

Original Article

“Personality traits and heart disease in the Middle East”. Is there a link?

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Abstract: The significant role of psychosocial factors as a contributing factor to an increased risk of having a myocardial infarction has been extensively studied in the western world. This era of economic crises has seen an exponential rise in heart disease at a relatively earlier age. Whether these dynamics are equally associated, in the younger ethnically diverse population of UAE, which contributes to more than 50% of the population is not very well known. Objectives: No studies have examined the role of psychosocial variables and personality traits as a contributing factor to CAD in the UAE. The objective of this case controlled study was to explore relationships between demographics, socioeconomic status, personality types, stress-handling abilities, emotional intelligence, and cardiac risk factors. Methods: The participants of this case controlled study included 90 MI patients admitted to a govt hospital in UAE during the period of 2011-2012, which were matched to 90 healthy individual. A analysis of their personality types, emotional intelligence and stress handling skills was performed using specific questionnaires. Results: The results showed a significantly higher incidence of Type A personality in the MI group. In addition, these individuals were also much more likely to have diabetes, hypertension, and a history smoking, when compared to controls. Moreover a significant relationship between the presence of Type A personality and the presence of CAD was identified. Associations among variables were examined followed by analysis, discussion, and recommendation for prevention and treatment of CAD in UAE.

Keywords: Cardiovascular disease, psychosocial factors, coronary disease, UAE youth, psychosocial factors, prevention of coronary artery diseases

Introduction

Research has indicated that emotional resilience and personality traits have a substantial impact on cardiovascular diseases [1, 2]. As early as in the 1930's the presence of aggressive behavior in particular was attributed as a factor contributing to heart disease [3].

Traits like excessive anger, hostility, time urgency, inappropriate competitiveness and preoccupation with work, are described as self-created causes of stress contributing to CAD [4].

A meta-analytical study by Boxmeyer revealed that almost 50% of patients with coronary artery disease had no significant risk factors [5]. Similarly the INTERHEART study on 15,000 patients, demonstrated important effects of psychosocial factors on myocardial infarction [6].

Furthermore various studies have shown that coronary heart disease, is much more common in individuals prone to chronic stress and those who learn stress management have a significant reduction in cardiac related events than those who undergo standard cardiac rehabilitation care [7].

Type A (high strung), Type B (easy going), and Type D (distressed type) personality traits have an association to CAD [8-10].

Rosanski [11] indicated that psychosocial factors in CAD are evident in at least three ways: 1) they directly promote the growth (pathogens) of CAD; 2) they contribute to maintenance of unhealthy lifestyle behaviors, like smoking and poor diet; and 3) after the development of CAD, when reduction of unhealthy lifestyle behaviors becomes increasingly important, psychological stresses act as barriers to positive change in

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these lifestyle behaviors. Literature review indicates more than 4000 studies on the effects of psychosocial factors on cardiac illnesses conducted and published in the West but none from the Middle Eastern region [1]. There is no data available to identify the specific risk factors for the sample population of this country and no study has been done in the past to observe the effects of CAD on the patient, the family, and the society as a whole.

Although the medical aspects of this disease are addressed during hospital admission and follow up visits, the psychosocial aspects are often overlooked mainly due to the lack of support services for these patients, cost factors, and the stigma of young patients labeled as suffering from psychological issues.

Given that not much information is available on the prevalence and psychosocial variables of this illness in UAE, this exploratory study was conducted with the following objectives: a) To examine the demographics of the ethnically diverse group of CAD patients in UAE, b) To explore the prevalence of cardiac risk factors in the target population, and c) To identify the most common psychosocial variables, stress-handling abilities and state of emotional well-being in CAD patients.

Additionally, the study aimed to explore relationships between demographics, personality types, stress-handling abilities, emotional intelligence, and smoking habits.

Materials and methods

Subjects and setting

The sample for this case-control study consisted of 180 participants. The case group consisted of 90 patients with CAD and where as the control group consisted of a sample of 90 individuals without history of CAD. Patient with CAD were recruited from a local Hospital in UAE who underwent catheterization due to an MI in the last one year. The study took place in 2011. 100 patients under the age of 45 were interviewed and patient demographics were obtained from medical records. Emirati patients included in the sample had received the treatment in the last one-year and expatriates had undergone the treatment in the last 6 months. Control subjects were recruited from the same

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Instruments and procedures

Questionnaires used for the study were: a) Basic Demographics Survey, b) Coronary Artery Disease (CAD) Assessment, c) Type 'A' Personality Test, d) Stress-handling test, e) Emotional IQ Test, and f) Type D (DS-14) Personality Test. Demographics information included in the study were gender, age, nationality, marital status, education level, and occupation. For analyzing the effect of occupation on CAD, occupations were classified into professional and non-professional categories. Occupations that require specialized knowledge and advanced skills were classified as professional. The CAD Assessment was developed by Health-line Networks. It consists of nine items that assess cardiac risk factors in terms of smoking habit, life style, family history of CAD, level of cholesterol, and presence of high blood pressure and diabetes.

Personality Type A and Stress Maintenance Questionnaires used were internet-based tests developed by Stressdoctors. Com, a private group of health professionals categorized as under Seminary and based in Vancouver, Canada. Stress Maintenance Questionnaire consists of 14 items designed to measure how stress is handled. The score range of this instrument is +160 to -160. The respondents with scores below 60 are vulnerable, 60-90 are moderate resistant, and above 90 are fending off stress. Personality Type A Questionnaire contains 25 items with dichotomous format designed to identify Type A and Type B individu-

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als. The score range is zero to 25. Respondents with score of 14 or above are Type A whereas those with score below 14 are Type B.

The Emotional Intelligence Test is also an internet-based assessment tool developed by (14). It consists of 20 items with dichotomous (true/false) format that categorizes respondents into two groups, emotionally healthy and emotionally unhealthy. All these tests have sub-scales due to which, the authors did not calculate the reliability for the entire scale.

Type D questionnaire or D Scale14 (DS14) was used to assess negative affectivity (NA), social inhibition (SI), and Type D personality. 14 items are rated using a 5-point Likert scale ranging from 0=false to 4=true. A cutoff of 10 on NA and SI scales is used to classify subjects as Type D ($NA \geq 10$ and $SI \geq 10$). DS14 is a well-recognized personality test for measuring the impact of 'Distressed' type on the heart. Factor analysis provided evidence for its 2-factor structure (NA and SI). The correlation of NA with neuroticism ($r=0.68$), SI with extraversion ($r=-0.59/-0.65$), and scale-level factor analysis confirmed the construct validity of the DS14 against the NEO-FFI. The NA and SI scales were found to be internally consistent ($\alpha=0.88/0.86$) and stable over a 3-month period (test-retest $r=0.72/0.82$) (15). However, its results are yet to be seen in non-Western cultures.

These questionnaires were translated research assistants into spoken languages (Arabic, Urdu, and Hindi) and then checked for accuracy by the authors. Three multilingual research assistants with educational qualifications of at least a bachelor's degree worked on this project doing patient phone interviews and data collection from hospital records. The researchers performed data collection for control group in 2012. Individuals without history of CAD were approached in public settings. After obtaining their consent, individuals were administered the questionnaires included in the study.

Data analysis

The data were analyzed using Statistical Package for Social Sciences (SPSS) 18.0. In order to assess the prevalence of psychosocial risk factors, descriptive statistics were used for all psychological tests and all variables. In addition, chi-square test of association was

employed to assess relationship among variables.

Results

The main general features of cardiac patients and controls are summarized in **Table 1**. Demographics of patients indicate that 95% were males, 71% belonged in the 30-39 age group, 88% were South Asian, followed by 20% Middle Eastern, and Chi-square test of association indicated that patients were more likely to have family history of CAD. In addition, prevalence of diabetes, hypertension, smoking, and sedentary lifestyle was significantly higher among patients. No conclusion regarding level of cholesterol can be made since the majority of patients did not know their cholesterol level (see **Table 2**).

1% South East Asian. 96% were married, only 12% had education above high school, and 92% were classified as non-professionals (see **Table 1**). The patients and control groups were similar in gender, age, and nationality but single individuals with higher educational level were overrepresented in the control group.

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Result of Chi square test of association indicated that there is a significant relationship between type A personality and CAD ($p < 0.01$). As presented in **Table 3**, Type A personality was significantly more prevalent among patients (61%) compared to control subjects (36%). Further analysis indicated that age and occupation have significant interaction effect. 70% of patients at age 30-40 were type A compared to 31% of controls (p -value for interaction < 0.001). Likewise, 62% of non-professional patients were type A compared to 40% of controls (p -value for interaction < 0.01).

The two groups were found to be significantly different in terms of emotional self-management ($p < 0.001$). 100% of control subjects were classified as emotionally unhealthy whereas

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Table 1. Demographic characteristics of participants in patient and control groups (n=180)

	Patients (n=90) n (%)	Controls (n=90) n (%)	Statistics
Gender			
Male	86 (95)	82 (91)	p=0.23
Female	4 (4)	8 (9)	
Age group			
20-29	7 (8)	15 (17)	p=0.18
30-39	64 (71)	57 (63)	
40-44	19 (21)	18 (20)	
Nationality			
Middle East	20 (22)	30 (33)	p=0.19
South Asia	69 (77)	58 (64)	
South East Asia	1 (1)	2 (2)	
Marital Status			
Married	86 (96)	67 (74)	
Single	3 (3)	14 (16)	p=0.001
Divorced	1 (1)	0 (0)	$\chi^2=19.47$
Not Reported	0 (0)	9 (10)	
Education			
≤High School	79 (88)	45 (50)	p=0.00
>High School	11 (12)	42 (47)	$\chi^2=30.45$
Not Reported	0 (0)	3 (3)	
Occupation			
Professional	6 (7)	10 (11)	p=0.04
Non-professional	82 (91)	71 (79)	$\chi^2=6.24$
Not Reported	2 (2)	9 (10)	

Table 2. Percentages of cardiac risk factors and Chi-Square statistics of patient and control groups

	Patients n (%)	Controls n(%)	Statistics
Family History of CAD			
Yes	39 (43)	10 (11)	p=0.000
No	49 (55)	77 (86)	$\chi^2=23.58$
Don't know	2 (2)	3 (3)	
Diabetes			
Yes	40 (44)	9 (10)	p=0.000
No	50 (56)	79 (88)	$\chi^2=28.13$
Don't know	0 (0)	2 (2)	
Cholesterol above 200 mg/dL			
Yes	4 (4)	10 (11)	p=0.000
No	13 (15)	76 (85)	$\chi^2=108.99$
Don't know	73 (81)	4 (4)	
Blood pressure			
Yes	34 (38)	12 (13)	p=0.001
No	55 (61)	75 (84)	$\chi^2=14.59$
Don't know	1 (1)	3 (3)	
Smoking			
Yes	65 (72)	16 (18)	p=0.000
No	25 (28)	74 (82)	$\chi^2=53.89$
Sedentary life			
Yes	38 (42)	21 (23)	p=0.002
No	52 (58)	62 (69)	$\chi^2=12.77$
Not reported	0 (0)	7 (8)	

64% of patients were reported being in this category. Only 27% of patients indicated themselves as Type D, which does not significantly differ from 29% of control subjects. There was no significant difference between the two groups in stress handling abilities (Table 3).

Discussion

Population statistics of UAE indicate that foreigners constitute more than 80%, of which 54% are from south East Asia.

Studies have shown a higher incidence of CAD in expatriates belonging to this region and an etiology other than the traditional cardiac risk factors have been thought to contribute to this phenomenon [14, 15]. Likewise it also has been noted that young Asian Indians tend to have more complex myocardial infarction at a disproportionately younger age [16, 17]. In addition to a low HDL or high-density lipoprotein levels, these patients show elevated levels of lipoprotein (Lp), metabolic syndrome, homocysteine fibrinogen, and C-reactive protein.

This case-control study performed on an ethnically diverse population revealed a high incidence of Cad in expats (88%) in particular in those with lower educational levels (88%) and those belonging to a lower socio-economic status. Most of these patients were unaware of their medical condition. Significantly 79% of these patients were less than 39 years of age and 91% worked in low-paid jobs. "Low paid" is defined as income below AED 4,000 (\$ 1,089) per month but most labor class workers in the region earn less than this amount per month. Additionally this category of workers live without family and such a health challenge could lead to increased psychosocial stress affecting worker health and quality of life.

Our study shows that majority of these patients were laborers involved in

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Table 3. Frequency and percentage of psychosocial variables of patient and control groups

Variables	Patients n (%)	Controls n (%)	Statistics
Personality type A & B			
Type A	55 (61)	32 (36)	p=0.001
Type B	35 (39)	58 (64)	$\chi^2=11.769$
Personality type D			
Type D	23 (27)	22 (29)	p=0.866
Not type D	61 (73)	55 (71)	$\chi^2=0.28$
Emotional intelligence			
Emotionally healthy	32 (36)	0 (0)	p=0.000
Emotionally unhealthy	58 (64)	88 (100)	$\chi^2=38.14$
Stress handling			
Under 60: you are vulnerable	51 (57)	51 (58)	p=0.361
60-90: moderate resistance	35 (39)	30 (34)	$\chi^2=3.203$
90+: you are fending off stress	4 (4)	7 (8)	

hard physical work, so sedentary lifestyle was ruled out as a major causative factor.

Personality type studies in the West suggest positive link between Type A and CAD, and positive association between stress and CAD [18].

Similarly the current study also showed that the prevalence of Type A is significantly higher among CAD patients when compared to control subjects. Anger and hostility are among the main features of Type A behavior pattern and their underlying mechanisms have a detrimental influence on the cardiovascular system through endothelial damage, and by causing increased heart rate and blood pressure. People with hostile behavior also exhibit increased homocysteine levels. Work stress is known to cause accelerated blood coagulation with an increase in fibrinogen and a decrease in fibrinolytic capacity. Low socio-economic status has interestingly also been shown to be related to fibrinogen levels [19].

One of the interesting findings of this study is that stress-handling abilities were not found to be a risk factor for development of CAD. These results may suggest that coping styles is not the only indicator of the magnitude of physiologic responses to stressors, but other individual difference factors may play a role [20]. Among these are temperament, health habit, genetic and environmental factors that influence autonomic, neuroendocrine, and cardiovascular systems. The effect of these factors should be examined in future studies.

In this study no significant association between Type D personality and CAD was found. A similar study on Chinese patients showed that Type D were at increased risk of anxiety and depression that may eventually lead to CAD but Type D by itself was not an indicator or predictor of CAD prone personality [21] the case of non-western samples, it is possible that such patients perceive distress differently making DS-14 Scale culturally inappropriate. Although studies associate emotional intelligence as a

factor in heart illness [22], it was not confirmed in this study. No direct link between emotional intelligence and the presence of cardiac illness were found. However, it was suggested that effect of emotional intelligence on heart illness might be indirectly operated by mental health factors such as depression. This explanation is plausible given that emotional intelligence were consistently found to be associated with mental health [23] especially depression which consequently lead to CAD [24]. This could be an interesting area for future research. Interestingly, majority of participants in control group were emotionally unhealthy. One possible explanation for this result is that the sample may not be representative or the questionnaire was not culturally appropriate for this population.

Given the current scenario, it is important to discuss the steps that are needed for prevention. A psychiatric or psychological examination using the Diagnostic and Statistical Manual (DSM IV-TR) criteria may help in ruling out psychiatric comorbidity and tailoring an individualized treatment plan).

Research shows that in the social realm, strong social support clearly improves coping abilities in heart patients. However, expatriates without a family base in gulf countries present a unique challenge to the system. In such circumstances, supportive cross-cultural communication and culturally competent care have shown to be highly effective ways of preventing and treating CAD. For patients with families, social support has shown clear benefits.

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Literature is replete with studies showing benefits of health awareness programs on heart-related illnesses showing that except for non-controllable risk factors (family history, sex, and age), patients can modify their controllable risk factors (like smoking, level of cholesterol, obesity, sedentary lifestyle, hypertension, diabetes, metabolic syndrome, and psychological stress) through counseling, education, and effective drug treatment [25]. Awareness and coping skills programs, lifestyle modification, mood changes and changes in self-perception can help patients gain control of their health. Also, an awareness of different personality types and their influences on heart diseases, emotional factors, effects of different types of coping skills, and learning how to manage stress can go a long way in the total health care management program of CAD patients.

Studies in the US show that up to 60% of the cardiac patients suffer from some degree of depression and 50% suffer from panic disorders, and therefore, psychological factors in cardiac illnesses constitute important precipitants and consequences [26]. Psychological research on CAD is almost non-existent in this part of the world, making such investigations valuable. The decision to establish and implement a comprehensive treatment plan should be taken by a panel of medical experts.

In future studies, more established scales, such as the Bortner Type A Scale, the Framingham Type A Scale and the Multidimensional Type A Behavior Scale may yield more detailed and meaningful information. Qualitative study in the form of personal in-depth interviews may also yield information on beliefs about illness and coping mechanisms prevalent in the ethnic mix of people living in this country. The incidence of CAD variations within subcontinent patients needs investigation on larger sample and may lead to interesting findings. The Framingham model longitudinal research identifying potential risk factors among Emirati samples is recommended.

This study also raised some questions that could be addressed in follow-up investigations on a larger national sample: 1) Does culture have significant influence on how patients with coronary artery disease interpret distress? 2) Can replication studies in the region confirm incidence of CAD in people from lower socio-

economic background? 3) What specific rehab programs and social support services are available for patients; how they can be improved, and what coping mechanisms do patients use in the absence of such services? 4) What psychosocial factors are specific to the region for the younger "local" patients and 5) why is the incidence of CAD higher in people from certain ethnic backgrounds? Only through concerted efforts, researchers can appreciate and address the complex nature of CAD in this part of the world.

Conclusion

This study revealed significant findings on the prevalence and psychosocial variables in this country. It is interesting to see that personality Type D, stress handling abilities, and emotional intelligence are not significant cardiac risk factors. More culturally sensitive measurements are needed to build on these preliminary findings. Making patients modify their behaviors can be a challenge here and needs practical steps to address the growth of CAD. Development of locally standardized measures and qualitative research are indicated, and may lead to the identification of psychosocial factors specific to ethnic cultures. An interdisciplinary approach in prevention and treatment of CAD is imperative to deal with such illnesses in the region.

Disclosure of conflict of interest

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