Original Article

Psychological well-being in cardiac patients and healthy people in Guilan

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Abstract

Introduction: Psychological well-being (PWB) and having a meaningful life play a role in reducing the incidence and mortality of cardiac disease. The aim of this study is to assess PWB in two groups of people with heart disease and healthy people.

Materials and Methods: This descriptive study was performed in two groups of people with heart disease and healthy people referring to a cardiac clinic of Heshmat Hospital in Rasht from Feb to July 2016. Ryff's PWB and demographic information were completed for all the participants. Average grade of welfare and six subscales both groups were compared using independent t-test. Relevance of well-being score with variables was surveyed using multiple linear regression model.

Results: Number of 88 cases entered in the study with the average age of 50.47 ± 15.88 year. Total score was 80.50 ± 10.44 in ill group and 87.66 ± 8.75 in healthy group which was significantly higher in healthy group (P=0.001). The results showed that the score of well-being in people without cardiac disease is 8.7 units more than the group suffering from it. It also showed that the score of well-being in individuals without hypertention is 3.5 units higher than those who are hypertention. No significant relevance was observed between other demographic variables and well-being score.

Conclusion: In this study cardiac disease and hypertention were considered as factors related to well-being status. Futuristic longitudinal studies to survey the occurance of cardiac disease in individuals with various well-being score and executing plans to improve well-being situation as a preventive factor is recommended.

Keywords: Cardiovascular diseases, Coronary artery disease, Optimism, Psychological well-being

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Introduction

The World Health Organization (WHO) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease (1). This definition indicates the relationship between the well-being of mind and body and its importance (1,2). Psychological well-being (PWB) impacts on positive mental well-being so it's necessary to understand life's existential challenges. Ryff who is one of the most famous theorists in this field, defines positive well-being as something more than the absence of disease (3). He defines psychological well-being as an individual's attempt for perfection towards their real potential abilities (4,5). Ryff's model is considered as one of the most important models in the field of psychological well-being. In this model, psychological well-being is a different and multi-dimensional concept.

Self-admission (the ability to see and accept your strengths and weaknesses), purposefulness in life (having purposes in life which makes an individual's life meaningful and gives it a direction), personal growth (flourishing an individual's potential talents and abilities through the course of time), having positive relationship with others (having a valuable and intimate relationship with important people in life), mastery of environment (the ability of organizing and managing the things related to life, specially everyday routines) and autonomy (the feeling of independence, self-sufficiency and freedom from the norms, the ability of pursuing needs and acting based on thoughts, feelings and personal beliefs), are the aspects of psychological well-being (6,8).

Cardiac disease is among the most prevalent reasons of death and disability in the world. Mental factors are effective in the etiology and exacerbation of cardiac disease and also increase the probability of death. Optimism and positive affection correlate with the increase in chance of survival, improvement of immune system and the decrease of diabetes and high blood pressure and also the improvement of cardiac system (9).

Numerous studies have shown the positive relationship between psychological well-being and cardiovascular conditions (11,12). In a review study, Boehm et al. investigated the relationship between positive psychological well-being and cardiac disease and its mechanism which could relate it to cardiac disease (10).

Numerous factors are effective in psychological well-being such as, economical factors (12), social support, physical activity (11,13), individuals' personality, anxiety and depression (14). Other studies conducted in other countries have shown the direct relationship between some of the positive factors of well-being with better psychological health, increase in personal and job satisfaction, decrease in being absent at work and success in achieving goals (3,15).

In a study conducted in 2012 by Dehnavi et al. psychological well-being in patients suffering from multiple sclerosis was compared with healthy people. The findings of the study showed that psychological well-being in patients suffering from multiple sclerosis was significantly lower than the healthy people group in all aspects (16). According to our search, a study which investigates the condition of well-being in patients with cardiac disease has not been conducted in Iran. On the other hand, due to the importance of positive psychology in the world, and the lack of enough investigations about it in Iran, such investigations are clearly needed. Due to the mentioned reason and since having psychological well-being and the health of cardiovascular system are related (10,11), the aim of this study is to investigate the condition of psychological well-being in patients with and without cardiac disease in the Heshmat Hospital of Rasht.

Materials and Methods

This is a descriptive study which compared and investigated the condition of

psychological well-being in two groups of 30 to 60-year old members. 176 participants took part in this study that was equally divided into two groups of patients and healthy people, each one containing 88 members. The first group consisted of patients suffering from acute coronary syndrome who had gone through traditional coronary vessel angioplasty 6 months prior to the study. The samples from the patients, who referred to the cardiac clinic of Heshmat Hospital from February to July of 2016 for follow-up treatment, were chosen through available sampling method.

The second group members were chosen from the patients' caregivers, and consisted of individuals without any hospitalization experience regarding cardiac disease, angiography or traditional angioplasty experience, tachycardia, chest pain, shortness of breath and syncope. Both of the groups were homogenized according to age, gender and education. Participants who had the history of multiple sclerosis, sleep disorder, digestive disorders interfering with daily routines, decrease in the function of joints and muscles, cognitive disorders and major mental disorders according to their medical history and participants' statements, which could interfere with the psychological well-being of the individuals, were excluded from this study.

Convenient sampling was used and all the suitable participants entered the study on their own tendency. All the participants were allowed to leave at any time during the study. The protocol of this study with code number of 423 was certified by the research council and ethics committee on 26th of January 2016.

The patients' demographic and clinical information was completed using a designed checklist by a trained person.

Research instruments

A) Demographic information: It consisted of age, gender, education, living place, marital status and clinical information like the history of high blood pressure and diabetes that had been collected through interviewing the participants.

B) Ryff's questionnaire: To determine the condition of psychological well-being, Ryff's 18-question questionnaire was used (17). It is a self-reporting instrument, but since some of the participants could have been unable to complete the questionnaire because of the lack of enough education, the researcher read and completed all the questions for the participants to prevent any bias. The questionnaires were completed in a designated room in the clinic for both groups. The questionnaire of psychological well-being was designed by Ryff in 1989 and then revised in 1995 (18). The original questionnaire consisted of 120 questions, but in further revisions, shorter forms of 84, 54 and 18 questions were suggested. The 18-question questionnaire was used in this study. Ryff's scale of psychological well-being consists of six sub-scales including self-admission, positive relationship with others, autonomy, purposeful life, personal growth and mastery of environment. The questions were about how an individual feels about life. Each subscale had three questions that the participants answered using 6-item likert scale (1=strongly agree to 6=strongly disagree). The score of each subscale was ranged 3 to 18. The minimum and maximum scores of well-being were respectively 18 and 108. The reliability and validity of this scale have already been confirmed in several studies (8). The internal consistency of the sub-scales and their Cronbach's alpha were reported to be between 0.77 and 0.90 (19). In another study, the internal consistencies of scales were between 0.82 and 0.90 (20). Vahedi et al. assessed the reliability of this study using split-half method and its Cronbach's alpha was reported between 0.7 and 0.71 (21).

After checking the data, information was imported into SPSS 22. After checking the normality of the data using Kolmogorov-Smirnov test, the demographic characteristics and medical history were

shown as main, standard deviation, frequency, and percentage. The average quantitative data in the two groups was compared using independent t-test while chi-square test was used to compare the qualitative variables in the groups. Independent t-test was also used to compare the score of average well-being and sub-categories in the two groups. After checking the multiple linear regression test's assumptions, the relationship between the total score of psychological well-being, and demographic variables, medical history and the groups under study, was investigated.

Results

From 176 subjects, 100 of them which correspond with 56.81% of the total population were male participants. The average age of the population was 50.47 ± 15.88 years. Approximately 63.63% of the population under study lived in cities. About 7.38% of the subjects lived alone while 78.98% and 13.63% of them lived respectively with their spouses, and children. The frequency of diabetes and high blood pressure in the total population was respectively 42.04% and 28.40%. In table 1 the frequency of demographic factors such as age, average, gender and frequency, education, working condition, participants' living place and disease history were separately indicated in the two groups.

Table 1. Characteristics of participants and history of disease according to cardiac patients and healthy people

Variable		With cardiac disease	Without cardiac disease	P
		Frequency (%)	Frequency (%)	
Age (mean±SD)/year		56.2 ± 15.8	54 ± 15.9	$0.109^{\#}$
Gender (Male)		52 (59.09)	48(54.54)	0.87
Education level	Illiterate (%)	15(17.04)	20(22.72)	0.061
	Below diploma (%)	54(61.36)	54(61.36)	
	College education (%)	19(21.59)	14(15.90)	
Patient's main occupation	Retired	6(6.8)	13(14.77)	0.06
	Housewife	32(36.36)	28(31.81)	
	Unemployed	43(48.86)	5(5.68)	
	Employee	7(7.95)	42(47.72)	
Place of living	Urban (%)	44(50)	62(70.45)	0.09
	Rural (%)	50(56.81)	26(29.54)	
Life status	Alone	7(7.95)	6(6.81)	0.6
	With spouse	71(80.68)	68(77.27)	
	With children	10(11.36)	14(15.90)	
History of Hypertension		44(50)	30(34.09)	0.2
History of Diabetes mellitus		27(30.68)	23(26.13)	0.3

*compared with chi square test, # compared with independent t test

The average age in the group with cardiac disease was a little higher than the healthy group, but this difference wasn't statistically significant. The difference in the distribution of the samples in both groups according to diabetes history and blood pressure was not statistically significant. The frequency of the variables such as education, job and living place, and individual's life condition were statistically similar in both groups ($P>0.05$).

The total score of well-being in the two groups were respectively 80.50 ± 10.44 and 87.66 ± 8.75 that was significantly

better in the healthy group (*P*=0.001). As it is shown in table 2, the patients group's score in all 6 sub-categories of

psychological well-being was lower comparing to the healthy group (*P*<0.05).

Table 2. Comparison of the total score for the psychological well-being and subscales in cardiac patients and healthy people

	Health(88) (mean±SD)	Patient(88) (mean±SD)	P^*
Total score	8.75±87.66	10.44 ±80.50	0.001
Self-acceptance (SA)	2.25 ±15.64	3.31 ± 14.14	0.001
Purpose in life (PL)	2.97 ± 14.25	2.98 ± 11.23	0. 01
Personal growth (PG)	2.35 ± 16.38	3.11±14.10	0.001
Positive relations with others (PR)	2.8 ±16.2	3.8 ± 14.3	0.001
Environmental mastery (EM)	2.60 ± 15.91	3.02 ± 14.60	0.009
Autonomy (A)	2.91 ± 14.23	3.09 ± 12.38	0.02

*independent t test

The relationship between total well-being score and study variables, was investigated using multiple linear Regression model through enter model. The linearity assumption was tested with scatter plots Dubian-Watson index of Regression model is 2 which confirms noncollinearity assumption. The Normality of total wellbeing was checked with Kolmogorov-Smirnov test (*P*=0.09)

The predictive factors except age were entered to the model in 0 and 1 codes. The variables of life condition, education and different occupation groups were converted to dummy variables and then entered to regression model. The results of linear regression test through enter method are shown in table 3 for each variable.

Table 3. The relationship between total score of psychological well-being and the demographic and clinical variables and the study group based on multiple linear regression analysis

Independent variable	B	95%CI	standard Beta	P^*
Age	0.03	-0.09 -0.1	0.06	0.5
Gender	-0.2	-4.6 -4.1	-0.01	0.9
life status	-1.9	-5.1 -1.1	0.09	0.2
Hypertension	-3.5	-6.9 -0.1	-0.1	0.04
Diabetes mellitus	-2.9	-6.7 -0.7	-0.1	0.1
Patient's main occupation employed	reference			
Retired	0.14	-5 -5	0.04	0.9
Housewife	-2.3	-9 -4.2	0.05	0.4
Unemployed	-0.23	-4.7 4.3	0.01	0.9
Education Below diploma	reference			
Illiterate	3.6	-0.6 -7.8	0.1	0.09
College education	4.7	0.06 -9.4	0.1	0.06
Life status With spouse	reference			
Alone	-1.5	-11.6 -8.5	-0.04	0.7
With children	-3.8	-12.9 -5.1	-0.1	0.39
Groups (cardiac patients and healthy)	8.7	11.4 -5.5	0.4	0.001

*multiple linear regression

As it is shown in the table, the history of blood pressure, groups under study, and effective and predictive variables in psychological well-being were obtained and the average of well-being score in the healthy group was 3.5 scores higher than the group including patients with high blood pressure, and well-being score in healthy group was 8.7 scores higher than cardiac patients group.

Discussion

The results of this study showed that cardiac patients have a lower psychological well-being score in comparison with healthy people. Furthermore the members of healthy group achieved better scores in all the 6 sub-categories of well-being including, self-admission, purposefulness in life, personal growth, having a positive relationship with others, mastery of environment and autonomy.

In a cohort study on 7942 people, the results showed that better psychological well-being is associated with a lower risk of cardiac disease in the coming years (11). The findings also showed that the development of cardiac disease and its mortality rate is lower in individuals with better optimism characteristics (23,24). In other studies which investigated other aspects of psychological well-being such as emotional liveliness and having positive attitude in life, it was shown that the probability of cardiac disease development and its mortality rate is lower in individuals with better psychological well-being scores (9,25). The findings of a futuristic study conducted on 97253 women without cardiac disease and cancer, also indicated that women with high pessimism degree at the beginning of the study, showed a higher risk of developing cardiac disease and its mortality during eight years of the study (24). In other studies, the feeling of having a valuable life as a norm of well-being was accompanied by lower risk of cardiac disease mortality rate in both middle-aged and older male and female participants (26,27). Beside these findings, a meta-analysis on 70 studies showed that positive psychological well-being, including positive attitude, happiness and good behavior is accompanied by less mortality rate especially the mortality rate of cardiac disease (28).

In this study, even by considering gender group of male and female, and history of high blood pressure and diabetes, the healthy group had a higher psychological well-being score. Alongside our study, a 7-year follow-up on the elderly showed that the feeling of valuable life is accompanied by lower mortality rates even after controlling age and gender (29). The study which compared the relationship between well-being condition and the development of blood pressure in future years, showed that more energy and liveliness contribute to lower development of blood pressure in future years and this result was obtained after controlling age and gender demographic factors (30). Blood pressure was also recognized as an effective factor in individuals' well-being in a way that the participants suffering from high blood pressure had lower well-being conditions in comparison with those without high blood pressure.

On the other hand, it was shown in another study, that patients suffering from multiple sclerosis have lower well-being scores without regard to gender factor and marital status, while individuals with higher education, have higher well-being scores. This could be due to the early diagnosis and treatment of disease in people with higher education which has fewer negative impacts on an individual's well-being (16). In current study, individuals with higher education were reported to have higher well-being scores in comparison to individuals without a high school diploma, which wasn't a significant difference and higher education wasn't considered as a predictive factor. In current study, the well-being score in different groups wasn't different in terms of marital status and it had no impact on well-being in regression analysis. In another study, single

individuals had lower well-being scores in comparison to married individuals (11). In another study in 2015 better well-being condition, especially regarding personal growth, positive attitude and life satisfaction, were recognized as predictive factors for low risk of metabolic syndrome and this relationship was independent of marriage factor (31).

In this study, housewives had better well-being scores in comparison to individuals having a job, but this difference wasn't statistically significant. It seems that unemployment and low income can lead to the decrease in patients' well-being condition due to the disease expenses and worsening economic conditions. In several studies which investigated the impact of income on well-being and life satisfaction, it was shown that low income and low life satisfaction, and emotional well-being of individuals are related (32,33). In the studies mentioned above, cardiac disease factor wasn't considered in cardiac patients and healthy people. Therefore, conducting more accurate studies to investigate the effect of cardiac disease factor independently is needed.

The mechanism of well-being effect on the decrease of cardiac disease risk has been investigated in several studies and this relationship is independent of known cardiac risk factors improvement such as blood pressure, diabetes and dyslipidemia (11). Studies have shown that the characteristics of optimism lead to the improvement of psychological condition by increasing neuroendocrine, the function of endothelial and the decrease of inflammation and blood pressure (34,35). On the other hand, optimism has led to individuals' tendency towards healthier behaviors such as adopting a better diet and doing physical activities (36), and has an indirect impact on the individuals' social function (37). In a review article, healthy behaviors such smoking, using alcohol, physical activities, sleeping time and quality, using healthy food, meditation and also some biological factors such as

interleukin 6 and 10 C reactive protein (CRP) and fibrinogen were introduced as mediators of well-being effect and optimism on the decrease of cardiac disease (19).

Although this study was conducted in a cardiology hospital with a healthy group including patients' caregiver, who had similar life and social structures, it had some limitations. 1) Although the participants' incomes were indirectly checked through investigating their working conditions, the direct comparison of well-being scores in the two groups regarding their incomes which can have a direct impact on individual's well-being seems necessary since the participants were unwilling to talk about their income in this study. 2) The participants in the healthy group were chosen only from the patients' caregiver in this study. Choosing healthy subjects from other societies would pave the way for a better comparison.

Conclusion

Healthy people had a better well-being condition in comparison to cardiac patients. Beside total well-being score, healthy people had better scores in categories such as self- admission, purposefulness of life, personal growth, having a positive relationship with others, mastery of environment and autonomy, in comparison to cardiac patients. In spite of differences in the groups regarding the individuals' life condition, after controlling demographic variables in regression model, well-being score was only related to individuals participating in groups under study and the history of blood pressure.

president and staff members of Heshmat Heart Hospital in the city of Rasht. The authors declare no conflict of interests.

References

1.   Bok S. Rethinking the WHO definition of health. Harvard Center for Population and Developmental Studies. Work Pap Ser 2004; 14(7): 21.

2.   Sayers J. The world health report 2001-Mental health: new understanding, new hope. Bull World Health Organ 2001; 79(11): 1085.

3.   Ryff CD, Singer B. The contours of positive human health. Psychol Inq 1998; 9(1): 1-28.

4.   Keyes CL, Shmotkin D, Ryff CD. Optimizing well-being: the empirical encounter of two traditions. J Pers Soc Psychol 2002; 82(6): 1007-22.

5.   Ryff CD. Psychological well-being in adult life. Curr Dir Psychol Sci 1995; 99-104.

6.   Huppert FA. Psychological well-being: Evidence regarding its causes and consequences. Appl Psychol Health Well-Being 2009; 1(2): 137-64.

7.   Ryff CD, Singer B. Human health: New directions for the next millennium. Psychol Inq 1998; 9(1): 69-85.

8.   Krueger AB, Schkade DA. The reliability of subjective well-being measures. J Public Econ 2008; 92(8): 1833-45.

9.   Davidson KW, Mostofsky E, Whang W. Don't worry, be happy: positive affect and reduced 10-year incident coronary heart disease: the Canadian Nova Scotia Health Survey. Eur Heart J 2010; 31(9): 1065-70.

10.   Boehm JK, Kubzansky LD. The heart's content: the association between positive psychological well-being and cardiovascular health. Psychol Bull 2012; 138(4): 655-91.

11.   Boehm JK, Peterson C, Kivimaki M, Kubzansky L. A prospective study of positive psychological well-being and coronary heart disease. Health Psychol 2011; 30(3): 259-67.

12.   Erikson EH. Identity and the life cycle: Selected papers. Psychological issues 1959; 1: 1-171.

13.   McAuley E, Rudolph DL. Physical activity, aging, and psychological well-being. J Aging Phys Act 1995; 3(1): 67-96.

14.   King P. The concept of well-being and its application in a study of ageing in Aotearoa. New Zealand: EWAS Working Paper Series; 2007.

15.   Myers DG, Diener E. Who is happy? Psychol Sci1995; 6(1): 10-9.

16.   Dehnavi SR, Heidarian F, Ashtari F, Shaygannejad V. [Psychological well-being in people with multiple sclerosis in an Iranian population]. Journal of research in medical sciences 2015; 20(6): 535-9. (Persian)

17.   Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. J Pers Soc Psychol 1989; 57(6): 1069-81.

18.   Ryff CD, Keyes CLM. The structure of psychological well-being revisited. J Pers Soc Psychol 1995; 69(4): 719-27.

19. Van Dierendonck D. The construct validity of Ryff's Scales of Psychological Well-being and its extension with spiritual well-being. Pers Individ Dif 2004; 36(3): 629-43.

20.   Schmutte PS, Ryff CD. Personality and well-being: reexamining methods and meanings. J Pers Soc Psychol 1997; 73(3): 549-59.

21.   Vahedi Sh GS, Vahedi Sh, Ghanizadeh S. [Path analysis model between intrinsic religious motivation, praying, spiritual wellbeing and quality of life with psychological well-being of college students]. Journal of health psychology 2008; 3(2): 27-42. (Persian)

22.   Dastjerdi R FV, Kadiva P. [The role of five big personality factors in predicting psychological wellbeing]. Journal of Birjand University of Medical Sciences 2011; 18(2): 126-33. (Persian)

23.   Giltay EJ, Kamphuis MH, Kalmijn S, Zitman FG, Kromhout D. Dispositional optimism and the risk of cardiovascular death: the Zutphen Elderly Study. Arch Intern Med 2006; 166(4): 431-6.

24.   Tindle HA, Chang Y, Kuller LH, Manson JE, Robinson JG, Rosal MC, et al. Optimism, hostility and incident coronary heart disease and mortality in the Women's Health Initiative. Circulation 2009; 120(8): 656-62.

25.   Kubzansky LD, Thurston RC. Emotional vitality and incident coronary heart disease: benefits of healthy psychological functioning. Arch Gen Psychiatry 2007; 64(12): 1393-401.

26.   Tanno K, Sakata K, Ohsawa M, Onoda T, Itai K, Yaegashi Y, et al. Associations of Ikigai as a positive psychological factor with all-cause mortality and cause-specific mortality among middle-aged

and elderly Japanese people: findings from the Japan Collaborative Cohort Study. J Psychosom Res 2009; 67(1): 67-75.

27.   Koizumi M, Ito H, Kaneko Y, Motohashi Y. Effect of having a sense of purpose in life on the risk of death from cardiovascular diseases. J Epidemiol 2008; 18(5): 191-6.

28.   Chida Y, Steptoe A. Positive psychological well-being and mortality: A quantitative review of prospective observational studies. Psychosom Med 2008; 70(7): 741-56.

29.   Seki N. [Relationships between walking hours, sleeping hours, meaningfulness of life (Ikigai) and mortality in the elderly: prospective cohort study]. Nihon Eiseigaku Zasshi 2001; 56(2): 535-40. (Japanese)

30.   Trudel-Fitzgerald C, Boehm JK, Kivimaki M, Kubzansky LD. Taking the tension out of hypertension: a prospective study of psychological well being and hypertension. J Hypertens 2014; 32(6): 1222-8.

31.   Boylan JM, Ryff CD. Psychological well-being and metabolic syndrome: Findings from the midlife in the United States national sample. Psychosom Med 2015; 77(5): 548-58.

32.   Ferreri-Carbonell A. Income and well-being: an empirical analysis of the comparison income effect. J Public Econ 2005; 89(5): 997-1019.

33.   Kahneman D, Deaton A. High income improves evaluation of life but not emotional well-being. Proc Natl Acad Sci 2010; 107(38): 16489-93.

34.   Endrighi R, Hamer M, Steptoe A. Associations of trait optimism with diurnal neuroendocrine activity, cortisol responses to mental stress, and subjective stress measures in healthy men and women. Psychosom Med 2011; 73(8): 672-8.

35.   Ikeda A, Schwartz J, Peters JL, Fang S, Spiro III A, Sparrow D, et al. Optimism in relation to inflammation and endothelial dysfunction in older men: the VA Normative Aging Study. Psychosom Med 2011; 73(8): 664-71.

36.   Joutsenniemi K, Härkänen T, Pankakoski M, Langinvainio H, Mattila AS, Saarelma O, et al. Confidence in the future, health-related behavior and psychological distress: results from a web-based cross-sectional study of 101 257 Finns. BMJ Open 2013; 3(6): e002397.

37.   Srivastava S, McGonigal KM, Richards JM, Butler EA, Gross JJ. Optimism in close relationships: How seeing things in a positive light makes them so. J Pers Soc Psychol 2006; 91(1): 143.