0.89 | | 0.78 | | 0.87 | | 0.99 | | 0.75 | | 0.67 | | 0.86 | |
| (95% CI) | | (0.79, 0.99) | | (0.68, 0.90) | | (0.78, 0.98) | | (0.87, 1.15) | | (0.56, 0.99) | | (0.55, 0.82) | | (0.77, 0.97) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** |
| **Diabetes** | Yes | 7 | 10 | 5 | 9 | 7 | 8 | 8 | 8 | 6 | 8 | 7 | 8 | 7 | 10 |
| 1, 2, 7 | No | 93 | 90 | 95 | 91 | 93 | 92 | 92 | 92 | 94 | 92 | 93 | 92 | 93 | 90 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 0.68 | | 0.59 | | 0.86 | | 0.88 | | 0.65 | | 0.81 | | 0.68 | |
| (95% CI) | | (0.55, 0.82) | | (0.43, 0.79) | | (0.69, 1.08) | | (0.68, 1.15) | | (0.36, 1.19) | | (0.56, 1.19) | | (0.55, 0.83) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1 statistically significant association with vitamins/minerals (p<0.005)

2 statistically significant association with yoga/meditation (p<0.005)

3 statistically significant association with herbal medicines (p<0.005)

4 statistically significant association with aromatherapy oils (p<0.005)

5 statistically significant association with Chinese medicine (p<0.005)

6 statistically significant association with other alternative therapies (p<0.005)

7 statistically significant association with Total CAM (p<0.005)

\* adjusted for level of education, area of residence, marital status, income, health insurance, comorbidities, symptoms, smoking status, and alcohol consumption.

**Table 3 The distribution of consultations with general practitioners (GPs) and specialists amongst women with heart disease, hypertension**

**and/or diabetes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Number of consultations with doctors in the previous 12 months** | | | | | | | | | | | | | | | |
| **Condition** | | **General Practitioner (GP)** | | | | | | | **Specialist** | | | | | | | | |
| 0 | 1 - 2 | 3 - 4 | 5 - 6 | 7 - 12 | 13 - 24 | 25+ | 0 | 1 - 2 | 3 - 4 | | 5 - 6 | 7 - 12 | | 13 - 24 | 25+ |
|  |  | n=454 | n=3047 | n=3030 | n=1683 | n=1021 | n=361 | n=101 | n=4528 | n=3171 | n=1011 | | n=372 | n=200 | | n=52 | n=34 |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | | **%** | **%** | | **%** | **%** |
| **Heart** | Yes | 1 | 2 | 3 | 6 | 11 | 15 | 15 | 2 | 5 | 9 | | 13 | 10 | | 12 | 10 |
| **Disease** 1, 2 | No | 99 | 98 | 97 | 94 | 89 | 85 | 85 | 98 | 95 | 91 | | 87 | 89 | | 88 | 90 |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  |  |
| Risk Ratio\* | |  |  |  | 1.13 |  |  |  |  |  | |  | 1.35 | |  |  |  |
| (95% CI) | |  |  | (1.05, 1.21) | | |  |  |  |  | | (1.22, 1.51) | | | |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  |  |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | | **%** | **%** | | **%** | **%** |
| **Hypertension** | Yes | 6 | 18 | 34 | 41 | 45 | 49 | 58 | 27 | 32 | 38 | | 42 | 37 | | 30 | 47 |
| 1, 2 | No | 94 | 82 | 66 | 59 | 55 | 51 | 42 | 73 | 68 | 62 | | 58 | 63 | | 70 | 53 |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  |  |
| Risk Ratio\* | |  |  |  | 1.22 |  |  |  |  |  | |  | 1.10 | |  |  |  |
| (95% CI) | |  |  | (1.18, 1.27) | | |  |  |  |  | | (1.04, 1.17) | | | |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  |  |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | | **%** | **%** | | **%** | **%** |
| **Diabetes** 1, 2 | Yes | 2 | 2 | 8 | 11 | 15 | 21 | 23 | 5 | 8 | 13 | | 13 | 17 | | 20 | 24 |
|  | No | 98 | 98 | 92 | 89 | 85 | 79 | 77 | 95 | 92 | 87 | | 87 | 83 | | 80 | 76 |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  |  |
| Risk Ratio\* | |  |  |  | 1.13 |  |  |  |  |  | |  | 1.14 | |  |  |  |
| (95% CI) | |  |  | (1.06, 1.20) | | |  |  |  |  | | (1.03, 1.25) | | | |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | |  |  | |  |  |

1 statistically significant association with GP (p<0.005)

2 statistically significant association with specialist (p<0.005)

\* adjusted for level of education, area of residence, marital status, income, health insurance, comorbidities, symptoms, smoking status, and alcohol consumption.

**Table 4 The distribution of consultations with allied health care practitioners amongst women with heart disease, hypertension and/or diabetes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Consultations with allied health care practitioners in the previous 12 months** | | | | | | | | | | | |
| **Condition** | | **Physiotherapist** | | **Counsellor** | | **Nurse** | | **Optometrist** | | **Dietitian** | | **Podiatrist** | |
| Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
|  |  | n=6681 | n=2981 | n=1702 | n=7775 | n=2606 | n=6898 | n=1434 | n=8045 | n=365 | n=9088 | n=813 | n=8585 |
|  |  | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** | **%** |
| **Heart** | Yes | 7 | 4 | 7 | 4 | 8 | 4 | 5 | 4 | 10 | 4 | 7 | 4 |
| **Disease** | No | 93 | 96 | 93 | 96 | 92 | 96 | 95 | 96 | 90 | 96 | 93 | 96 |
| 1, 2, 3, 5, 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 1.50 | | 1.73 | | 1.35 | | 0.95 | | 1.39 | | 1.31 | |
| (95% CI) | | (1.15, 1.96) | | (1.08, 2.72) | | (0.99, 1.83) | | (0.74, 1.22) | | (0.95, 2.06) | | (0.98, 1.73) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Hypertension** | Yes | 34 | 30 | 34 | 31 | 43 | 29 | 32 | 30 | 47 | 30 | 36 | 30 |
| 1, 3, 5, 6 | No | 66 | 70 | 66 | 69 | 57 | 71 | 68 | 70 | 53 | 70 | 67 | 70 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 1.11 | | 1.24 | | 1.53 | | 1.05 | | 1.42 | | 1.21 | |
| (95% CI) | | (0.98, 1.26) | | (1.01, 1.53) | | (1.32, 1.78) | | (0.95, 1.17) | | (1.15, 1.77) | | (1.06, 1.39) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Diabetes** | Yes | 8 | 8 | 11 | 7 | 17 | 6 | 9 | 5 | 33 | 6 | 17 | 6 |
| 2, 3, 4, 5, 6 | No | 92 | 92 | 89 | 93 | 83 | 94 | 91 | 95 | 67 | 94 | 83 | 94 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Odds Ratio\* | | 0.86 | | 1.20 | | 2.16 | | 1.81 | | 5.08 | | 3.31 | |
| (95% CI) | | (0.68, 1.09) | | (0.83, 1.75) | | (1.71, 2.72) | | (1.46, 2.24) | | (3.92, 6.58) | | (2.69, 4.07) | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1 statistically significant association with physiotherapist (p<0.005)

2 statistically significant association with counsellor (p<0.005)

3 statistically significant association with nurse (p<0.005)

4 statistically significant association with optician (p<0.005)

5 statistically significant association with dietitian (p<0.005)

6 statistically significant association with podiatrist (p<0.005)

\* adjusted for level of education, area of residence, marital status, income, health insurance, comorbidities, symptoms, smoking status, and alcohol consumption.

**Table 5 The distribution of body mass index (BMI) categories amongst women with heart disease, hypertension and/or diabetes**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **Heart Disease** | | **Hypertension** | | **Diabetes** | |
| Yes | No | Yes | No | Yes | No |
| n=428 | n=9320 | n=750 | n=8998 | n=2945 | n=6803 |
|  |  | | **%** | **%** | **%** | **%** | **%** | **%** |
| **BMI category** 1, 2. 3 | | |  |  |  |  |  |  |
| Underweight | (< 18.5 kg/m2) | | 2 | 2 | 1 | 2 | 1 | 2 |
| Acceptable wt | (18.5 – 24.99 kg/m2) | | 25 | 37 | 22 | 43 | 13 | 38 |
| Overweight | (25.0 – 29.99 kg/m2) | | 31 | 33 | 33 | 33 | 29 | 34 |
| Obese | (≥ 30 kg/m2) | | 42 | 28 | 44 | 22 | 57 | 26 |
|  |  |  |  |  |  |  |  |  |

1 statistically significant association with heart disease (p<0.005)

2 statistically significant association with hypertension (p<0.005)

3 statistically significant association with diabetes (p<0.005)