

## Predictors of herbal medicine in patients with coronary artery disease in Jordan

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### Abstract

**Objective:** To explore the relation between herbal use and 14 independent variables among cardiac patients.

**Methods:** The cross-sectional study was conducted through face-to-face interviews of 690 consecutive patients visiting the outpatient department at the Queen Alia Heart Institute from June 1, 2008 to June 1, 2009. Data were collected using a specially-designed questionnaire. Univariate analysis was carried out to explore the relation between herbal use and 14 pre-determined risk factors. Categorical data between the two groups (herb users, non-users) were studied using paired two-tailed Fischer's exact test. Variables were expressed as absolute numbers and percentages. Multivariate logistic regression analysis of significant univariate predictors of herbal use was then performed using the block entry method.

**Results:** There were 471 (68.26%) men and 219 (31.73%) women in the study population. Of the total, there were 97 (14.1%) subjects using herbs: 77 (79.4%) men, 20 (20.6%) women ( $p=0.01$ ). Other factors of statistical significance included history of smoking ( $p=0.008$ ), urban residence ( $p=0.005$ ), duration of coronary artery disease  $< 5$  years ( $p=0.03$ ), impaired left ventricular function ( $p=0.002$ ), lower educational level ( $p=0.02$ ). Multivariate logistic regression analysis predicted herbal use in all univariate predictors except for the duration of coronary artery disease ( $p=0.053$ ).

**Conclusion:** Specific and appropriate awareness and educational programmes need to be initiated with target audience in mind to optimise safety and efficacy of consumed herbs and to ensure an affordable healthcare system.

**Keywords:** Herbal, Coronary, Jordan. (JPMA 63: 216; 2013)

### Introduction

The use of complementary alternative medicine (CAM) has increased in recent times mainly because of the high cost of conventional therapy, advice and pressure of the community, and the growing belief in alternative modalities. According to one estimate,  $>80\%$  of the developing world's population still depends on CAM, versus about half of the population in industrialised countries.<sup>1</sup>

Herbal therapy (HT) may protect against cardiovascular diseases by contributing to the total antioxidant defense system of the human body. Flavonoids are groups of herbal antioxidants that are inversely related to mortality from coronary artery disease (CAD) and to the incidence of heart attacks.<sup>2</sup>

A recently published study by our group<sup>3</sup> revealed that HT use among CAD patients in Jordan is not uncommon, reaching a frequency rate of about 14%. The number of Jordanian traditional medicinal plants cited as CAD-specific herbs by the respondents in our previous study was 28. Many of these plants had never been properly explored, or evaluated compared to Chinese or western medicines.<sup>4</sup> Moreover, many of the herbs reputed for cardiovascular

relief in the Middle East region, were not used by our participants confirming again loss of knowledge by younger generations and/or poor counselling by healthcare providers as suggested previously.<sup>4</sup>

Several odd recommendations were passed to the customers by different herbalists in our study, indicating that they were mostly uneducated and untrained in the field of herbal medicine; similar to what was found earlier.<sup>5</sup>

To address the problems of loss of Jordanian traditional HT knowledge, odd herbalist recommendations, weird and potentially dangerous herbal preparations, we aimed to explore the relation between herbal use and 14 independent variables among our study population,<sup>3</sup> in order to be able to predict sectors which represent the ideal targets for appropriate awareness educational programmes.

### Subjects and Methods

The cross-sectional study which comprised 690 consecutive out-patients with history of chronic CAD who visited cardiology clinics at Queen Alia Heart Institute (QAHI) from June 1, 2008, to June 1, 2009.<sup>3</sup> Data were collected using a specially-designed questionnaire filled by 7 cardiologists. Results regarding the commonly used plants and their mixtures, miscellaneous data about frequency, dose, side effects, benefit perception, willingness to continue using the herb and the advising person have all been published.<sup>3</sup> The current study

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involved univariate and multivariate analyses, to explore the relation between HT use and 14 pre-determined risk factors, including: age, gender, residence area, educational level, smoking status, extent and duration of CAD, status of left ventricular (LV) function, satisfaction on medical therapy, regular use of herbs for other chronic diseases, the presence or absence of diabetes or arterial hypertension, past history of coronary bypass surgery and past history of repeated (more than two) coronary interventions. Categorical data between the two groups (herb users; non-users) were studied using paired two-tailed Fischer's exact test. Variables were expressed as frequencies and percentages. Multivariate logistic regression analysis of significant univariate predictors of herbal use was then performed using the block entry method with the Systat for Windows, version 10 (SPSS Inc.). Differences were considered significant if p value was <0.05.

Verbal informed consent was obtained from each patient before the filling of the questionnaire. The study was approved by the local ethical committee of the Royal Medical Services.

## Results

Using univariate analysis, there were significant associations between HT use and smoking status ( $p=0.008$ ; OR 1.9), impaired LV function ( $p=0.002$ ; OR 1/0.5=2.0), urban residence ( $p=0.005$ ; OR=2.1), lower educational level ( $p=0.02$ ; OR=1.8), duration of CAD < 5 years ( $p=0.03$ , OR= 1.7) and male gender ( $p=0.01$ ; OR=1.9). There was also tendency towards more herbal use in patients with past history of repeated interventions ( $p=0.054$ ; OR= 1.6) and those aged < 60 years ( $p=0.08$ ; OR= 1.6). No significant relations between the extent of CAD, satisfaction on medical therapy, regular use of herbs for other diseases, presence of hypertension or diabetes and past history of coronary artery bypass surgery were noticed in our study population (Table-1).

Odds ratios and 95% confidence intervals were calculated using logistic regression (Table-2). A significant association was found between herbal use and male gender (Wald  $X^2=5.987$ ,  $p=0.014$ ), urban residence (Wald  $X^2=17.468$ ;  $p<0.0001$ ), impaired LV function (Wald  $X^2=67.468$ ,  $p<0.0001$ ), below secondary educational level (Wald  $X^2=$

Table-1: Significant predictors for herb use according to univariate analysis.

Categorical variable		All N°	Patients on Herbs N°	Patients not on Herbs N° (%)	P value	Risk reduction	OR (95% CI)
Name	Arms	690	97 (14.1)	593 (85.9)			
Gender	Male	471	77 (79.4)	394 (66.4)	0.01	1.8	1.9
	Female	219	20 (20.6)	199 (33.6)			
Residence area	Urban	462	77 (79.4)	385 (64.9)	0.005	1.9	2.1
	Rural/Bedouin	228	20 (20.6)	208 (35.1)			
Duration of CAD	1-5 years	421	69 (71.1)	352 (59.4)	0.03	1.6	1.7
	>5 years	269	28 (28.9)	241 (40.6)			
Extent of CAD	≤ SVD	225	33 (34.0)	192 (32.4)	0.82	1.1	1.1
	2VD, 3VD, LM disease	465	64 (66.0)	401 (67.6)			
Age ( years)	<60	340	57 (58.8)	283 (47.7)	0.08	1.5	1.6
	≥60	350	40 (41.2)	310 (52.3)			
LV function	Normal	353	46 (47.4)	307 (51.8)	0.002	0.5	0.5
	Impaired	337	51 (52.6)	286 (48.2)			
Educational level	Illiterate, primary, elementary	454	74 (76.3)	380 (64.0)	0.02	1.7	1.8
	Secondary, university graduate	236	23 (23.7)	213 (36.0)			
Satisfied on treatment	Yes	625	90 (92.8)	535 (90.2)	0.57	1.3	1.4
	No	65	7 (7.2)	58 (9.8)			
Regular use of herbs for other chronic dis.	Yes	48	7 (7.2)	41 (6.9)	0.83	1	1.1
	No	642	90 (92.8)	552 (93.1)			
Smoking	Yes	375	65 (67)	310 (52.3)	0.008	1.7	1.9
	No	315	32 (33)	283 (47.7)			
Presence of HTN	Yes	486	70 (72.2)	416 (70.2)	0.72	1.1	1.1
	No	204	27 (27.8)	177 (29.8)			
Presence of diabetes	Yes	358	49 (50.5)	309 (52.1)	0.83	1	0.9
	No	332	48 (49.5)	284 (47.9)			
Past history of CABG	Yes	120	12 (12.4)	108 (18.2)	0.19	0.7	0.6
	No	570	85 (87.6)	485 (81.8)			
Past history of multiple interventions	Yes	165	31 (32)	134 (22.3)	0.054	1.5	1.6
	No	525	66 (68)	459 (77.4)			

Table-2: Multivariate logistic regression analysis of the study population.

Variable	Estimated regression coefficient	Estimated SE	Wald $\chi^2$	P	OR	95% CI for odds ratio
Male gender	0.0331	±0.023	5.987	0.014	1.39	1.16-1.67
Impaired LV	0.0308	±0.003	67.543	<0.0001	1.86	1.28-2.44
Urban residence	0.2500	±0.625	17.468	0.001	1.58	1.13-2.35
Higher educational level	0.5620	±0.277	4.456	0.037	1.45	1.02-2.02
Duration of CAD	0.0346	±0.014	2.243	0.053	1.04	1.01-1.07
Smoking	0.1491	±0.034	34.692	<0.0001	1.13	1.32-1.93

4.456;  $p=0.037$ ) and smoking (Wald  $X^2=34.692$ ;  $p<0.0001$ ). However, there was no significant association with the duration of CAD (Wald  $X^2=2.243$ ;  $p=0.053$ ).

## Discussion

In line with a few similar trials, our study revealed that HT use was related to urban,<sup>6,7</sup> lower educational level<sup>7,8</sup> and smoking<sup>6,7</sup> factors.

Previous studies have indicated consistently strong association of HT use with female gender,<sup>9,14</sup> high educational status and high income.<sup>12,13,15-17</sup> The association with female gender in these surveys may be largely explained by a more frequent contact of women with health services because of maternal and child health programmes.

However, in our trial,<sup>3</sup> results revealed that HT was associated with male gender and lower educational level, and these may reflect the high level of education among Jordanian population where men are equally exposed to media and to all levels of healthcare, leaving no special edge for women in this context, and where educated people will resist buying herbs except after thorough search and thinking.

In most previous surveys, HT association had been less marked and controversial with smoking status<sup>7,18</sup> and type of residence whether rural or urban.<sup>7,19</sup> In fact, the rate of herbal supplement use in rural health systems has not been adequately documented. While in rural areas, there are additional cultural factors that encourage the use of botanicals, such as the concept of 'man-earth' relationship and religious beliefs, surveys have recorded the amount of herbal product use in urban settings more frequently. In urban areas, patients have easier access to media and better tolerance to the additional costs of HT, especially when conventional medicine has failed them.

In one survey, the proportion of hypertensive subjects having had an appointment with a traditional healer in the preceding year was 1.8% (95% CI: 0.7% to 2.8%), higher among those treated pharmacologically for hypertension (10.6% versus 1.0%;  $p<0.001$ ). However, it was noticed that the urban/rural differences across

genders support a trend toward smaller differences.<sup>19</sup>

In contrast, in our trial, smokers and urban residents have 1.9 and 2.1 higher odds for HT, both significant at  $p$  values of 0.008 and 0.005 respectively. Rural residents are no more cultivating medicinal plants for selling, and urban residents may have easier access to different botanicals available at the widely distributed herbalist shops.

Studies have found different age ranges for the highest prevalence of herbal medicine use ranging from young to late middle age.<sup>13,15,20,21</sup> In accordance with these trials, phytotherapy was less noticed in our elders aged > 60 years. The trend towards higher HT use in patients younger than 60 years was not statistically significant. Elders > 60 years are subjected less to the influence of the media although potentially should be more knowledgeable about the different types of herbs.

In our trial, HT use was not associated with extent of CAD, but in contrast with many similar previous trials,<sup>14,22,23</sup> our respondents with relatively recent CAD diagnosis (<5 years) had 1.7 higher odds for HT use according to univariate analysis. However, the statistical significance of this association disappeared during multivariate analysis ( $p=0.053$ ).

There was a strong association between herbal medicinal use and the degree of LV impairment ( $p=0.002$ ), with a clear tendency noticed, as well, in patients with past history of multiple percutaneous interventions ( $p=0.054$ ), reflecting the deep desire of these patients to get any sort of complementary medicine to alleviate their somewhat difficult and resistant cardiac status, which is observed both in heart failure patients and in those who are subjected to frequent angioplasty procedures.

Patients frequently experience longer symptom-free intervals after coronary bypass and usually suffer much less frequently than those who are subjected to percutaneous coronary interventions (PCIs), and, hence, are less probable to seek potential relief with herbs.

Congestive heart failure (CHF) is the end product of CAD on many occasions and can degrade the heart's ability to

pump blood efficiently. There is no drug cure for CHF; and the pharmaceutical drugs given in an attempt to cope with the condition have many side effects. Therefore, it may be possible that our respondents used herbal medicines to reduce swelling due to retained fluids. The good safety record and effectiveness of Hawthorn, which was the commonest herb used in our study population, have been well documented in heart failure settings in a number of clinical studies, reviews and meta-analyses.<sup>24</sup>

Conversely, most of the herbs reputed for diuresis in the Middle East region, were not used by our participants, despite that fact that nearly half of them had impaired LV function (337 of 690), which again confirms the loss of knowledge by younger generations.<sup>3</sup>

Many patients seek alternative medicine after they have tried conventional medicine and found it to be ineffective or to have resulted in side effects. However, in our study, there was a lack of significant association between HT use and satisfaction with drug therapy, and that is in accordance with previous published findings.<sup>11</sup> This suggests that our patients use traditional remedies as complement and not as substitute to conventional therapy.

In accordance with most of previous similar trials, no relation between HT use and the presence or absence of diabetes or hypertension or the use of herbs for other illnesses was noticed in our population.

As we concluded in the main trial,<sup>3</sup> which was the largest ethno botanical survey ever carried out in CAD patients. Our centre at QAHI is a tertiary care medical facility that receives referrals from all provinces in Jordan, and, hence, should reflect the true frequency among all Jordanians. However, our study was conducted only among the outpatients and, therefore, may not be generalised over the entire to the overall CAD population.

## Conclusion

The study identified sectors to which educational herb programmes and counselling should be directed. Male gender, lower educational level, smoking status, urban residence, CAD patients with impaired heart function, represent ideal targets for appropriate awareness schemes aimed at optimising safety and efficacy of consumed herbs and ensuring an affordable healthcare system.

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