



## Anxiety, depressive and somatic symptoms in adults with congenital heart disease

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### ABSTRACT

**Objective:** Despite the improvement in life-expectancy of adults with congenital heart disease, they may experience unique medical and social challenges that could impact on their psychological functioning. The aims of this study were to address the experience of anxiety, depressive and somatic symptoms among adults with congenital heart disease in comparison with that of non-heart diseased persons considering the role of various factors (e.g. socio-economic).

**Methods:** In cross-sectional case–control study, the participants consisted of 347 patients with congenital heart disease (18–64 years, 52.2% female) and 353 matched (by sex/age) non-heart diseased persons. The participants completed a questionnaire. The data were analyzed with bivariate and multivariate methods.

**Results:** In bivariate analyses, scores in anxiety and somatic symptoms were higher among patients than the healthy controls (both at  $p \leq 0.001$ ), whereas the groups did not differ in depressive symptoms. Following multiple-linear-regression-analyses, only the association between congenital heart disease and somatic symptoms was confirmed. Among the patients, perceived financial strain was significantly related to anxiety, depressive and somatic symptoms; lower perceived social support to anxiety and depression; and low annual income to somatic symptoms. Additionally, somatic symptoms were associated with anxiety and depressive symptoms, and vice versa. And no medical variables were related to anxiety, depressive and somatic symptoms.

**Conclusions:** Congenital heart disease was only independently associated with somatic symptoms. Financial strain, social support and co-existence of emotional distress with somatic symptoms should be considered in developing appropriate interventions to improve the well-being of patients with congenital heart disease. However, longitudinal research is warranted to clarify causality.

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### Introduction

During the past decades there have been dramatic advances in the treatment of congenital heart disease (CHD). Currently, a large number of infants with CHD survive into adulthood and the prevalence of adults with CHD is approximately 4 per 1000 [1,2]. This growing group of patients may be prone to psychosocial problems because of life-long medical follow-ups, which add to their daily-life concerns for such areas as education, employment and having their own family. Different psychosocial challenges including negative thoughts, heart-focused anxiety and difficult transition to adulthood, and treatment-related worries such as decision-making, preparation and adjustment have been reported [3–5]. Being treated for life-threatening medical conditions

has been described as repeated trauma, which affects psychosocial functioning in the long-term [6].

Few studies have addressed the psychological experiences of adults with CHD [3,7–14]. Some studies have showed that adults with CHD are not faring well, e.g. high depression levels [7,8,11], while others have reported more positive outcomes, e.g. low neuroticism [14–16]. Furthermore, the severity of CHD has been shown to be both related [5,8] and unrelated to psychopathology [15–17]. These inconsistent findings may pertain to such factors as small sample sizes, lack of comparison groups, low response rates, and differences in socio-cultural factors and the measurement of various parameters (e.g. disease severity).

Socio-economic status and social support are important determinants of health. High socio-economic status has been associated with lower health risk behaviors and better physical health, and may reduce the exposure to or experience of stress and negative life events, which can affect emotional functioning [18,19]. Social support improves health-related behaviors in addition to increasing the perception of self-worth and provides more control over life conditions. It has been shown that social support buffers stressors, and thereby helps

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individuals to cope with negative life events [20,21]. There is a lack of data concerning the social factors and psychological functioning among CHD patients, which may hinder the development of psychological care.

This study aims at: (1) describing the level of anxiety, depressive and somatic symptoms among adults with CHD in comparison with non-heart diseased controls; (2) scrutinizing the association of CHD with anxiety, depressive and somatic symptoms considering demographic/socio-economic, life-style and social support variables; (3) scrutinizing the associations of anxiety, depressive and somatic symptoms with demographic/socio-economic, life-style and social support variables among both groups; and (4) scrutinizing the associations of medical variables with anxiety, depressive and somatic symptoms among CHD patients.

## Method

### Participants/setting

The patients comprised 347 adults admitted to the Tehran Heart Center and Shahid Rajaei hospital in Tehran due to congenital heart defects between April 2002 and March 2010. Patients not suffering from Marfan syndrome or cognitive deficiencies (e.g. Down syndrome); aged 18–64 years at the time of study; residents in Tehran province; and who could read/write Persian were included. Patients ( $n = 61$ ) with the following diagnosis were excluded: isolated bicuspid aortic valve, isolated dextrocardia, isolated patent foramen oval, common atrium, malformation of coronary arteries, malformation of the cardiac septum, aorto-pulmonary fistula, arterio-venous fistula, partial anomalous pulmonary venous connection, small ventricular septal defect, hypertrophic cardiomyopathy or primary pulmonary hypertension, since the number of patients of each diagnosis was too small. Additionally, 26 patients refused to participate (response rate 93%). Patients were categorized in three hierarchical groups based on heart defect complexity with more severe defects in group I. This classification was inspired by Marelli et al. [1] as shown in Table 1. Non-heart diseased participants ( $n = 353$ ) were matched by sex and age ( $\pm 2$  years) to the patients and served as a comparison group. The comparison group was randomly selected from the same area where the patients lived and a systematic randomization procedure was used to select them. Furthermore, they did not suffer from cognitive deficiencies and were able to read/write Persian. Thus, the final overall sample consisted of 700 persons (for further details see [22]).

### Instruments

The participants filled in a self-report questionnaire covering various areas (see below). Anxiety and depressive symptoms were assessed with the Persian version of The Hospital Anxiety and Depression Scale

(HADS [23,24]). The scale comprises 14 items (graded 0–3), 7 each about anxiety (e.g. I get sudden feelings of panic) and depressive (e.g. I feel as if I am slowed down) symptoms. The range for each subscale is 0–21. A score of 0–7 corresponds to no cases, 8–10 to possibly cases and 11–21 to probable cases of anxiety and depression. High scores correspond to high anxiety and depressive symptom levels. Cronbach  $\alpha$  was 0.86 for total HADS (0.81 for anxiety and 0.79 for depression symptoms).

Somatic symptoms were assessed with the short version of the Giessen Complaint List (GBB [25]), which includes 24 items (graded 1–5, no complaints–severely affected). The symptoms are organized in four domains with six items in each: exhaustion (e.g. tiredness); gastrointestinal (e.g. nausea); musculoskeletal (e.g. pains in joints or limbs); and heart distress (e.g. heavy, rapid or irregular heart-throbbing). The total score ranges from 0 to 96, 0–24 in each symptom domain. The higher the scores, the more one is affected (total/domains). Cronbach  $\alpha$  was 0.92 for the total GBB-24 (0.83 for exhaustion, 0.74 for gastrointestinal, 0.81 for musculoskeletal and 0.80 for heart distress symptoms).

Social support was assessed with the Multidimensional Scale of Perceived Social Support (MSPSS [26]). It consists of 12 items (graded 1–7, very strongly disagree–very strongly agree), and the total score ranges 12–84. High scores correspond to high social support (total/domains). Cronbach  $\alpha$  for the total MSPSS was 0.88.

Socio-demographic variables consisted of age, sex, marital status, having offspring, educational level, employment, sick-leave during past year, profession, annual income, and financial strain.

The addressed life-style variables were body mass index (BMI, calculated for each participant with the formula  $\text{kg/m}^2$  based on self-reported height and weight), dieting, physical activity (e.g., walking; at least 30 min, three times a week), and substance use including cigarette smoking (daily), tobacco smoking by water-pipe (regularly), alcohol (regularly) and opium use (daily).

For patients, the assessed medical variables were severity of the cardiac defects (defect category), time of CHD diagnosis, and the history of CHD hospitalization, operation and angiography and use of heart-related medications (for further details see [22]).

### Design and procedure

This cross-sectional case–control study obtained ethical approval from the Tehran Heart Center ethical review board. Patients meeting the inclusion criteria were contacted and provided with detailed information about the study. If they agreed to participate, an appointment was made for a trained researcher to visit them at home to deliver the questionnaire and provide complementary oral and written information as well as written consent forms. The questionnaires were gathered at their home on an agreed second appointment (for further details see [22]). For the non-heart diseased group, the procedure of delivering and collecting the questionnaires was the same, except that the first contact was made at their home.

### Statistical methods

The data analyses were conducted with the PASW statistic package 19.0 (IBM/SPSS Inc., Chicago, IL). We summarized normally distributed continuous variables by mean and standard deviation (SD), non-normally distributed continuous variables by median and categorical variables by absolute frequencies and percentages. To examine group differences (CHD patients vs. non-heart diseased persons), Student's *t*-test or Mann–Whitney *U* test for continuous variables and chi-square tests for categorical variables were performed.

Block-wise multiple linear regression analyses were performed to scrutinize factors (independent variables) associated with anxiety, depressive and somatic symptoms (dependent variables). As the somatic

**Table 1**  
Categories of CHD patients by defect type ( $n = 347$ )

Group I ( $n = 83$ )	Group II ( $n = 186$ )	Group III ( $n = 78$ )
Atrio-ventricular canal defect	Atrial septal defect	Anomalies of the pulmonary artery
Tetralogy of Fallot	Ventricular septal defect	Anomalies of the pulmonary valve
Univentricular heart	Patent ductus arteriosus	Congenital tricuspid valve disease
Transposition of the great vessels	Aortic coarctation	Congenital aortic stenosis
Truncus arteriosus	Ebstein's anomaly	Congenital aortic insufficiency
Hypoplastic left heart syndrome		Congenital mitral stenosis
		Congenital mitral insufficiency

CHD indicates congenital heart disease.

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