Gensini scores and well-being states among patients with coronary artery disease: A comparison study

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Original Article

Abstract

BACKGROUND: World Health Organization (WHO) considered Mental Health Continuum (MHC) as a good instrument for well-being studies. Moreover, gensini score (GS) is an intensity index for coronary artery disease (CAD). The aim of our study was to compare GSs among patients who had coronary artery disease with different well-being states.

METHODS: This was a cross-sectional study conducted in Tehran Heart Center, Iran, in 2013. The study population consisted of 50 non-depressed patients who were candidates for coronary artery bypass graft (CABG). All of the participants were interviewed according to the Iranian version of Mental Health Continuum (IV-MHC) and were allocated to flourishing, maternal mental health (MMH) and languishing states based on the related classification criteria. GS was calculated for each participant. Data were analyzed by SPSS.

RESULTS: Forty one (82%) patients were in flourishing, 9 (18%) in MMH and nobody was in languishing states. The mean (standard deviation) of GS was 90.43 (44.424) and 89.67 (33.378) for flourishing and MMH ones, respectively (P = 0.962). There was no statistically significant correlation between GSs and well-being states (all Ps > 0.050).

CONCLUSION: Considering IV-MHC classification, all of our patients were only allocated to flourishing and MMH states. There was no relationship between intensity of CAD and the states (P > 0.050). We recommend further research with larger sample sizes for better evaluation of the Iranian version of the instrument.

Keywords: Coronary Artery Disease, Depression, Mental Health, Iran

Introduction

Recently, some psychologists have presented a new model explaining complete mental health as a combination of lack of major depression during the last 12 months and having subjective well-being. In this model, subjective well-being has been introduced as a complete state of positive feeling and positive functioning in life, and categorized into emotional well-being, psychological well-being, and social well-being.[1-3] Moreover, non-depressed individuals have been categorized in the three subjective well-being states including flourishing, languishing, and maternal mental health (MMH). Flourishing is a state of mental health that individuals have no depression and are surrounded with high positive emotions and functions. Languishing is a level of absurdity in individuals who are empty of emotions and positive functioning, however they are not depressed. Languishing persons have neither illness nor positive subjective well-being in terms of mental health.[4-7]

Psychologists have created a questionnaire and named it Mental Health Continuum (MHC) or Keyes' well-being questionnaire for evaluating and categorizing individuals in different groups of well-being states.[8-12] World Health Organization (WHO) has recently taken this instrument into

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consideration and recommended its evaluation and examination in other non-American societies.[13] Hence, Keyes' MHC was favorably received attention by other scientists and researchers from other countries like Canada, Italy, Australia, and Egypt.[14-18] Likewise, the Iranian version of Keyes' mental health continuum (IV-MHC) has been used widely in recent years.[19,20]

Different studies confirmed the strong and consistent association between depression and coronary artery disease (CAD).[21,22] One of the best indices for showing the intensity of CAD is Gensini score (GS). The advantage of this index is that GS provides a quantitative variable for statistical analysis. GS is a scoring system and is mainly calculated based on the involved artery, the extent of atherosclerosis and the existence of collateral.[23] The aim of this research was to compare GSs in different groups of individuals, who had CAD and were hospitalized in Tehran Heart Center, Iran, in 2013, with subjective well-being states.

Materials and Methods

Sixty-one patients who were candidates for coronary artery bypass grafting (CABG) and were hospitalized in Tehran heart center (affiliated with Tehran University of Medical Sciences) enrolled in this cross-sectional study conducted in October 2013. Their functional classes were one or two and they did not have any accompanying active disabling diseases. They were selected randomly and consecutively from patient admission list before the surgery. Patients were interviewed using general health questionnaire-28 (GHQ) items for depression evaluation.[24] In this stage, 8 patients were diagnosed as depressed and were excluded and the rest were evaluated according to MHC. Three patients could not understand the questions of MHC and were excluded. Ultimately, 50 patients were included in our preliminary study.

The general health questionnaire contained 28 questions about 4 sub-scales of physical signs, anxiety and sleeping disturbances, social impairment, and severe depression. The questionnaire was created by Goldberg in 1972 and shows the state of interviewed participants during the past month.[24] Each sub-scale included 7 questions and each question had 4 replies including not at all, almost normal, more than normal, and exceedingly over normal. Numerating was based on the following criteria; the first alternative had zero score, the second had one, the third had two, and the fourth had three scores. The

score above 6 was considered in sub-scale of depression as a disease, and these participants were excluded from the study. This questionnaire was standardized to Iranian version by Taghavi.[24]

The Keyes' MHC contained three main scales including emotional well-being, psychological well-being, and social well-being and thirteen subordinated sub-scales.[9] Emotional well-being contained two sub-scales by itself, one sub-scale item of life satisfaction and six sub-scale items of positive feeling. In life satisfaction item, the respondents were asked a question about the level of their satisfaction in life by choosing from 0 to 10 (0 = not satisfied and 10 = very satisfied). In positive feeling sub-scale, respondents were asked to choose from a list of six signs of positive feelings and selecting a number between 1 to 5 as all, most, some, a little, and none of the time respectively, in order to determine how much they had experienced each sign within last 30 days.

The 6 psychological well-being sub-scales were as self-acceptance, autonomy, environmental mastery, purpose in life, personal growth and positive relations with others. The psychological well-being scale contained 18 items for evaluating 6 aspects of psychological well-being which were answered based on a 7-rating scale of Likert ranging from completely disagree to completely agree. The social well-being short-scale form was used for examining social well-being.[1] The form, including 15 items for evaluating 5 aspects of social well-being, was answered based on a 7-rating scale of Likert ranging from completely disagree to completely agree.

Being recognized as an individual in the flourishing state, the person should be entitled in upper tertile in one of the 2 sub-scales of positive emotions and six of the 11 sub-scales of positive functions. Being recognized as an individual in languishing state, the person should be entitled in lower tertile of at least one of the 2 sub-scales of positive emotions and six of the 11 sub-scales of positive functions. Consequently, individuals without languishing and flourishing states had MMH.[9]

Recently, Keyes et al. suggested another method for the classification of individuals among flourishing, MMH, and languishing groups. He has named the previous classification as categorical and the new method as continuous. In the categorical method, the scores of 13 sub-scales were simply added up together and final classification of individuals was determined based on total score. In this way, individuals with well-being score located in one-third of upper level were named flourishing, the

next one-third were known MMH and the last group were called languishing.[25]

Keyes' well-being questionnaire was standardized by Joushanlou et al in our country in 2006.[19] They reported the internal consistency of the subordinated sub-scales between 0.43 to 0.85.

A cardiologist calculated GS of studied patients through evaluating the coronary arteriograms. Considering the specific diagram and table, he first scored three variables of severity (ranged from 1 to 32), segment location multiplying factor (ranged from 0.5 to 5), and collateral adjustment factor (ranged from 1 to 16) and then multiplied them.[26] Both questionnaires (GHQ and MHC) were completed by a trained general practitioner during the interviews. Both categorical and continuous methods were used for calculating subjective well-being states. Scoring the GSs were done by one of the assistant professors of cardiology in Tehran Heart Center, Tehran, Iran. This research was designed and approved based on the ethical rules of Tehran University of Medical Sciences. The research project was explained to the patients and verbal consents were received.

Kolmogorov-Smirnov (KS) test was used to examine the distribution of the numeric variables. Once the KS test values violated the assumption of normality for the variables, we used Mann-Whitney test for the data analysis. Student's independent t-test was used for the remained numeric analysis. We also used Pearson correlation test for exploring the correlation state of some variables. Alpha was considered less than 5 percent. We used SPSS software (version 16.0, SPSS Inc., Chicago, IL, USA).

Results

The mean and standard deviation (SD) of patients age were 58.9 and 8.75, respectively. 43 (86%) of patients were men, 49 (98%) were married and 42 (84%) were employed. The mean ± SD of individuals educational experience was 7.42 ± 5.60 year. The descriptive statistics of subjective well-being scales are mentioned in table 1. In the next step, the patients well-being states were evaluated using two above-mentioned methods. Considering the categorical method, 41 (82%) were allocated to the flourishing group and 9 (18%) to the MMH group. None of the patients was in the languishing group. For the next step, GSs of patients in flourishing and MMH groups were compared (Table 2). The mean ± SD of GS for flourishing individuals and those having MMH was 90.43 ± 44.42 and 89.67 ± 33.38, respectively. The difference between the two groups was not statistically significant (P = 0.962).

Table 1. Descriptive statistics of the subjective well-being scales in the patients

Indicator	Mean ± SD
Life satisfaction	7.34 ± 2.25
Positive feelings	23.26 ± 4.51
Self-acceptance	16.98 ± 3.45
Autonomy	15.28 ± 2.99
Environmental mastery	18.06 ± 2.98
Purpose in life	12.80 ± 2.71
Personal growth	16.76 ± 3.22
Positive relations with others	17.72 ± 2.79
Social acceptance	11.76 ± 3.37
Social contribution	16.32 ± 4.01
Social coherence	12.84 ± 4.56
Social integration	16.28 ± 3.47
Social actualization	9.96 ± 3.19

SD: Standard deviation

Then, the patients well-being scores were calculated by the second method (continuous method). 40 (80%) patients were allocated to the flourishing group and 10 (20%) to the MMH group. None of the patients were in the languishing group. For the next step, the GSs of the flourishing and MMH patients were compared (Table 2). The mean ± SD of GS for the flourishing individuals and those having MMH was 89.06 ± 44.621 and 95.20 ± 33.177, respectively. There was no statistically significant difference between the two groups (P = 0.686).

Table 2. Comparing gensini scores between flourishing and moderately mentally healthy patients based on categorical and continous methods of classification

Method of classification	Groups of well-being	Count	Mean ± SD	P*
Categorical method	Flourishing	41	90.43 ± 44.424	0.962
	MMH	9	89.67 ± 33.378	
Continuous method	Flourishing	40	89.06 ± 44.621	0.686
	MMH	10	95.20 ± 33.177	

* Independent t test
SD: Standard deviation; MMH: Maternal mental health

The mean and SD of patients emotional, psychological, and social well-being scales and total subjective well-being score are mentioned in table 3. Pearson correlation coefficients were analyzed among the above scales with GSs and none of them was significant (P > 0.050). Also, GHQ sub-scales were compared between the two groups of flourishing and MMH and no statistically significant difference was found (P > 0.050) (Table 4).

Table 3. The descriptive statistics of patients well-being scores and correlation measures between well-being and gensini scores

Type of Scale	Mean ± SD	r	P*
Emotional well-being	30.60 ± 5.92	0.009	0.951
Psychological well-being	97.86 ± 8.76	0.017	0.905
Social well-being	67.56 ± 8.74	0.263	0.065
Total well-being	196.02 ± 16.79	0.149	0.302

* Pearson correlation test
SD: Standard deviation

Pearson correlation was recruited to analyze different GHQ scales and its total score with subjective well-being scores and its total score. Although some of the items were statistically significant, none of them had coefficients of correlation more than 0.513 (Table 5).

Discussion

None of the participant in our research was allocated in the languishing group. By comparing GSs between the flourishing and MMH groups, we did not find any statistically significant difference (Table 2). We used both categorical and continuous methods for classifying individuals into well-being states. However, we did not find any difference between the two methods. Furthermore, we analyzed the correlation between the GSs with the score of each scale and the total score of subjective well-being in order to evaluate the existence of any relationship (Table 3); however, no correlation was found.

There is no study evaluating the relationship between the subjective well-being scales and CAD severity. However, Keyes and Grzywacz[27] and Keyes et al.[28] and Keyes and Simoes[29] found that being in the lower level of well-being was correlated with mental disease and increased risk of death, including the risk of cardiac death (by any known causes at any age and any gender). Moreover, Keyes[30] classified 3032 Americans between the age of 25 and 74 into four groups of depressed, flourishing, languishing, and MMH in a survey in 2004 and then examined them in terms of having some illnesses like cardiovascular diseases. The Keyes' study showed that the lowest incidence of cardiovascular disease was related to the flourishing and the highest one was related to the depressed groups. Also, the incidence of cardiovascular disease among depressed people was 1.7 times greater than the others and flourishing individuals had the lowest risk of cardiovascular disease.[30]

We did not recognize any significant difference by comparing the four sub-scale scores of GHQ between the two groups of flourishing and MMH as well (Table 4). Moreover, we analyzed the correlation between the four sub-scale scores of GHQ and its total score with the three sub-scale scores of well-being and its total score (Table 5). However, no cases was detected with coefficients of correlation more than 0.513.

Since we found no correlation among all of our analyses, the probable causes should be precisely reviewed. First, Keyes used composite international diagnostic interview short form scale for discriminating depressed from non-depressed participants in similar studies[9], but we used GHQ which is an instrument commonly used in our country. Moreover, it seems that the Iranian version of the instrument should be reevaluated. Based on the method of the standardization of IV-MHC,[19] the following challenging points are considered. 1- they did not examine their participants based on the existence of depression at the beginning of the study and they classified all participants into the three groups of flourishing, MMH, and languishing.

Table 4. Comparing general health questionnaire sub-scales between flourishing and moderately mentally healthy patients

GHQ Sub-scale	Well-being status group	Count	Mean ± SD	P*
Physical symptoms	Flourishing	41	4.12 ± 2.72	0.190
	MMH	9	6.67 ± 3.43	
Anxiety a sleep disturbances	Flourishing	41	4.41 ± 3.58	0.206
	MMH	9	6.11 ± 3.66	
Social impairment	Flourishing	41	8.29 ± 1.62	0.129
	MMH	9	9.22 ± 1.72	
Severe depression	Flourishing	41	0.81 ± 1.23	0.420
	MMH	9	1.11 ± 1.36	

* Independent t and Mann-Whitney U tests
SD: Standard deviation; GHQ: General health questionnaire; MMH: Maternal mental health

Table 5. The correlation between general health questionnaire sub-scales and well-being scales

GHQ Scales	Well-being Scales			Total
	Emotional well-being	Psychological well-being	Social well-being	
Physical symptoms	-0.354[*]	-0.278	-0.195	-0.374[*]
Anxiety and sleep disturbances	-0.474[*]	-0.445[*]	-0.171	-0.489[*]
Social impairment	-0.341[*]	-0.358[*]	-0.053	-0.336[*]
Severe depression	-0.309[*]	-0.172	0.082	-0.156
Total	-0.513[*]	-0.458[*]	-0.133	-0.496[*]

[*] Pearson correlation test, P < 0.050
GHQ: General health questionnaire

2- for conducting factorial analysis, the number of samples should be 10 to 20 times more than the number of items. Hence, it seems that Bakhshi et al.[31] and Joshanloo et al.[32] should have analyzed at least 400 participants for analyzing 40 items. 3- in SPSS, it is not suggested to use linear factor analysis with Pearson correlation matrix among items without considering psychometric characteristics (such as equal difficulty index for all the questions). 4- the researchers used Cronbach alpha coefficient for analyzing data, but it seems that using ordinal theta analysis is more appropriate in such cases. 5- the authors considered the distribution of quantitative variables as normal. Whereas, control of normality needs a test. 6- appropriate rotation of principal components method should be a varimax rotation. 7- considering exploratory factor analysis table, the remaining of at least 3 questions for assumed factors were neglected in psychometric criteria. 8- interestingly, there has been some researches in Iran, in which the researchers have used the Iranian version of Keyes' social well-being scale solely.

Keyes introduced his short form of MHC in 2008 as an appropriate replacement for future studies.[33] Redelinghuys studied 451 urban and 599 rural Africans by using general health questionnaire and Keyes' MHC-short form in 2012. The results showed that self-efficiency decreased the stress and caused better subjective well-being.[18]

It is worth mentioning that the Keyes' instrument focus is depression and does not consider other diseases. So, individuals who are suffering from other mental diseases are considered having subjective well-being and can be allocated in any of the three groups of flourishing, MMH, and languishing.

One of the limitations of our study was that he individuals were patients who were hospitalized and were scheduled to be under open cardiac surgery a few days after the interview. Therefore, some of them were under surgery stress. Hence, the results of this research should be interpreted cautiously. Additionally, we just studied 50 individuals and our small sample size might have led to observe insignificant differences.

Conclusion

We did not succeed in assigning any person in a languishing group of the IV-MHC. Moreover, we did not find any relationship between the intensity of CAD and well-being states of individuals. It seems that using IV-MHC should be interpreted more cautiously. By performing further studies with larger sample sizes, we can reach to an appropriate evaluation from Iranian version of this scale.

Acknowledgments

Conflict of Interests

Authors have no conflict of interests.

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