

Knowledge, use of complementary alternative medicine and health-related quality of life among cardiovascular disease patients

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Abstract

The use of complementary and alternative medicine (CAM) has become more prevalent among chronic disease patients. Moreover, health-related quality of life (HRQoL) related to cardiovascular disease (CVD) is a vital assessment for health intervention and treatment outcome. Hence, this study attempted to determine the knowledge and use of CAM among CVD patients and their HRQoL. A cross-sectional study was conducted among ninety CVD patients at the cardiology specialist clinic in Hospital Sultanah Bahiyah, Kedah using a purposive and convenience sampling method. A self-administered questionnaire was used to collect their clinical characteristics, knowledge of CAM and pattern usage, while Minnesota Living with Heart Failure Questionnaire was used to determine HRQoL. The data was analysed using multiple response analysis, Mann-Whitney and Chi-Square tests. The knowledge level among respondents was fair with a median score of 53.33%. Furthermore, 63.3% respondents use CAM, while potential improvement in condition (71.9%) and fear of side effects (66.7%) were the most cited reasons for CAM use and non-CAM use, respectively. The most common type of CAM reported was biological-based therapies (91.2%). The main purpose of using CAM was to maintain general health and improve well-being (82.5%). Majority were satisfied with CAM effectiveness (78.9%) and claimed that they did not experience any side effect from CAM use (96.5%). Family and friends (70.2%) were the main sources of CAM recommendation, while 56.1% did not disclose the use of CAM to their doctor. The HRQoL score (median 18) among CVD respondents were deemed to be good. However, no significant difference in HRQoL between CAM users and non-users was noted. In addition, no significant association was found between knowledge level and CAM usage, while only gender and marital status was significantly associated ($p < 0.05$) with CAM use. The use of CAM among CVD patients was not significantly influenced by their knowledge of CAM and did not show any significant improvement in HRQoL although more than half were CAM users.

1. Introduction

Cardiovascular disease (CVD) is the leading cause of mortality worldwide and in Malaysia. The total deaths in Malaysia caused by CVD reached 36% in 2012 (World Health Organization [WHO], 2014; Ang and Chan, 2016). Coronary artery disease (CAD) is the most common form and was found as the major burden of disease in Malaysia (Ang and Chan, 2016). Meanwhile, the National Cardiovascular Disease Database (NCVD) reports that more than 95% patients have at least one CVD risk factor, such as hypertension, diabetes mellitus, dyslipidaemia, smoking, obesity and family history (Ahmad and Sim, 2013).

Although many conventional medications are available for treating CVD, the trend of complementary and alternative medicine (CAM) use in recent decades has become more common among patients. For instance, research has documented that CAM use in Asian patients is prevalent, especially among those associated with chronic disease (Lee *et al.*, 2004). In addition, a review by Grant *et al.* (2012) showed that the worldwide prevalence of CAM use among cardiac patients ranged from 4% - 61%. According to the National Center for Complementary and Integrative Health (NCCIH, 2007), CAM encompasses diverse medical and health care systems, practices and products that are not considered part of conventional medicine, which consist of

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biologically-based therapies, mind-body interventions, manipulative and body-based systems, alternative medical systems, and energy therapies.

The use of CAM has been increasing dramatically in both developed and developing countries (Qidwai *et al.*, 2013). In Malaysia, the use of traditional and complementary medicine (TCM) among the population has become more prevalence (Siti *et al.*, 2009). Moreover, a previous survey involving chronic disease patients in Malaysia reported that 63.9% were using CAM (Hasan *et al.*, 2009). Previous studies also showed that biologically-based therapies were the most common form of CAM used among CVD patients, including herbal medicine, megavitamin, non-vitamin non-mineral, and so on (Chu *et al.*, 2013; Bahall, 2015; Teo *et al.*, 2016). Studies reported that 29-60% of general CAM users believed that this modality has remedial benefits and known to be safe, natural and fewer side effects than modern medications (Qidwai *et al.*, 2013; Rabito and Kaye, 2013).

Apart from that, the use of CAM among heart disease patients was influenced by friends and family (Hasan *et al.*, 2009; Ching *et al.*, 2013; Bahall, 2015). As a result, patients' knowledge of CAM may not be well structured. In fact, it is essential to obtain adequate knowledge of CAM from qualified physicians or CAM practitioners prior to use a form of CAM. This is because CAM modalities may have a negative impact on the compliance with modern medicine. For example, there are potential drug interactions between CAM products with the concomitant prescribed medications which may lead to fatalities (Qidwai *et al.*, 2013). Nonetheless, CVD patients often do not disclose or discuss CAM use with their physicians, with the cited reasons such as 'physicians will disapprove', 'it is not important to inform the doctor on the use of CAM', 'doctor would not understand', and 'lack of time during consultation' (Hasan *et al.*, 2009; Teo *et al.*, 2016).

With CVD remaining the leading cause of death worldwide, the health-related quality of life (HRQoL) of patients has become a major concern. The HRQoL outcome is an essential indicator of both diagnostic and therapeutic interventions, and the measure elements included physical, psychological, and social aspects of positive well-being as well as negative impacts of illness, treatment, and infirmity (Kawecka-Jaszcz *et al.*, 2013). CVD usually leads to devastating consequences, resulting in impaired HRQoL (Wang *et al.*, 2014). To date, no research has been done on the knowledge of CAM and the HRQoL among CVD patients in Malaysia. Hence, this study is aimed to determine the knowledge and pattern of CAM use among CVD patients and their

HRQoL.

2. Materials and methods

2.1 Research design

A cross-sectional study was conducted in Kedah, Malaysia between July and September 2017. In the present study, a total of ninety patients associated with CVD, whether CAM users or non-users, participated. The cardiology specialist clinic of Hospital Sultanah Bahiyah (HSB) was chosen as the sampling location because the clinic is referred by most of the CVD patients in Kedah. According to the National Cardiovascular Disease – Acute Coronary Syndrome Registry (NCVD-ACS) 2011 – 2013, the distribution of patients with acute coronary syndrome (ACS) at HSB was 4.7% (Ahmad and Sim, 2015). Thus, the sample size was calculated using the formula suggested by Charan and Biswas (2013) with a confidence level of 95% and a margin error of 5%. A total of ninety respondents were recruited, although only a minimum of seventy respondents was required in this study because there would be more CVD cases that were not included in the NCVD-ACS Registry as this only involved seventeen public hospitals, one university hospital and the National Heart Institute. The study was approved by the Institute for Health Behavioural Research (IHBR) and Medical Research and Ethics Committee (MREC) under the Ministry of Health Malaysia with registration number NMRR-17-1084-35979. Additionally, written consent forms were obtained from all the respondents prior to answering the questionnaire.

2.2 Research instrument

A self-administered questionnaire consisting of five sections (socio-demographics, clinical characteristics, knowledge of CAM, pattern of CAM use and HRQoL) was used as the research instrument in the present study. The items, number of questions, scales used, and references were summarized in Table 1.

Multiple choices (Yes, No, Not Sure) were provided for items of knowledge section, with four items worded negatively to avoid respondents answering in a consistent manner. The correct scores were summed up and categorized into poor (0 – 50%), fair (51 – 69%) and good (70 – 100%) (Khan *et al.*, 2014). The last section was adopted from the Minnesota Living with Heart Failure Questionnaire by Rector and Cohn (1984) which rate based on 6-point Likert scale (0 = no impairment to 5 = very much impairment). This questionnaire was used because it is short, easy to understand and administer, and has a high internal consistency reliability with Cronbach's alpha of 0.86 (Rector *et al.*, 1987; Adebayo *et al.*, 2017). Referencing the cut-off scores for overall

Table 1. Summary of each section in questionnaire

Section	No. of questions	Items	Scales	References
A: Socio-demographic	7	Gender, age, race, marital status, educational level, employment status and monthly household income.	Nominal scale, ordinal scale	Ching et al. (2013); EPU, (2014); Farooqui et al. (2016).
B: Clinical characteristics	3	Types of CVD diagnosed, cause of CVD, current prescribed modern medicine.	Nominal scale	Mackay and Mensah (2004); Krasuski et al. (2006); Bahall (2015); Teo et al. (2016); AHA (2017); Miller et al. (2004); Maimunah et al. (2011); Li et al. (2013); Rabito and Kaye (2013); Qidwai et al. (2013); Haque et al. (2015).
C: Knowledge of CAM	15	General theory and effect of CAM, specific function of CAM on CVD.	Nominal scale	Wood et al. (2003); Barraco et al. (2005); Yeh et al. (2006); Hasan et al. (2009); Ching et al. (2013); Chu et al. (2013); Teo et al. (2016).
D: Pattern on CAM use	10	Prevalence, types, reason of use/non-use, using purpose, source of information, disclosure to doctor, perceived effectiveness and side effects.	Nominal scale	Wood et al. (2003); Barraco et al. (2005); Yeh et al. (2006); Hasan et al. (2009); Ching et al. (2013); Chu et al. (2013); Teo et al. (2016).
E: Health-related Quality of Life (MLHFQ)	21	Impact of frequent symptoms, physical factor, emotional factor, social function, and impact of treatments.	Ordinal scale (Likert scale)	Rector and Cohn (1984) (Minnesota Living with Heart Failure Questionnaire).

HRQoL suggested by Behlouli et al. (2009), a total score below 24 represents good HRQoL; a score between 24 and 45 represents moderate HRQoL; and a score above 45 represents poor HRQoL. Both English and Malay versions of the questionnaire were prepared for the respondents from different ethnicities to ease the comprehension of the questions. Content validity was achieved via a rational review from the professional reviewer of Institute for Health Behavioural Research, while internal consistency was used to determine the reliability. The Cronbach's alpha for HRQoL was 0.795, indicating good reliability.

2.3 Data analysis

The data was analysed using Statistical Package for Social Science (SPSS, Version 20.0). The descriptive test was used to present socio-demographic characteristics, level of CAM knowledge, prevalence of CAM use, CAM disclosure, perceived effectiveness, side effects and HRQoL in frequency (n) and percentage (%). Clinical characteristics and pattern of CAM use (reasons, types, purposes, recommendation sources, reason for non-disclosure) were reported in terms of frequency (n) and percentage of cases (%) due to multiple responses being given for those questions. Mann-Whitney U test was employed to compare HRQoL between CAM users and non-users. Association between categorical variables (level of CAM knowledge and CAM usage, socio-demographic profile and CAM usage) were determined by cross-tabulation (Chi-square test). The significant value was set at 0.05 for all statistical analyses.

3. Results

3.1 Socio-demographics and clinical characteristics

The socio-demographic characteristics of the respondents are shown in Table 2. A majority of the CVD respondents were male (60%), Malay (66.7%), married (87.8%) and aged between 50-69 years (66.6%). For the educational level, 61.2% of respondents had achieved a SPM certificate or lower and only 26.6% had a STPM certificate or above. A majority (72.2%) were unemployed or retired. Almost 60% also reported a lower monthly household income (< RM3000).

In the present study, a majority (51.1%) reported two types of CVD. Coronary heart disease (CHD) (64.4%) was the most prevalent type of CVD, followed by hypertension (50%). Meanwhile, 86.7% of respondents reported with at least one type of CVD risk factor, in which hypercholesterolemia (64.4%), family history (33.3%) and diabetes mellitus (32.2%) were the three most common risk factors as shown in Table 3. In addition, more than half of the respondents (51.1%) were not sure of their types of CVD medication.

3.2 Level of knowledge of CAM

Based on Figure 1, a similar percentage of respondents (43.3%) were within a poor or fair range, and only 13.3% of respondents had good CAM knowledge. The overall result showed that the respondents had a fair knowledge of CAM since the median score was 53.33% (IQR=28.33).

Table 2. Socio-demographic data of respondents

Characteristics	(n=90)	
	Frequency (n)	Percentage (%)
Gender		
Male	54	60
Female	36	40
Age category [Median (IqR): 60(14.25)]		
<50	14	15.6
50-69	60	66.6
≥70	16	17.8
Race		
Malay	60	66.7
Chinese	20	22.2
Indian	10	11.1
Marital status		
Single	3	3.3
Married	79	87.8
Divorced/widowed	8	8.9
Educational level		
None	10	11.1
SPM or below	55	61.2
STPM or above	24	26.6
Others	1	1.1
Employment status		
Employed	24	26.7
Unemployed/housewife	43	47.8
Student	1	1.1
Pensioner	22	24.4
Monthly household income (RM)		
No income	11	12.2
< 3000	53	58.9
3000-5000	15	16.7
>5000	11	12.2

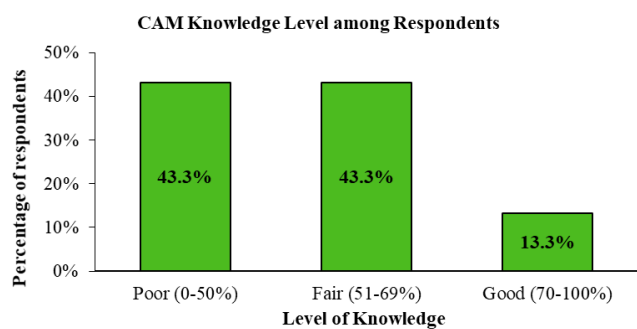


Figure 1. CAM knowledge level among CVD respondents (n=90)

Most of the respondents could correctly provide the general definition of CAM (68.9%); types of Traditional Malay Medicine (68.9%); general benefits of Traditional Chinese Medicine (70%); benefits of garlic and massage therapy (62.2%); benefits of yoga (56.7%); advantages of Tai Chi (75.6%); and benefits of acupuncture (62.2%). In contrast, majority of respondents were not sure of the benefit of Chinese herbal medicine (62.2%); benefits of fish oil consumption (47.8%); benefits of ginseng (55.6%); benefits of ginkgo biloba (67.8%); and advantages of deep breathing exercise (51.1%). Furthermore, from questions about knowledge of the adverse effect of CAM, 51.1% of respondents answered correctly that there are potentially dangerous drug

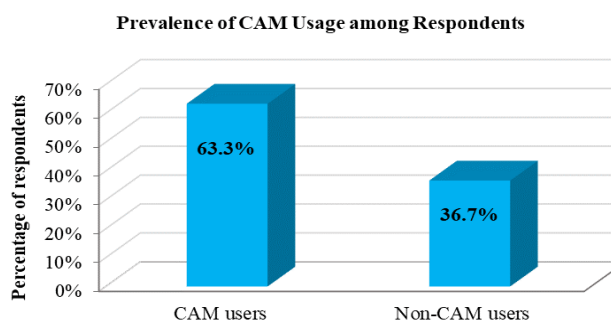


Figure 2. Prevalence of CAM usage among CVD respondents (n=90)

interactions between supplements and modern medication. However, 51.1% of respondents did not score well on the potential herb-drug interactions between herbal medicine and cardiovascular medications, as 11.1% answered wrongly and 40% were not sure.

3.3 Prevalence of CAM use and reasons

As illustrated in Figure 2, 63.3% of respondents were CAM users. Based on Table 4, the most commonly cited reasons for CAM use were “potential improvement in condition” (71.9%), “proven benefit in the condition being treated” (43.9%) and “fewer side effects than modern medicine” (40.4%). On the other hand, “afraid of

Table 3. Clinical characteristics and current CVD medication used among respondents

Clinical Characteristics	(n=90)	
	Frequency (n)	Percentage of cases* (%)
Types of CVD		
Hypertension	45	50.0
Coronary Heart Disease (CHD)	58	64.4
Stroke	2	2.2
Congestive Heart Failure (CHF)	9	10.0
Valvular Heart Disease	16	17.8
Cardiac Arrhythmia	13	14.4
Others	7	7.8
Not sure	0	0
Types of CVD risk factors		
Diabetes Mellitus (DM)	29	32.2
Hypercholesterolemia	58	64.4
Obesity	11	12.2
Excess alcohol consumption	1	1.1
Smoking	21	23.3
Family history	30	33.3
Others	6	6.7
Not sure	12	13.3
Types of CVD medication used		
Anticoagulant	17	18.9
Antiplatelet agent	33	36.7
ACE inhibitor	8	8.9
Angiotensin II receptor blocker	3	3.3
Beta blocker	22	24.4
Calcium antagonist	11	12.2
Digoxin	5	5.6
Diuretics	9	10.0
Vasodilator	4	4.4
Statin	22	24.4
Others	10	11.1
Not sure	46	51.1

* Percentage are reported per cases.

Table 4. Reason of CAM use and non-use among respondents

Characteristics	Frequency (n)	Percentage of cases* (%)
Reason for CAM use (n=57)		
Inexpensive or somehow cheaper than modern medicine	8	14.0
Dissatisfied with modern medicine	3	5.3
Fewer side effects than modern medicine	23	40.4
Potential improvement in condition	41	71.9
Proven benefit in condition being treated	25	43.9
Believe on safety and quality of CAM	8	14.0
Fear of adverse drug reaction of modern medicine	10	17.5
Just to try	8	14.0
Reason for non-CAM use (n=33)		
Satisfied with current modern medicine	20	60.6
Afraid of side effect	22	66.7
Not believe of CAM efficacy	5	15.2
Less availability	1	3.0
Oral type of CAM have terrible taste	0	0
Other reason	2	6.1

* Percentage are reported per cases.

Table 5. Types of CAM use among the respondents

Characteristics	Frequency (n)	Percentage of cases* (%)
Types of CAM use (n=57)		
Biological-based therapies	52	91.2
Body-based therapies	25	43.9
Mind-body therapies	9	15.8
Alternative medical system	8	14.0
Energy therapies	1	1.8
Types of Biological-based therapies (n=52)		
Megadose vitamin	7	13.5
Herbal remedies	42	80.8
Non-vitamin non-mineral	33	63.5
Others	2	3.8

* Percentage are reported per cases.

Table 6. Purpose of using CAM among respondents and their perceived effectiveness

Characteristics	Frequency (n)	Percentage (%)
Purpose of using CAM (n=57)*		
Current CVD treatment	19	33.3
Other co-morbidity treatment	17	29.8
Other common illness	14	24.6
Maintain general health and improve well-being	47	82.5
Improve effectiveness of current modern medicine	7	12.3
Satisfaction on CAM efficacy (n=57)		
Yes	45	78.9
No	5	8.8
Not sure	7	12.3
Side effect from CAM (n=57)		
Yes	1	1.8
No	55	96.5
Not sure	1	1.8

* Percentage are reported per cases.

Table 7. Source of CAM recommendation and disclosure among respondents

Characteristics	Frequency (n)	Percentage (%)
Source of recommendation (n=57) *		
Family and friends	40	70.2
Patients who use CAM	21	36.8
Health-care professional	9	15.8
CAM practitioner	10	17.5
Other source	8	14.0
CAM disclosure to doctor (n=57)		
Yes	25	43.9
No	32	56.1
Reason of not disclosing (n=32)*		
Doctor never ask	26	81.2
Doctor will not approve	3	9.4
Not important for them to know	4	12.5
Doctor will not understand	4	12.5
Lack of consultation time	4	12.5
Other reason	1	3.1

* Percentage are reported per cases.

Table 8. HRQoL score among respondents

HRQoL dimension	No. of items	Max. score	Median score (IqR)
Overall score*	21	105	18 (23)
Physical score	8	40	8.5 (11)
Emotional score	5	25	4 (5.5)

*Cut-off score: <24 = good HRQoL; 24-45 = moderate HRQoL; >45 = poor HRQoL (Behloul et al., 2009).

side effect” (66.7%) and “satisfied with current modern medicine” (60.6%) were the most common reasons claimed by non-CAM users.

3.4 CAM usage pattern

As shown in Table 5, biological-based therapies (91.2%) were the most prevalent type of CAM used, while herbal remedies (80.8%) and non-vitamin non-

mineral (63.5%) were the most common form of biological-based therapies used. Next, body-based therapies (43.9%) and mind-body therapies (15.8%) were other common types of CAM used among respondents.

Meanwhile, a majority (82.5%) claimed that the purpose of using CAM is to maintain general health and improve well-being, while only 33.3% use CAM to treat

Table 9. Median score of HRQoL between CAM users and non-CAM users

HRQoL Dimension	Median (IqR)		p-value
	CAM Users (n=57)	Non-CAM Users (n=33)	
Overall score	17 (24.5)	19 (21)	0.818
Physical score	8 (11)	9 (13)	0.426
Emotional score	4 (6)	4 (6.5)	0.973

p>0.05 indicate no significant difference by Mann-Whitney U test

Table 10. Association between knowledge level and CAM usage

Variable	CAM Usage (%)		Pearson Chi-Square
	Yes (n=57)	No (n=33)	
Poor	21 (36.8)	18 (54.5)	$\chi^2 = 2.799$ p = 0.247
Fair	27 (47.4)	12 (36.4)	
Good	9 (15.8)	3 (9.1)	

1 cell (16.7%) have expected count <5. The minimum expected count is 4.40.

p>0.05 indicate non-significance by Chi-Square test

Table 11. Association between socio-demographic and CAM usage

Variables	CAM Usage (%)		Continuity Correction
	Yes (n=57)	No (n=33)	
Gender			
Male	40 (70.2)	14 (42.4)	$\chi^2 = 5.600$ p = 0.018*
Female	17 (29.8)	19 (57.6)	

0 cell (0%) have expected count < 5. The minimum expected count is 13.20.

Age Category	CAM Usage (%)		Pearson Chi-Square
	Yes (n=57)	No (n=33)	
< 50 years	7 (12.3)	7 (21.2)	$\chi^2 = 1.651$ p = 0.648
50 – 59 years	21 (36.8)	9 (27.3)	
60 – 69 years	19 (33.3)	11 (33.3)	
≥ 70 years	10 (17.5)	6 (18.2)	

0 cell (0%) have expected count < 5. The minimum expected count is 5.13.

Race	CAM Usage (%)		Pearson Chi-Square
	Yes (n=57)	No (n=33)	
Malay	37 (64.9)	23 (69.7)	$\chi^2 = 2.010$ p = 0.366
Chinese	15 (26.3)	5 (15.2)	
Indian	5 (8.8)	5 (15.2)	

1 cell (16.7%) have expected count < 5. The minimum expected count is 3.67.

Marital Status	CAM Usage (%)		Fisher's Exact
	Yes (n=57)	No (n=33)	
Married	54 (94.7)	25 (75.8)	p = 0.016*
Not married	3 (5.3)	8 (24.2)	

1 cell (25%) have expected count < 5. The minimum expected count is 4.03.

Educational Level	CAM Usage (%)		Pearson Chi-Square
	Yes (n=57)	No (n=33)	
Primary	15 (26.8)	9 (27.3)	$\chi^2 = 0.008$ p = 0.996
Secondary	26 (46.4)	15 (45.4)	
Tertiary	15 (26.8)	9 (27.3)	

0 cell (0%) have expected count < 5. The minimum expected count is 8.90.

Employment Status	CAM Usage (%)		Continuity Correction
	Yes (n=57)	No (n=33)	
Employed	16 (28.1)	8 (24.2)	$\chi^2 = 0.022$ p = 0.882
Unemployed	41 (71.9)	25 (75.8)	

0 cell (0%) have expected count < 5. The minimum expected count is 8.80.

Monthly Household Income	CAM Usage (%)		Fisher's Exact
	Yes (n=57)	No (n=33)	
≤ RM5000	49 (86)	30 (90.9)	p = 0.740
> RM5000	8 (14)	3 (9.1)	

1 cell (25%) have expected count < 5. The minimum expected count is 4.03.

*p<0.05 indicate significance by Chi-Square test.

their current CVD problem (Table 6). Moreover, almost 80% of respondents were satisfied with the effectiveness of CAM, and 96.5% claimed that they did not experience any side effects from using CAM.

The findings in Table 7 also showed that friends and family (70.2%) were the major sources of the recommendation of using CAM among respondents, while more than half of respondents (56.1%) reported that they did not disclose CAM use to their doctor. The most common reason for not disclosing cited by the respondents was “doctors never ask” (81.2%).

3.5 Health-related quality of life among CVD patients

Based on Table 8, the score for overall HRQoL of the respondents was low, indicating that their HRQoL were good. Moreover, the score for both physical and emotional dimension was also considered low. No significant differences in HRQoL were found between CAM users and non-users (Table 9).

3.6 Association between knowledge level and CAM use and socio-demographic and CAM use

According to Table 10, there was no significant association between knowledge level and CAM usage among CVD respondents, which indicates that the use of CAM was not significantly influenced by respondents' level of knowledge of CAM.

Based on Table 11, gender ($p=0.018$) and marital status ($p=0.016$) were significantly associated with CAM use, while other socio-demographic characteristics were not significantly associated with CAM use.

4. Discussion

In the present study, the demographic data was in line with the annual report of National Cardiovascular Disease – Acute Coronary Syndrome Registry (NCVD-ACS) 2011-2013 and National Cardiovascular Disease – Percutaneous Coronary Intervention Registry (NCVD-PCI) 2010-2012, where majority of CVD patients were male, Malay and aged between 50-59 years (Ahmad and Sim, 2014; Ahmad and Sim, 2015). Thus, the outcome of the results can be inferred to the study population. Furthermore, the findings showed that coronary heart disease (CHD) was the most prevalent types of CVD, as supported by WHO (2017) and Malaysian National Burden of Diseases and Injury Study (Yusoff *et al.*, 2013), whereby the CHD is the main cause of death in Malaysia as well as global. Next, strokes are the second leading cause of death from CVD according to WHO (2017) and the Malaysian National Burden of Disease and Injury Study (Yusoff *et al.*, 2013), however, was the least in the study. This is because most stroke patients

have difficulties in moving, speaking as well as writing, and were subsequently unable to participate in the study since they were required to complete the questionnaire on their own. Additionally, findings for CVD risk factors are also supported by the National Health and Morbidity Survey (NHMS, 2015), which reported that dyslipidaemia, hypertension and diabetes were the most common modifiable risk factors. Also, a majority were not sure of their types of CVD medication, which may cause them to be more susceptible to the consequences of herb-drug interaction if they were CAM users (Rabito and Kaye, 2013).

In Malaysia, no study on CAM knowledge among CVD patients has been reported. Nevertheless, one study did reveal that 89.8% of Malaysia women (with total respondents, $n=460$) had a low level of knowledge of herbal medicines (Law and Soon, 2013), which was consistent with the present study. In Malaysia, garlic consumption (Ching *et al.*, 2013) and massage therapy (Othman and Farooqui, 2013) are commonly practiced as part of CAM, hence the percentage of positive responses on the benefit of garlic and massage therapy among respondents was high. On the other hand, a majority of respondents were not sure of the benefit of Chinese herbal medicine, perhaps due to the fact that other ethnicities might not be familiar with the function and benefits. In addition, respondents who reported a lack of knowledge of the potential herb-drug interactions may have a lack of discussion on CAM with their regular physician. For instance, the present findings reported that the main source of CAM knowledge was from family and friends, and most of the CAM users did not disclose CAM use to their doctor. As a consequence, they lack knowledge of the adverse effect of concurrent use of CAM with conventional medicine.

In the present study, the prevalence of CAM use was in line with studies by Chu *et al.* (2013), Siti *et al.* (2009) and Hasan *et al.* (2009). Additionally, a previous study done by Kew *et al.* (2015) in Pahang reported that the study population with CVD risk factors was more likely to use CAM as compared to general study population (31.7% versus 25.9%), although the prevalence of use of CAM among patients with CVD risk factors was lower compared with the present study. This may be due to the study not being conducted in a clinical setting, as it was a community-based study. According to Bahall and Edwards (2015), positive feedback of CAM is the main factor promoting CAM usage. Hence, it was believed that respondents may have obtained positive testimonies for a particular form of CAM, or even witnessed how CAM benefited someone who used it to treat a specific condition, which could explain why “potential improvement in condition” was cited by most of the

CAM users in the present study. In contrast, respondents who did not use CAM were afraid of side effects may be due to lack of knowledge of CAM which caused them afraid to try. In addition, the respondents also felt their current prescribed medications and medical treatment was sufficient to treat their condition; thus, any form of CAM became unnecessary to them.

The prevalent use of biological-based therapies among CVD patients, particularly herbal medicine, was comparable with previous studies by (Siti *et al.*, 2009; Chu *et al.*, 2013; Bahall, 2015). Moreover, Erku and Mekuria (2016) and Ching *et al.* (2013) reported that herbal products were used by the majority of hypertensive patients in Ethiopia and Malaysia, respectively. The trend of herbal remedies was dominant among the Malaysian population because the traditional healing practices, supported by vast natural resources available since ancient times, are still being practiced by most of the population of various ethnicities (Siti *et al.*, 2009). Nonetheless, Farooqui *et al.* (2016) and Hasan *et al.* (2009) revealed that vitamin supplements were the most common CAM used among patients with cancer and chronic disease, respectively, to reduce the effects of chemotherapy and for health maintenance. Meanwhile, massage therapy was prominent among Malaysian stroke patients due to its effectiveness in decreasing blood pressure, pain, anxiety level and muscle tone, as well as increasing health-related quality of life (HRQoL) (Jouzi, 2009; Kadir *et al.*, 2015; Lämås *et al.*, 2016; Yang *et al.*, 2017).

The typical purpose of CAM use in the present study was also comparable with Siti *et al.* (2009), namely for health maintenance. This may be because the majority believed the use of herbal medicine can promote vital life energy, which can maintain general health (Tabish, 2008). The vital energy is especially essential for those associated with chronic disease patients. Additionally, the findings of the present study are consistent with those of Teo *et al.* (2016); Bahall (2015); Chu *et al.* (2013) and Hu *et al.* (2013), as most of the study respondents were satisfied with the CAM efficacy and only fewer respondents experienced side effects (Bahall, 2015; Teo *et al.*, 2016). Therefore, CAM therapies were deemed to be helpful for CVD and non-CVD condition, since most were satisfied with the effectiveness of CAM. One noteworthy point is that respondents were combining the use of CAM with currently prescribed medication, but not substituting their medications with CAM. This may imply that they were satisfied with current modern medications, yet also believed that the use of CAM can act as complementary medicine for their CVD condition, or as an alternative treatment for other non-CVD illness, as well as improve their general health.

In general, the overall HRQoL of the respondents was good, indicating that the impact of their heart condition on the quality of life was low. This finding was in accordance with study among cancer patients in Malaysia, whereby their HRQoL was considered as good (Loke *et al.*, 2017), but in contrast with studies by Ko *et al.* (2015), Tan *et al.* (2014) and Xie *et al.* (2008). This may be because a majority of respondents in this study attended a cardiology specialist clinic for checking-up as well as consulting their own doctor. In addition, they were taking modern medication, and some told that they came to follow-up the treatment of their heart condition. Thus, it was believed that the HRQoL of respondents may have been improved before they were recruited in the present study, which resulted in good HRQoL. This was supported by a previous study by Azmi *et al.* (2015), in which the HRQoL of patients with ACS improved from the time of admission to follow-up at 12 months after discharge. Furthermore, findings have reported that the intervention of pharmaceutical care such as cardiac rehabilitation program can improve HRQoL of ACS patients (Anchah *et al.*, 2017).

Apart from that, no significant difference of HRQoL found between CAM users and non-users, which indicates that CAM usage among respondents did not significantly improve their HRQoL. This finding is in line with previous studies by Loke *et al.* (2017) and Zick *et al.* (2005). However, Chu *et al.* (2013) reported a significant difference of HRQoL between CHD patients who use CAM and do not use CAM, whereby patients who use CAM showed better current health status. This is because, in China, traditional Chinese medicine is considered to be the main type of CAM, and can even be the major treatment method in certain rural area, thus have a significant effect on their HRQoL; this may explain the reason why patients who use CAM showed better current health status (Chu *et al.*, 2013).

On the other hand, the lack of a significant association between knowledge level and CAM usage implies that the use of CAM was not significantly influenced by respondents' level of knowledge of CAM, which was consistent with the previous study conducted among people living with AIDS (Limsatchapanich *et al.*, 2013). It was further reported that positive perceptions towards the use of CAM are believed to be one of the factors that drive them to use CAM. In contrast, the previous study by Nagashekhara *et al.* (2015) reported that patients' level of knowledge of CAM was negatively correlated with CAM usage. This finding may be explained in that most respondents were using CAM based on anecdotal rather than scientific evidence, as they believed what they had been told, especially from those who had the experience using CAM modalities

(Evans *et al.*, 2007). For instance, a qualitative study by Farooqui *et al.* (2012) revealed that Malaysian cancer patients who were CAM users are the best evidence to prove the effectiveness of a type of CAM, as they believed they would also get the same effect as others experienced from using the CAM.

Except for gender and marital status, the present study showed no significant association between CAM use and socio-demographic characteristics, suggesting that gender and marital status are possible factors that predict that married male was more likely to use CAM. The present findings are in accordance with a previous study among hypertensive patients in African countries (Osamor and Owumi, 2010; Erku and Mekuria, 2016), but are contradictory to previous studies that reported women were more likely to use CAM in general, as well as people with multiple chronic diseases (Zhang *et al.*, 2015; Alwhaibi and Sambamoorthi, 2016; Farooqui *et al.*, 2016). One possible explanation may be because most women involved in the current study were housewives, which might have a disproportionate share of household work than men, and thus be less likely to use CAM because they have less exposure to CAM modalities (Bianchi *et al.*, 2012). Moreover, Osamor and Owumi (2010) also supported that respondents who are married were more likely to use CAM because they were supported by their spouse in considering taking CAM as adjunct treatment. In addition, they can also discuss with their partner before deciding to take a form of CAM or may even be influenced by their family members who had been helped by CAM. For instance, Hasan *et al.* (2009) stated that patients often begin use CAM due to the direct influence of the family history of CAM use.

5. Conclusion

More than half of CVD patients in Kedah reported using CAM with biological-based therapies, particularly herbal medicines, as the most prevalent CAM modalities used. Although the level of knowledge of CAM among CVD respondents was fair, the majority were unsure about the benefits of certain CAM modalities and the potential herb-drug interaction. The existence of an interaction gap between patients and doctors in the discussion of CAM may place them at higher risk of adverse effects from the concurrent use of modern medicine and CAM. Additionally, the impact of heart failure on respondents' quality of life was low, indicating a good HRQoL. Also, the HRQoL was not significantly different between CAM users and non-CAM users. Furthermore, the use of CAM was not significantly influenced by the level of CAM knowledge, while only gender and marital status were significantly associated with CAM use.

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