

Relationship between health literacy and health promoting behavior in patients with heart failure referred to clinics of Shahid Beheshti University of Medical Sciences

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ABSTRACT

Patients with heart failure are considered one of the most important groups exposed to the danger of low health literacy that may affect their health-promotion behaviors and quality of life and increase the load of health-related costs. Therefore, the present study aimed to determine the relationship between health literacy and health-promoting behaviors in patients with heart failure who referred to heart clinics of Shahid Beheshti University of Medical Sciences. This correlational study was conducted on 300 heart failure patients, selected by random cluster sampling method with proportional allocation. Data collection tool was demographic information questionnaire, Health literacy measurement and Health promoting Lifestyle Profile 2 (HPLP2). Data analysis was performed using SPSS software version 19 through statistical tests, including independent t-test, Pearson and Spearman correlation coefficient, Mann-

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Whitney-U test and Kruskal-Wallis. The results showed that mean and standard deviation (SD) score of health literacy of participants was 3.29 ± 0.6 and mean and SD score of health-promoting behaviors was 2.42 ± 0.29 . The Pearson correlation coefficient showed direct and significant relationship between health literacy and health-promoting behaviors ($r=0.66$, $P<0.001$). The results of this research showed the statistically significant relationship between health literacy level and health-promoting behavior. Therefore, health literacy should be paid special attention, as a factor affecting health-promoting behaviors, healthy life style and quality of life. According to the results of this study, programming education and development of health-promoting behaviors in patients with heart failure suggest that the health literacy needs more attention in health-promotion plans.

KEY WORDS: HEALTH LITERACY, HEALTH-PROMOTING BEHAVIOR, PATIENT, HEART FAILURE

INTRODUCTION

The prevalence of chronic diseases is a challenge in the present century in health and treatment sector (Karbashi *et al.* 2012). Among chronic diseases, the prevalence of congestive heart failure is increasing (Rahnavard *et al.* 2006). As in the whole world, 23 million people are suffering from heart failure and annually two million new cases of heart failure are diagnosed (Shiba and Shimokawa, 2011). However, in Iran, no detailed data exists from people with heart failure (Rezaee loye *et al.* 2009). At the same time, with increase in number of patients suffering from chronic diseases, like heart failure, systems presenting health services face numerous difficulties in long run to provide services to these people. In other words, chronic diseases need chronic care. Therefore, many believe that self-care should be performed by patients, in order to organize these patients and facilitate their affairs (Mellen, 2002). Based on the findings of previous studies, high mortality rate, inappropriate use of preventive services, and deterioration of heart failure are associated with inadequate health literacy (Dennison *et al.* 2011).

Inadequate health literacy is defined as the limited ability of people for acquiring, interpreting, and understanding primary information and health services that are necessary for appropriate decision-making in health areas (Raisi *et al.* 2013). Among patients with heart failure, as well, low health literacy is associated with mortality (Eckman *et al.* 2015).

According to studies by American Center for Health Care Strategies, people with low health literacy are unlikely to understand and practice the written and oral information presented by the specialists (Raisi *et al.* 2011). Recent reviews have reported poor health literacy in 33 to 51% of adults discharged from hospitals and more than 60% of referrals to cardiac clinics (Fernandez, 2014); while, heart failure disease can affect routine life activities, due to its natural capability. As a result, these patients become dependent to others for self-care (Abbasi *et al.* 2010). Today, health literacy is also an important concept in widespread aspects of health

promotion (Kanj and Mitic, 2010). Epidemiological studies have shown that the development of risk factors for coronary artery disease can be controlled by having a healthy lifestyle and people can improve their health through health-promoting behaviors (Mohseni Pouya *et al.* 2016).

Pender have suggested that health-promoting behaviors including exercise, nutrition, stress management, interpersonal relationship, spiritual growth, and health responsibilities reduce the risk of disease (Hosseini *et al.* 2015). These behaviors are one of the major measures exterminating health that is known as a background factor in preventing many diseases (Raisi *et al.* 2011). With regard to the importance of two issues of health literacy and health-promoting behaviors in patients with heart failure and regarding the report of Agency for Health Care Research and Quality on need for further researches more on health literacy and the way it affects people's health (Raisi *et al.*, 2013) and considering the fact that until now the relationship between health literacy and healthy behaviors in cardiac patients has not been studied in Iran, the present research evaluated the relationship between health literacy level and health-promoting behaviors in patients with heart failure as one of the most important vulnerable groups.

MATERIALS AND METHODS

In this correlational study, a total of 300 of patients suffering from heart failure referred to cardiac clinics of hospitals affiliated to Shahid Beheshti University of Medical Sciences were selected by random cluster sampling according to the following inclusion criteria: diagnosis of heart failure grade 2 and 3 in medical records according to doctor's diagnosis, minimum age of 25 years and maximum of 65 years, ability to read and write Farsi texts, passing at least six months after final diagnosis of the disease, receiving pharmaceutical treatment for heart failure (pills and medicinal regimen). Data was collected through two questionnaires and a scale that included the following tools:

1. Demographic information questionnaire (including a total of 7 questions, 5 questions related to personal information and 2 questions related to the disease).
2. Health literacy measurement: This tool was designed by Montazeri *et al.*, in 2014 that includes 33 items in 5 domains; 4 of them include access, understanding, assessment, decision-making, and employing the information, each containing 6, 7, 4, and 12 items, respectively, and the reading skill contains 4 items with 5-item Likert scale.
3. HPLP2: This scale is used to assess health-promoting behavior, which includes spiritual growth, responsibility, physical activity, nutrition, interpersonal relationship, and stress management, designed by Walker *et al.* (1987), containing 52 items and 4-option Likert scale that was translated by Hosseini *et al.*, in 2010 (Hosseini, 2013).

In the present research, validity of the demographic questionnaire was determined through qualitative method. Also, to determine the validity, other qualitative method was used to determine face validity and qualitative and quantitative methods were used for determine content validity. Content validity index (CVI) was determined using quantitative methods. For this purpose, opinion of 10 experts in the nursing field was used. CVI of the Health literacy measurement and HPLP2 was 0.92, and 0.94, respectively. To determine the reliability of the tools in the present study, internal consistency (Cronbach's alpha) and stability (Interclass Correlation Coefficient (ICC)) were used. Cronbach's alpha coefficient of the total health literacy tool and HPLP2 was $\alpha = 0.78$, and 0.87 , respectively. Also, total ICC of this tools was calculated $\alpha = 0.82$, and 0.79 , respectively. To gather data, after confirming the proposal of the research and getting introduction letter and receiving sampling license, 7 hospitals were purposively selected based on the list of hospitals with cardiac clinic affiliated to Shahid Beheshti University of Medical Sciences, Tehran. Then, one of the researchers selected hospitals randomly and referred to each clinic (which was assessed by the researcher before) during working hours. Then, samples were selected randomly among patients with qualified conditions of sampling in the research. Then, while providing necessary explanation about the research objectives and emphasis on confidentiality of data, written informed consent letter was obtained from patients and the research tools were completed orally and by asking participants.

To analyze data, SPSS software version 19 was used. To report descriptive data, mean and SD, frequency and percentage were used. To analyze data in inferential statistics, Kolmogorov-Smirnov test was used

and when the data distribution was normal, parametric tests (independent t-test, Pearson correlation coefficient) and when the data distribution was not normal, non-parametric tests (Mann-Whitney-U, Kruskal-Wallis and Spearman correlation coefficient) were used. Finally, after univariate analysis, to assess the impact of variables beside each other on the outcome variable (health promotion behaviors), all variables with a possibility greater than 0.2 entered multiple regression model.

RESULTS AND DISCUSSION

The results showed that men included 51.7% of patients with heart failure and 86% were married. Mean and SD of age of participants was 54.83 ± 8.21 and they were mostly at age range 60 to 65 years. 39.3% of participants had secondary school education and 98% had no history of employment in a area of medical sciences. Most of participants (57.7%) had a monthly income of less than 250,000 Tomans per family member. Also, 90% of participants stated a history of hospitalization due to heart reasons. At the same time, 84% of the participants claimed no history of education in the form of leaflets, pamphlets or oral training (Table 1).

Based on the results of the current study, mean and SD score of health literacy in patients with heart failure was 3.29 ± 0.6 and 87.7% of participant showed moderate health literacy. Also, mean and SD of health-promoting behaviors of participant in the study was 2.42 ± 0.29 and 57% of participant had moderate level. Results of Pearson statistical test showed a significant positive correlation between health literacy and health-promoting behaviors ($P < 0.001$). Therefore, higher level of health literacy increased the health-promoting behaviors score in patients with heart failure.

Among the subscales of health literacy, mean and SD scores of total participants in the reading skill was higher than other skills (3.8 ± 0.87), and in the aspect of evaluation and decision-making, the mean and SD scores of people was less than other factors (3 ± 0.83). The results of independent t-test showed no significant difference in scores of overall health literacy between women and men ($P > 0.05$). Among other demographic variables of health literacy, marital status and monthly income had a significant relationship ($P > 0.05$). Pearson correlation test showed significant difference in total health literacy at different age groups with education ($P < 0.001$). Table 2 shows the correlation of health literacy with age and educational status of participants in the research.

In the fields of health-promoting behaviors, mean and SD scores of participants was higher in interpersonal relationship than other subscales (2.8 ± 0.34) and was the least in the stress management with a mean and SD of

variable		number	%
Sex	male	155	51.7
	female	144	48.3
Education	primary	81	27
	Middle (guidance level)	118	39.3
	Secondary	14	4.7
	College	43	43
Employment status	Working in medical sciences	4	1.3
	Not employed in medical sciences	296	98.7
Marital status	Single	15	5
	Married	258	86
	Divorced	1	0.3
	Widow(er)	26	8.7
Age	25-29	4	1.3
	30-34	5	1.7
	35-39	6	2
	40-44	20	6.7
	45-49	20	6.7
	50-54	75	25
	55-59	51	17
	60-65	119	39.7
Monthly income	More than 250,000 Tomans per family member	32	32
	Less than 250,000 Tomans per family member	36	36
History of hospitalization	Yes	270	90
	No	30	10
History of education	Yes	48	16
	No	252	84

2.21±0.32, had the lowest score. The results of independent t-test showed significant differences in health-promoting behaviors between the studied women and men (P=0.02) and studied men were in better condition. Total health-promoting behaviors were significantly associated only with monthly income (P<0.001). Pearson correlation coefficient showed significant differences in health-promoting behaviors in different age groups and educational status (P<0.001). The correlation test of health-promoting behaviors with education level and

age are expressed in table 2. Also, table 3 shows the correlation between health literacy and health-promoting behaviors subscales in the study subjects.

Scale	Age		Educational status	
	r	p-value	r	p-value
Health literacy **	-0.41	<0.001	0.82	<0.001
Health-promoting behavior**	-0.18	0.002	0.6	<0.001

**Correlation is significant at 0.05.

Subscale of health-promoting behaviors	Health literacy	
	r	p-value
Nutrition**	0.516	<0.001
Physical activity **	0.520	<0.001
Interpersonal relationship **	0.457	<0.001
Health responsibility**	0.547	<0.001
Spiritual growth**	0.607	<0.001
Stress management**	0.544	<0.001
Total health-promoting behavior	0.66	<0.001

**Correlation is significant at 0.05.

Table 4. The results of multiple regression model fit to assess effective factors on health-promoting behaviors

Variable	Non-standardized regression coefficients	Standard deviation of regression coefficients	Standardized regression coefficients	p-value
Intercept	0.53	0.24		0.03
Health literacy	0.29	0.03	0.59	<0.001
Secondary school education	-0.15	0.07	-0.26	0.03
Age	0.005	0.002	0.1	0.005
Income status	0.1	0.29/0	0.17	<0.001

The results of multiple regression models showed that health literacy, education, age and income status were effective factors on health-promoting behaviors ($P > 0.05$). Health-promoting behaviors in people with secondary school education had a 0.13 less mean value than people with college education and each unit increase in age, increased mean health-promoting behaviors at 0.005 units. Health-promoting behaviors in people with an income more than 250,000 Tomans per person had a mean 0.1 unit increase than people with income less than 250,000 Tomans per person. Each unit increase in health literacy increased the mean health-promoting behaviors 0.29 units. Among the above-mentioned variables, health literacy had the greatest impact on health-promoting behavior. The results of multiple regression models are demonstrated in table 4.

DISCUSSION

The results showed that more than two-thirds of heart failure patients have moderate health literacy. This finding is consistent with the results of studies by Tehrani-Banihashemiet al., 2007; Raisi et al., 2013; Mollakhalili et al., 2014; Mo'tamedi et al., 2016; Raisi et al., 2011 inside our country, and abroad researches by Tung et al., 2014; Moseret al., 2015; and Jovis_veranes et al., 2011. Regarding the findings of the above-mentioned studies, it should be noted that patients with chronic conditions, like heart failure are at greater risk of inadequate care and weak consequences, such as lack of knowledge of disease, poor care, increased number of hospitalization and mortality caused by the disease. So, patients need adequate health literacy to participate in health care systems and appropriate health decisions (Mollakhalili et al., 2014).

The results of the current study showed that health literacy is an important factor affecting health-promoting behaviors in heart failure patients. Tsai et al (2014) and Raisi et al (2013) also found similar results in their study. In the present study, patients with higher health literacy had a better condition in all aspects of health promoting behaviors. As increase in patients' health literacy increased the physical activity levels. Also, these people

had a better nutritional status and sense of responsibility to their health. In this regard, Mollakhalili et al (2014) have pointed out that health literacy led to empowerment of people to apply information and health-related commands. Considering the effect of health-promoting behaviors in patients with heart failure on advancing health and quality of life, it decreases health-related costs to the same proportion, so health literacy should be considered as a factor that promotes health behaviors, creates a healthy life style and finally improves the quality of life. Meanwhile, the weaker health literacy was more prevalent among older patients. Higher health literacy in younger patients can be attributed to the fact that in the present study, this group with higher level education and more information on application of communicational media, like internet, has fewer problems and higher mean scores compared to older patients. Also, the higher physical power and probably lower incidence of comorbidities of heart failure, such as diabetes and hypertension, and less involvement of the joints cause higher physical activity were observed in younger patients. Based on the findings of the present research, health literacy had no significant relationship with gender of patients ($P > 0.05$). Therefore, the amount and method of understanding and interpretation of health information were not different between women and men and both groups need attention of the authorities concerned in this regard. But independent t-test showed significant difference between gender and health-promoting life style ($P < 0.05$). According to the results of the current study, generally, men were more likely to take care of their health than women. In the study by Tallet al (2014) and Nuthwer and Stump (2000), there was also a significant relationship between health-promoting life style and sex ($P < 0.001$). In the present study, all sub-scales of health literacy and health-promoting behaviors had higher scores among college-educated individuals than those with lower educational level. Tsai's study (2014), as well, showed a significant association between education and health literacy and these people were more likely to have an educational level above high school ($P < 0.001$). Notably, in the present study, all participants were literate, who were placed in that 4 educational groups and higher

level of education will possibly improve their health literacy. But in other studies in this regard, people's educational level were categorized as literate and illiterate that could have an impact on the results of the study.

Lev and Owen (2000) writes in this regard that knowledge and education increases the potential ability of the person against confusion and tension-causing factors and cause success in self-care behavior. As academic history of people is directly and meaningfully associated with health literacy, it is necessary to pay more attention to education and society health literacy, especially on health information. Developing appropriate health programs, providing simple and understandable training materials, spending more time with patients and slower interviews by doctors and medical staff are the solutions to help patients with low health literacy to improve their literacy. In the present study, the difference between people with and without a history of work experience in medical areas was not significant in health literacy ($P=0.3$) and health-promoting behaviors ($P=0.9$). This lack of difference is probably due to the small number of people employed in medical sciences participating in the present study that accounted for only 1.3% of them. Regarding the fact that the majority of participants in the present study had secondary school education, lack of high level health and treatment activity seems logical at this level of education. Another result of the present study indicated that except interpersonal relationship ($P=0.13$) and health responsibility ($P=0.9$), other dimensions of health-promoting behaviors had a significant relationship with income status ($P<0.05$), which can guide us to the fact that higher income does not necessarily lead to higher health responsibility and vice versa, people from low level of society do not take less care of their health; thus, training programs should be performed for all classes of the society. But higher mean scores of people in other dimensions, like nutrition, was due to higher income and can be justified due to better access to nutrition.

In the present study, the mean score of total health literacy and health-promoting behaviors was higher in trained people than untrained, but this difference was only significant in health literacy ($P<0.001$). Health literacy ($P=0.2$) and health-promoting behaviors ($P=0.6$) had no significant relationship with history of hospitalization, so that people with no history of hospitalization had higher mean scores in both variables. It seems that when the patient has no history of hospitalization after 6 months from definite diagnosis of heart failure, it confirms higher health literacy and more adherence to health-promoting behaviors in the patient. Thus, the results of this research emphasize the importance of

health literacy in the society, especially in hospitalized patients.

STUDY LIMITATIONS

In general, in this study, high number of questions of the tools used was one of the limitations, which was tried to be confronted by the following measurements: dedicate enough time to samples, answer their questions, consider a short break during interviews, and change the order of the research tools to be completed. In addition, the present study was performed in a cross-sectional basis, so future research with longer follow-ups can provide a better understanding of the causality relationships between variables.

CONCLUSION

The results of the current research showed that most of patients had moderate (borderline) health literacy. Therefore, these patients require more explanations by medical staff to understand and implement the doctors' instruction and other information and it is necessary to provide more time for relationships with their physicians and nurse and receive a simpler and more understandable information. Also, health managers and caregivers should pay attention to this issue and spend more time and give health instructions to this category of patients. In the end, assessing health-promoting behaviors and understanding the factors affecting it is of great importance that could improve the quality of life of patients with heart failure, but it needs policy-making and planning in this area. The importance of health-promoting behaviors should be considered more than before and be included in health care policy-making and programs. Regarding the vulnerability of heart failure patients and increasing prevalence in near future and the resulting associated challenge, planning is essential to face this challenge and lack of programming and policy-making in this regard will cause serious social, economic and health problems for society.

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