Review article

# Study exploring depression and cardiovascular diseases amongst Arabic speaking patients living in the State of Qatar: Rationale and methodology

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## ABSTRACT

In Qatar, cardiovascular diseases are the leading cause of death. Studies show that depression is associated with an increased morbidity and mortality among cardiovascular patients. Thus, early detection of, and intervention for, depression among cardiovascular patients can reduce cardiovascular morbidity and mortality, and save health care costs. To date there is no study in the Gulf region exploring depression among cardiovascular patients. The goals of our three-phase research program are to (1) understand the mental health issues, specifically depression, as experienced by cardiovascular patients living in the State of Qatar; (2) identify and implement strategies that would prevent depression and assist patients to deal with depression; and (3) evaluate, facilitate, and sustain strategies that are effective at reducing depression and foster its treatment among cardiovascular patients. This paper describe phase I of the research program. Using both quantitative and qualitative research methodologies, we will investigate (1) the prevalence and severity of depression among patients who have confirmed diagnosis of cardiovascular diseases (2) how contextual factors such as social, cultural, and economic factors contribute to the risk of depression and its management among cardiovascular patients, and (3) formulate effective intervention strategies that are expected to increase awareness, prevention of and treatment for depression among cardiovascular patients, thus reducing cardiovascular diseases morbidity and mortality in Qatar.

## BACKGROUND

The State of Qatar is situated on the Gulf coast of the Arabian Peninsula (Figure 1). With a population of 1,696,563 [1], Qatar has one of the fastest growing economies in the world. In 2010, Qatar GDP per capita was more than $88,000 USD [2].

Cardiovascular disease (CVD) is a health problem worldwide [3,4,5]. Similar to other countries in the world, in Qatar, cardiovascular diseases are the leading cause of mortality and morbidity [6,7]. It was estimated by the national authorities that cardiovascular diseases accounted for 20% of the main causes of death in Qatar. Data from Hamad Medical Corporation also showed that in Qatar, diseases of the circulatory system had the highest number of death in 2009 [8]. According to WHO's 2008's statistics, in Qatar, cardiovascular and diabetes have the highest age-standardized death rate per 100, 000 (Table 1) [9]. Furthermore, Qatar's rapid growth, changing environmental and social conditions, and lifestyle changes may have affected the prevalence and patterns of cardiovascular diseases. Thus, there is urgent need for the development of culturally appropriate and effective intervention programs to promote health, prevent and reduce CVD/coronary artery diseases' incidence, mortality and morbidity among the Qatari population [10]. In this paper, Qatari population includes both Arabic speaking citizens and Arabic speaking residents living in Qatar.

Depression has been identified as predictive of both developing cardiovascular disease and adverse outcomes among patients with existing cardiac disease [11,12]. It has repeatedly emerged as a common co-morbidity in patients with coronary heart disease [13,14]. Depression has been described in lay terms as "an illness that involves the body, mood, and thoughts, that affects the way a person eats and sleeps, the way one feels about oneself, and the way one thinks about things. A depressive disorder is not a sign of personal weakness or a condition that can be wished away.... Without treatment, symptoms can last for weeks, months, or years. Appropriate treatment can help most people with depression" [15]. According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders – DSM IV, depression is listed under the category of "Mood Disorders" with various forms ranging from Major Depressive Disorder to Bipolar I and Bipolar II Disorders. A person who is depressed may experience feeling "sad" or "empty"; diminished interest or pleasure in daily activities; significant changes in weight (gain or loss); agitation, restlessness or physically slowed movements; fatigue or a loss of energy; somatic symptoms such as pain. A depressed person may feel guilty and that they have no value, and may have a diminished ability to think, concentrate or make decisions. A depressed person may have recurring thoughts of suicide [16].

Currently, treatment for depression in cardiovascular disease often includes antidepressive treatment encompassing psychotherapeutic and/or psychopharmacologic interventions. However, according to ENRICHD Investigators [17], psychotherapy alone is not adequate intervention to reduce cardiac mortality. The use of antidepressive medications is also in dispute. Studies reported an association between antidepressant medicines and a wide range of CVD risk factors [18,19]. Serotonin reuptake inhibitors (SSRI) which are one type of antidepressants and structurally similar to fenfluramine was found to increase the risk of valvular heart disease and possibly pulmonary hypertension [20,21]. Although SSRI associated cardiovascular side effects are very rare with a reported incidence of less than 0.0003 percent [22], it has also been reported that SSRIs inhibit cardiac and vascular sodium, calcium and potassium channels and prolong QT intervals [23]. Thus electrocardiographic monitoring of patients with severe pre-existing cardiovascular disease who are taking SSRI's is necessary [24].

In contrast, Sowden and Huffman [5] reported the effective use of antidepressants, antipsychotics, mood stabilizers and benzodiazepines saying that many are safe to use in cardiac populations. Some, such as selective serotonin reuptake inhibitors and atypical antipsychotics, may even improve cardiac outcomes in healthy individuals and patients with CVD. They suggest that further research may lead to psychiatric treatments that reverse the detrimental effects of mental illness on cardiac health. They also insist that there is a need to raise awareness of mental health issues in cardiac patients so that basic but critical treatments may be initiated in this population.

A review of the literature reveals that depression has long been recognized as a risk factor for the development of cardiovascular disease in healthy patients, for recurrent events in patients with established cardiovascular disease, for adverse outcomes after coronary bypass graft surgery [11,25,26, 27,28,29], for development of heart failure, and for adverse outcomes in patients with existing heart failure [30,31,32,33]. It is particularly common among people hospitalized for an acute myocardial infarction and is associated with an increased risk of morbidity and mortality [34,35,36,37,38].

Depressive symptoms have been shown to be strong independent predictors of mortality, worse health status, poorer compliance [39], recurrent cardiac events, and increased health care use [36]. A recent extensive review of the link between depression and cardiovascular disease by Nemeroff and Goldschmidt-Clermont (September 2012) revealed that depression is associated with increased risk of



**Figure 1. Map of Qatar.**

Table 1. Qatar Non Communicable diseases (NCD) Country Profiles.

| NCD MORTALITY | | |
| --- | --- | --- |
| 2008 ESTIMATES | MALES | FEMALES |
| Total NCD deaths (000s) | 0.9 | 0.4 |
| NCD deaths under age 60 (percent of all NCD deaths) | 60.8 | 34.4 |
| AGE-STANDARDIZED DEATH RATE PER 100 000 | | |
| All NCDs | 367.5 | 433.7 |
| Cancers | 101.1 | 84.3 |
| Chronic respiratory diseases | 26.2 | 30.6 |
| Cardiovascular diseases and diabetes | 179.8 | 239.3 |

Source: WHO: Non Communicable diseases (NCD) Country Profiles. http://www.who.int/nmh/countries/qat_en.pdf

coronary artery disease, and increased morbidity and mortality after myocardial infarction, CABG surgery, congestive heart failure, or mitral valve replacement [40].

### Prevalence of Depression in Patients with Cardiovascular Disease

A 20% to 35% prevalence of depression in populations with cardiovascular disease was reported by Lett, Blumenthal, Babyak, et al [11] and Rozanski, Blumenthal, and Kaplan [12]. In patients with acute coronary syndrome (ACS), the prevalence of major depression ranges from 16% to 23% [34,41]. However, other studies have shown that 15 − 30% of cardiovascular patients experience depression after a cardiac event [42,43] and up to 40% of patients with congestive heart failure experience depression [44]. Based on a meta-analysis, van Melle and colleagues reported a 2- to 2.5-fold increased risk of impaired cardiovascular outcome associated with post-myocardial infarction depression [28].

Although it is not limited to gender, age or socio-economic-cultural-physiologic characteristics, these factors do influence the incidence and prevalence of CVD [45,46,47]. In terms of gender, depressive symptoms were found to be a stronger predictor of lack of functional improvement than were variables such as previous myocardial infarction, diabetes and ejection fraction. Additionally, the relationship between depressive symptoms and lack of functional improvement was more pronounced in women than it was in men [48]. According to Lee and Foody [49], men usually develop heart disease earlier than women, but women develop heart disease more rapidly once menopause has occurred. This might explain the finding by Vaccarino, Lin, Kasl, et al [50] that women may derive less functional benefit from CABG surgery. It pointed to the importance of considering depression as a cofactor among men, as well as women undergoing cardiac surgery. Smolderen, Spertus, Vriens, et al [51] reported that gender disparities, particularly among young women with cardiovascular disease, were a growing cause for concern. El-Menyar, Zubaid, Rashed et al's study of 8,169 patients with acute coronary syndromes in six Middle Eastern Countries revealed that women are more likely to have hypertension, diabetes, and dyslipidemia [52]. Women also had increases in hospital mortality and poorer treatment outcomes for acute coronary syndrome [52,53,54]. A recent study indicated that widowed marital status was linked with a higher cardiovascular risk profile, and higher in-hospital and 1-year health outcome. It is stipulated that this might due to the impact of high-level psychological distress, low level of social and psychological support for possible mental depression [55]. Furthermore, Takotsubo cardiomyopathy (TTC), an increasingly reported cardiovascular syndrome with clinical symptoms similar to myocardial infarction, was diagnosed mostly in elderly women in about 0.02% of all hospitalizations in the United States [56]. It was also found that women of 50 years old and over, whom suffered emotional distress, and had history of smoking, alcohol abuse, anxiety states, and hyperlipidemia, have higher odds of developing Takotsubo cardiomyopathy and which may occur as a consequence of depression [56].

### Risk Factors

According to Barth, Schumacher, and Herrmann-Lingen, depression in association with CVD may be influenced directly or indirectly [27]. Direct pathways refer to physiological factors that lead to atherosclerosis or coronary events. For example, somatic vegetative features of depression were associated with change in carotid intima-media thickness which may play an important role in the earlier stages of the development of coronary artery disease. Patients with depression have been found to have high sympathetic tone, hypercortisolemia, elevated catecholamine levels, abnormal platelet

activation, increased inflammatory markers, and endothelial dysfunction [28,57,58]. Indirect pathways refer to psychosocial and behavioral mediators such as poor health behavior, maladaptive coping styles, social isolation, chronic life stress [12], smoking, low physical activity, poor diet, failure to adhere to medical recommendations [39,59], and low levels of perceived emotional support [60]. However, the potential mechanisms linking the pathways between depression and impaired cardiovascular prognosis are still poorly understood according to van Melle, Jonge, Spijkerman, et al [28].

Barth, Schumacher, and Herrmann-Lingen suggest that clinical depression could be assessed by a standardized clinical interview such as the Structured Clinical Interview for the DSM-IV while depressive symptoms were to be measured with standardized psychometric scales [27]. For the latter, a range of scales are suggested including the Beck Depression Inventory, Beck Anxiety Inventory, Patient Health Questionnaire, Center for Epidemiological Studies Depression Scale, Taiwanese Depression Questionnaire, and the German Type D Scale. Despite their availability and the identified need, Ziegelstein and colleagues [59], assert that "...assessment for depression is not the standard of care for patients hospitalized for AMI" (acute myocardial infarction) (p. 393).

## Morbidity and Mortality

Depression has been associated with an increased risk of morbidity and mortality among people hospitalized for an acute myocardial infarction [34,35,36,37]. Further support for this finding was provided by Carney, Freedland and Sheps [61] who reported that depression is a risk factor for cardiac and all-cause mortality in patients with established coronary heart disease. These studies reveal variable findings depending on differentiation regarding diagnosis (e.g., transient depression symptoms vs clinical depression) and short-term vs long-term follow-up studies. Barth, Schumacher, and Herrmann-Lingen completed a meta-analysis examining the impact of depression on mortality in CHD patients. They reported that, within the first 6 months, depressive disorders were found to have no significant effect on mortality but, after 2 years, the risk was more than two times higher for CHD patients with clinical depression [27]. Based on two meta-analyses, Carney, Freedland, and Sheps reported a relatively low risk of mortality among patients with depression whose symptoms were transient after an acute myocardial infarction (MI) or other cardiac event. This was in contrast to patients with chronic, recurring clinical depression that continue to affect the course and outcome of CHD long after the recovery of acute MI [61]. In a randomized control study, Carney, Blumenthal, Catellier, et al concluded that depression was an independent risk factor for death after acute myocardial infarction, but that it did not have a significant effect on mortality until nearly twelve months after the acute event nor did it predict nonfatal recurrent infarction [62].

## Strategies to Increase Awareness, Prevention of and Treatment for Depression among Cardiovascular Patients

Recognition of depression as a co-morbidity in patients with acute coronary syndrome (ACS) has the potential to improve patients' depression-related morbidity and benefits patients with underlying coronary disease [63]. However, healthcare providers often fail to recognize clinically significant depressive symptoms in patients with ACS resulting in it being under-treated [42]. Related to this is the lack of attention to how often hospitalized patients with ACS who have significant depressive symptoms are recognized while receiving routine cardiovascular care [64].

Thus, appropriate recognition and treatment may help remove the "depression's barrier" and improve adherence to medications, lifestyle changes, self management, and acceptance of appropriate screening, referral for treatment, and follow-up [58]. Physician awareness and referral in early recognition of depression among cardiovascular patients is of utmost importance [65]. Soskolne, Marie and Manor [66] work with Israeli Arab women as well as Lamyian, Hydarnia, Ahmadi et al's study with Iranian women indicated that across cultures, physician recommendation is a strong predictor of patients getting screening and treatment [67]. Donnelly's study found that physicians who are of the same culture as the patients themselves are quite hesitant to offer screening or examination for medical problems that are highly stigmatized and private (i.e, breast cancer screening, mental illness, and HIV/AIDS) if they know how uncomfortable the patient could be [68]. All this underscores that physicians must be aware of their pivotal role in recognizing depression and encouraging screening as a matter of routine among cardiovascular patients in order to advocate for and make recommendations for treatment. Despite the well recognition of the association between depression and cardiovascular disease in North America, depression often is unrecognized and untreated in cardiac patients [65].

Rumsfeld and Ho (2005) assert that: "The failure to recognize depression in patients with cardiovascular disease is a failure to provide the best care for our patients" (p. 252). This leads to the need for health care professional and policy makers to answer the questions they pose: how can the recognition and treatment of depression be incorporated into cardiovascular practice? [58]

### THE STUDY METHODOLOGY

At present, public information on mental health care needs of cardiovascular patients and research programs that aim to develop and implement intervention strategies to address the issue specific to the State of Qatar's health care context are limited. In Qatar, in-depth systematic assessment of mental health status and screening for depression among cardiovascular patients are not yet routinely performed. Given that cardiovascular diseases are rising and depression has been identified as a major contributor to cardiovascular diseases morbidity and mortality, it is imperative that we investigate what Arabic cardiovascular patients and their health care providers in Qatar are experiencing with mental health issues and care in order to increase awareness, promote early recognition, and treatment of depression, which will, in turn, improve both quality of life and survival of cardiovascular patients. Therefore, funded by the Qatar National Research Fund, National Priorities Research Program (NPRP), adopting the Multiple Intervention Framework (Figure 2) [69], an interprofessional and multidisciplinary research team consists of members from cardiology, psychiatry, nursing, statistics and epidemiology will be undertaking a research program for which the goals are to (1) understand the mental health issues, specifically depression, as experienced by cardiovascular patients living in the State of Qatar; (2) identify and implement strategies that would prevent depression and assist patients to deal with depression; and (3) evaluate, facilitate, and sustain strategies that are effective at reducing depression and foster its treatment among cardiovascular patients. In the initial phase of the research program, two research studies will be conducted using quantitative and qualitative methodologies.
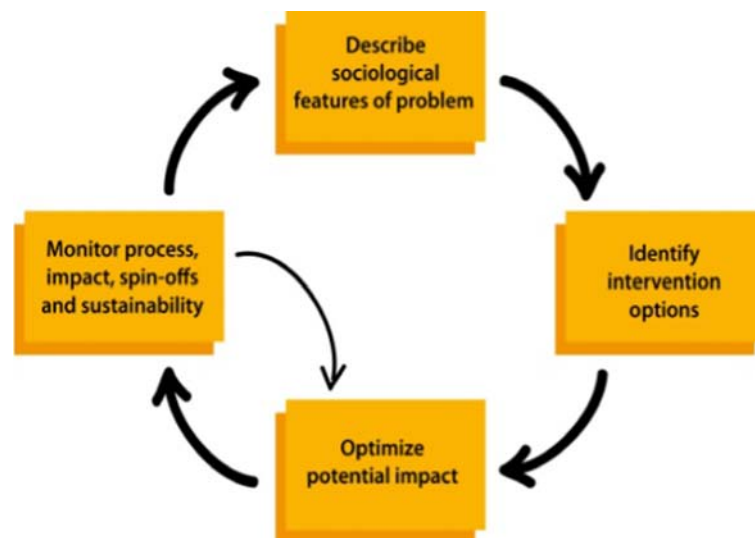


**Figure 2. Multiple intervention framework (Edwards, Mill & Kothari, 2004).**

### Theoretical Frameworks

#### Ecological Perspective

Adopting the Multiple Intervention Program Framework, our research will be based on the theoretical foundation of an ecological conceptual model, which refers to the interaction between individuals and their physical and socio-cultural environment [70]. This perspective has been used as a theoretical foundation to inform the Canadian health promotion framework, as stated in the Ottawa Charter for Health Promotion [71] and other documents, such as Lalonde's [72] and Epp's Framework [71]. Based on the ecological model, individuals' health care behaviour is seen to be influenced by their physical environmental variables, intrapersonal, and other social determinants of health [73,74,75,76].

Thus, to facilitate behavioural changes in individuals and the most healthful outcomes, efforts should be directed towards altering the unfavourable and fostering the favourable environmental

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conditions and interpersonal relationships in which one lives and practices health care. Not only should health care programs and services, and promotion interventions address what have been identified as individuals and population's needs, but interventions should also occur at multiple social, cultural, and environmental levels [75,77]. Furthermore, to promote and maintain population and individual health, we must (a) provide the health information and life skills necessary for individuals to make informed health care decisions, (b) offer economic and social conditions conducive to health and healthy lifestyles, (c) increase individuals' accessibility to social goods and services [74], and (d) involve not only individual, but also family and community members in the promotion of health and prevention of diseases [68].

Thus, in order to address depression among cardiovascular patients and promote its early recognition and treatment, we will investigate how environmental factors and other social determinants of health influence Arab women and men's health care practices and choices. Because the population of interest is Arab patients who come from different ethno-cultural backgrounds from the Middle East societies but are living in Qatar, exploring the influence of social and cultural factors on their health care behaviours and practices is essential to developing an effective and culturally appropriate mental health care program/service that will be accepted by the people of Qatar. Therefore, we combine an ecological conceptual framework with Kleinman's Explanatory Model of health and illness to guide our research.

### Kleinman's Explanatory Model

Based upon Kleinman's Explanatory Model, "[people's] beliefs about sickness . . . including their treatment expectations . . . affect the way individuals think about and react to sickness and choose among and evaluate the effectiveness of the health care practices available to them" [78]. Thus, individuals' explanatory models are derived from their knowledge and values, which are informed by their specific socio-cultural backgrounds. These models provided Kleinman with an explanation for sickness aetiology, symptoms, pathology, course of illness, and treatment [78]. One of the major deterrents of client compliance, satisfaction, and appropriate use of health care services was the difference between explanatory models of recipients and providers of health care [78]. Thus, providing effective health care requires that providers be able to elicit and recognize recipients' beliefs and values with respect to their understandings of illnesses and treatments, and to negotiate these differing perspectives [78]. In this study, in-depth interviews will be conducted with women and men to gain information on their knowledge regarding mental health, depression and its prevention, early detection and treatment, their view of the barriers and facilitators on seeking help for depression, and what they think as the best intervention/health promotion strategies to increase both patients and health care providers' awareness and treatment for depression among cardiovascular patients.

Previous studies show that not only do patients experience barriers to accessing health care, but health care and service providers also experience challenges in providing care to them. These studies highlighted the important role of health care providers [66,67,68,79,80]. Mohamed Sayed observes that health care professionals often work with two value systems, "one embracing the medical model while, at the same time, relying on traditional practices that might contradict the medically accepted notions of healing and health" [81], therefore, we plan to conduct individual in-depth interviews with health care providers to gain their perspectives about providing cardiovascular and mental health care to Arab patients living in Qatar, and what they perceive to be the needs, concerns, and strengths of Arab patients with whom they interact. The main reason for this avenue of inquiry is that high quality and efficient health care services can only be achieved if there is a mutual understanding and cooperation between the health care providers and the patients. To investigate whether discrepancies exist between the Arab patient's perspectives and the health care provider's perspectives, health care professionals will be asked similar questions. We will also inquire into what these professionals perceive as barriers for the Arab patients to access mental health care; what information, health care program and services would best benefit Arab patients; and what they perceive as the best possible strategies to increase awareness, prevention of, and treatment for depression among Arab cardiovascular patients in Qatar.

### Study 1: Population-Based Survey of Depression Amongst Cardiovascular Patients Living in the State of Qatar

This quantitative population-based survey that will investigate the prevalence and severity of depression among Arabic cardiovascular patients in Qatar and a relationship between these patients'

socio-demographic factors (such as income, occupation, employment status, education, nationality, marital status, age, gender, length of cardiovascular disease diagnosis, and spouse's educational level, employment status and occupation), and depression. This study will take place in Doha, Qatar at the Hamad General Hospital, Heart Hospital, which is an only government funded hospital in Doha that hosted the Department of Cardiology and Psychology. Patient participants will be recruited from five (5) sites which include: 4 cardiology units (chest pain unit, CCU, two (2) Cardiology Floor units), and a Cardiovascular Out-patient Clinic. We plan to conduct our first survey with all in-patients who are admitted to the 4 cardiology units mentioned above at the Hamad General Hospital in the first 6 months of 2013. Our second survey will be conducted with these same patients in 2 – 4 months at the out-patients clinic. Hamad Medical Corporation's (HMC) statistic indicated that, in the first 6 months of 2010, there were 2573 patients admitted to the Hamad General Hospital cardiology units as in-patients. Therefore, we anticipate that our survey might involve approximately 3000 eligible cardiovascular in-patient participants. Aiming for at least 80% response rate, our minimum sample size would be 2,400 participants. Using non-probability, convenient sampling method, structured questionnaire, and Beck Depression Inventory $2^{nd}$ Edition (BDI-II) self-report instrument, which had been translated into Arabic and validated for its validity and reliability, will be used. We will conduct face-to-face interview survey with approximately 2400 – 3000 Arabic cardiovascular in-patients who are age 20 or over. Furthermore, to be able to participate in the survey, patient should be in one of the cardiology units at Hamad General Hospital (Heart hospital) for at least one week, have experienced cardiac event or have confirmed diagnosis of CVD/coronary artery diseases but are in hemodynamic stable condition with no physical discomforts. Descriptive and inferential statistics will be performed using SPSS version 20.

### Study 2: Exploring Contextual Factors affecting Depression Amongst Cardiovascular Patients Living in the State of Qatar

To effectively address depression problem among cardiac patients and promote its early detection and treatment, using qualitative research methodology, we will investigate how environmental factors and other social determinants of health influence Arabic cardiac patients' mental health care practices from the perspective of patients (male and female) and health care providers. An exploratory qualitative research design using purposive sampling to recruit participants and in-depth interviews as the method of data gathering will provide more detailed contextual information that underlies patient and health care provider's thoughts, actions, and health-related behaviors. The individual in-depth interviews will be conducted in Arabic or English depend upon participant's references, and will be gender appropriate. Female or male interviewers who are fluent in both Arabic and English will conduct the interview. Qualitative in-depth interviews will be individually conducted with 30 Arabic women, 30 men, and 30 healthcare providers and/or until data saturation has been obtained. All the interviews will be audiotaped with permission from the participants. The data obtained from interviews in Arabic will be translated into English and transcribed for data analysis. Qualitative data analysis will be performed using NVivo version 9.

### CONCLUSION

Patients' mental well-being can be fostered, depression can be prevented, and barriers to deal with depression can be lowered or modified once they are identified, and these can serve as the foundation for an intervention plan that will help reduce cardiovascular morbidity and mortality in Qatar. Linking research findings to policy making and service delivery and practice is an important dimension of this project. Because the key-investigators of this study are Qatar's key health care providers who are very committed to providing services that meet the health care needs of Qataris and to help patients develop the capacity to deal with health and health care issues, we anticipate that the results of this research will raise awareness of the impact of depression on cardiovascular patients. Early detection and access to mental health care services and programs may impact cardiac outcomes [34,35,36,37,58, 61,63,64,65].

Little is known about women's and men's attitudes and knowledge of depression in relation to cardiovascular care, or their beliefs and practices around mental health issues in Qatar. Therefore, the anticipated benefits of this project are potentially vast. Conducting both quantitative and qualitative studies with women, men, and health care providers in Qatar, we will generate detailed information to

fill the identified knowledge gap and provide valuable insight into the development of socially and culturally appropriate and effective clinical practices guidelines and evidence-based directions for addressing depression in cardiovascular patients that are specific to the health care context of Qatar. The knowledge gained from this study will be applicable to the promotion of awareness, prevention of, and treatment for depression in Arabic patients with cardiovascular disease living in the Middle East region and people of similar ethnic and cultural backgrounds. Furthermore, the information gained from this study might be applicable to the development of translational personalized medicine, which may include clinical trials investigating polymorphic genetic markers led by the Qatar Cardiovascular Research Centre. Exploring genetic markers and pheromone distribution for clinical depression in cardiovascular patients should also greatly aid with the accelerated, rational development of effective personalized cardiovascular medicine, the anti-depression behavioral and pharmaceutical prevention of depression in cardiovascular patients in Qatar and worldwide.

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