

The Relationship between Health Literacy and Treatment Adherence in Cardiovascular Patients Hospitalized in Khorramabad Educational Hospitals

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ABSTRACT

Insufficient health literacy and incomplete information related to disease management can affect the adherence to treatment regimens. This study was performed to determine the relationship between health literacy and treatment regimen adherence in patients with CVD hospitalized in the educational hospitals of Khorramabad City in 2017. In this descriptive cross-sectional study, 161 CVD patients hospitalized in two educational hospitals in Khorramabad City were selected through a non-probabilistic sampling method to participate in the study. Data collection instruments included a sociodemographic information form, health literacy questionnaire, and treatment regimen adherence questionnaire. Descriptive statistics and Pearson and Spearman correlation coefficients were used for the data analysis. The health literacy of 75.2% of the cases was borderline or average. In addition, 68.9% of the patients adhered to the treatment regimen at an average level. There was a significant positive relationship between the total health literacy score and the total score of treatment regimen adherence ($p < 0.000$, $r = 0.74$). In this study, those with higher health literacy also showed greater adherence to the treatment regimen. Thus, promoting health literacy can be an effective tool for enhancing treatment regimen adherence.

Keywords: Cardiovascular disease, health literacy, treatment regimen adherence

Introduction:

Cardiovascular disease (CVD) is the most common cause of mortality in most countries of the world including Iran [1]. It is estimated that in 2020, CVD has been the primary cause of disability worldwide [2]. CVD accounts for 20% of causes of mortality in the world and 35% of deaths in Iran. Accordingly, measures should be taken to prevent, control, treat, and promote self-management of CVD patients [2,3]. CVD patients should be able to manage

their drug consumption, fluid intake, physical activity, and symptoms, and follow up their care through consultation and be visited by healthcare providers. Meanwhile, adherence to recommendations given by healthcare providers and self-care regimens requires equipping and applying education and knowledge principles for decision-making on care and management of situations. Evidence has shown that even if CVD patients receive

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adequate education about self-management based on clinical instructions, yet inadequate health literacy hinders achieving the self-management skills and knowledge [3,4].

One of the effective factors that has recently attracted the attention in CVD management is health literacy, which is known as an effective tool in prevention and health education [5]. Health literacy has been defined as the ability of reading, understanding, acting, listening to, applying, analyzing, and making decisions based on health recommendations [6,7]. World Health Organization in the fifth global conference for health promotion in Mexico defined health literacy as cognitive and social skills that determine the motivation and potential of individuals in achieving understanding and applying information with the aim of maintaining and promoting health. Also, health literacy functions as not only a personal characteristic but also as a key determinant across the public health [7]. Health literacy allows individuals to understand the guidelines of drug consumption, patient consent forms, homecare pamphlets, and details of the healthcare programs. Considering the relationship between health literacy and health consequences, recently the Affordable Care Act and patient protection pays more attention to health literacy through clear communication and information, patient orientation, guaranteeing equality, cultural qualifications, and optimal care [5].

Low health literacy affecting around 40% of American adults is a risk factor for poor drug management and in compliance to health care and related behaviors [4]. Those with poor health literacy are less likely to understand the written and verbal information presented by healthcare specialists and act accordingly. Thus, health literacy can be associated with health implications such as adherence to therapeutic regimen and drug regimens [7]. In the study by Dennison et al., it was found that insufficient health literacy was associated with in compliance to medication and treatment recommendations [8]. In compliance to medical recommendations is still considered an obstacle in achieving therapeutic goals. Also, one of the obstacles against prevention and

proper treatment for CVD and increasing healthcare costs is the patient's in compliance to medication regimens [1].

The study by Pang & Chang showed that only 30-39% of patients with hypertension have achieved controlled blood pressure in the therapeutic goals. On the other hand, 65% of them discontinued drug consumption after some time or had consumed them lower than the prescribed dose [1]. Although some studies have reported that low health literacy is associated with poor drug adherence, some others have noted that poorer health literacy is associated with better drug adherence. Some however have reported these relationships as insignificant [5,8]. In another study on heart failure patients, it was found that those with adequate health literacy showed greater HF knowledge and self-care confidence in comparison to those with borderline and inadequate health literacy. However, in this same study, no relationship was found between health literacy and self-care management such as drug adherence [8].

Previous studies have focused on patients with inadequate health literacy, but health literacy and its implications in CVD patients with different levels of health literacy has remained understudied [3, 5, 7]. Also, although extensive research has been performed on health literacy, regarding the relationship between health literacy and consequences such as medication adherence, the findings have been reported contradictory and different [5,7]. Most of these studies have not been on adults with CVD and cannot be generalized to this group of population. Thus, the present study was performed to determine the relationship between health literacy and adherence to therapeutic regimen in CVD patients referring to educational healthcare centers of Khorramabad City in 2017. Healthcare researchers believe that adequate knowledge on the relationship between health literacy and treatment adherence can support the necessary interventions for improving health literacy and health behaviors.

Materials and Methods

This is a cross-sectional descriptive research of correlation type. The research setting was hospitalization wards including cardiology and CCU in selected hospitals affiliated with Lorestan Universities of medical sciences located in Khorramabad city including Shahid Madani and Shahid Rahimi hospitals. They are considered as the main referral centers for CVD patients, and as such the participants were chosen from these centers from December 2017 to February 2018. The sample size was determined 161 according to a previous study [9] and based on confidence interval 95%, test power of 90%, and assuming that the correlation coefficient between health literacy and treatment adherence is at least 0.2. The participants were chosen through available nonprobabilistic sampling method and based on the inclusion criteria and their willingness to participate in the study. The inclusion criteria were adults older than 18 years, confirmation of CVD diagnosis by a physician or specialist, at least six months should have passed from the diagnosis, consuming at least one cardiac drug by the patient, not suffering chronic or advanced comorbidities, no cognitive disorder, ability of speaking and understanding Persian or Lori dialect by the patient. Also, instable hemodynamic status and the patient becoming bored by completing the questionnaires were the exclusion criteria.

Data collection instruments included sociodemographic and clinical data form, health literacy questionnaire, and therapeutic regimen adherence questionnaire. The sociodemographic and clinical information form captured the variables of age, gender, level of education, marital status, occupation, place of residence, income, duration past the disease diagnosis, presence of any member suffering CVD in the family, having previous information about CVD and medication regimen and the source of acquiring this information, as well as the method of controlling the disease [lifestyle modification or drugs].

The adult health literacy questionnaire has been developed by Montazeri et al. for the Iranian population within the age range of 18-65 years and in line with the sociocultural characteristics of Iran. This questionnaire includes 33 items in five areas including access to health information (6 items), reading (4 items), comprehension (7 items), assessment (4 items), and decision-making plus behavior (12 items). This questionnaire has been graded based on 5-point Likert scale from never (1 score) to always (5 scores). Score 33-66 represented poor health literacy, 67-132 and 133-165 indicated average and desired health literacy respectively here. The Cronbach alpha of the health literacy questionnaire subscales has also been determined by Montazeri et al. as 0.72-0.89 [10].

The treatment adherence questionnaire was designed by Thomas in 2004. Its validity has been determined with content validity index as 0.97 and reliability with Cronbach-alpha of 0.87 [11]. Twelve items of this questionnaire include three dimensions of adherence to diet (items 1-4), adherence to exercise (items 5-8), and medication adherence (items 9-12). Items 12, 10, 8, 7, 6, 5, and 3 of this questionnaire have been graded based on a 4-point Likert scale from never (1 score) to always (4 scores); in contrast, the scoring of items 11, 9, 4, 2, and 1 has been considered from never (4 scores) to always (1 score); in the statistical analysis of the score of these items, coding is performed again. Higher scores indicate better adherence. The reliability of this questionnaire in Iran has been determined by Cronbach alpha coefficient of 0.76 [12]. To determine the validity, the health literacy and treatment adherence questionnaires were provided to 7-10 faculty members of Khorramabad faculty of nursing- midwifery and were used without any special changes in the current study (for CVD patients).

After receiving the necessary introduction letters from the research Deputy of Lorestan University of medical sciences and Khorramabad faculty of nursing and

midwifery, the researcher attended the research setting. Then, by referring to the educational supervisor of the selected hospitals, he received an introduction letter to attend the hospitalization wards. In this way, the researcher attended personally for data collection in the morning shift of all weekdays except for holidays in the hospitalization wards of Shahid Rahimi and Shahid Madani hospitals. After selecting the eligible samples and introducing himself, explaining the research goal for the intended units, and acquiring their written informed consent form to participate in the study and assuring them about the confidentiality of information, he provided self-report questionnaires to the participants so that they could complete them in a quiet place. At the time of completion of questionnaires, in order to achieve uniform and consistent response to the possible questions of the participants, he was present among them, and in case the participants especially illiterate or poorly literate patients were unable to complete the questionnaires, he would read the items for them and reflected their opinions exactly into the questionnaire. On average, 20-30 min was required to respond to the items. The

sampling continued until reaching the desired number.

Data analysis was performed using descriptive statistical indicators; based on the distribution of studied variables, Pearson and Spearman correlation coefficients were used to determine the relationship between variables. The data of were analyzed in SPSS 16.

Results

The number of participants in this study was 161, whose mean age was 59.97 ± 12.68 years. The results indicated that most of them were female (59%) and married (71.4%). In terms of level of education, most of them had below diploma levels (78.9%). Most of them were housewives (59%) and 41% reported inadequate monthly income. Inquiry from healthcare staff and physicians was mentioned as the main source of information acquisition (65.8%). Also, 62.1% of them had reported lifestyle modification plus pharmacotherapy as the method of disease control (Table 1).

Table 1. The frequency of participants based on personal- clinical characteristics

Characteristics	n(%)	Characteristics	n(%)	Characteristics	n(%)
Gender		Financial situation		Source of information	
Male	66(41.0%)	Low	66(41%)	Physician & healthcare staff	106(65.8%)
Female	95(59.0%)	Moderate	58(36%)	Interactive voice response	2(1.2%)
Marital Status		High	37(23%)	Internet	4(2.5%)
Single	46(28.6%)	Employment status		TV & Radio	30(18.6%)
Married	115(71.4%)	Unemployed	9(5.6%)	Associates	15(9.3%)
Location		Self-employment	22(13.7%)	Magazine & journals	4(2.5%)
Urban	121(75.2%)	Housewife	95(59.0%)	Education	
Rural	40(24.8%)	office worker	16(9.9%)	Under Diploma	127(87.9%)
Diagnosis (year)		Retired	14(8.7%)	Diploma	26(16.1%)
<2	57(35.4%)	Other	5(3.1%)	University	8(5.0%)
2-5	43(26.7%)	Family history		Disease control	
6-10	33(20.5%)	Yes	88(54.7%)	Lifestyle modification	16(9.9%)
>10	28(17.4%)	No	73(45.3%)	Pharmacotherapy	45(27.9%)
				Both	100(62.1%)

Table 2. The frequency of participants based on health literacy/its dimensions and adherence to therapeutic regimen.

Variable	Dimension	Inadequate	Borderline	Adequate
Health literacy	Access to health information	3(3.0%)	122(75.0%)	36(22.0%)
	Reading	23(14.0%)	98(61.0%)	40(25.0%)
	Comprehension	29(18.0%)	94(58.0%)	38(23.0%)
	Assessment	21(13.0%)	108(67.0%)	32(30.0%)
	Decision-making and behavior	20(12.0%)	116(72.0%)	25(15.0%)
Adherence to therapeutic regimen	Total	31(19.3%)	121(75.2%)	9(5.6%)
	Diet	0.0(0.0%)	128(79.5%)	33(20.5%)
	Activities and sports	0.0(0.0%)	110(68.3%)	51(31.7%)
	Medications	0.0(0.0%)	122(75.7%)	39(24.2%)
	Total	0.0(0.0%)	111(68.9%)	50(31.1%)

Table 3. Relationship between total health literacy and its dimensions, with total adherence to treatment regimen

Health literacy	Adherence to therapeutic regimen			
	Diet	Activities and sports	Medications	Total
Access to health information	0.31*	0.62*	0.62*	0.70*
Reading	0.28*	0.56*	0.51*	0.68*
Comprehension	0.40*	0.63*	0.40*	0.59*
Assessment	0.29*	0.49*	0.58*	0.61*
Decision-making and behavior	0.36*	0.67*	0.67*	0.59*
Total				0.74*

*p value <0.001

Most of the studied individuals had borderline/average health literacy (75.2%). Also, most of them had average adherence to therapeutic regimen (68.9%). The most adequate and inadequate health literacy were related to the reading and understanding/comprehension subscales respectively. The largest average adherence level was related to the diet (79.5%) and the maximum high level of adherence was associated with activity and exercise (31.7%) (Table 2).

There was a positive and significant relationship between the total score of health literacy and total score of adherence to therapeutic regimen ($p < 0.001$, $r = 0.74$); those with higher health literacy levels showed greater adherence to therapeutic regimen. It was also found that the maximum and

minimum correlation between the health literacy dimensions and total adherence to therapeutic regimen was related to access ($p < 0.001$, $r = 0.704$) and understanding/comprehension ($p < 0.001$, $r = 0.592$) (Table 3).

Further, regarding the relationship between health literacy dimensions and dimensions of adherence to therapeutic regimen, the largest correlation coefficient was related to the association between decision-making-behavior literacy and medication adherence ($p < 0.001$, $r = 0.675$). The minimum correlation coefficient was found between reading literacy and dietary adherence ($p < 0.001$, $r = 0.285$) (Table 3). There was no significant relationship between sociodemographic or clinical characteristics and health literacy and adherence to therapeutic regimen

Discussion

The findings of the present study showed that there was a significant correlation between health literacy and adherence to therapeutic regimen among CVD patients. Meanwhile, most of the participants had borderline/average health literacy and adherence to therapeutic regimen. The results of other studies on the health literacy levels in chronic patients and the general public have been reported to be different. In the study by Dennison et al. in a small sample size of 95 HF outpatients, most of them had inadequate health literacy (42%) while 39% had adequate literacy. In this study, in addition to determining the prevalence of inadequate and borderline health literacy, the findings also showed that in patients with adequate health literacy, the knowledge of heart failure and confidence in self-care were greater in comparison to the patients with inadequate or borderline health literacy [8]. In the study by Chen et al., it was found that the mean health literacy of HF patients at the beginning of study in comparison to 2 and 4 months later was adequate, and health literacy over time significantly affected increasing knowledge on HF, but it had no effect on improving self-efficacy and adherence to self-care [3]. In the studies by Chen and Dennison only functional health literacy, i.e. basic levels of reading and writing skills for acquiring, understanding, and applying real information have been evaluated. However, in some other studies, other advanced dimensions of health literacy such as communication and critical aspects have also been examined. For example, is the study by Heijmans et al., the level of health literacy in a Dutch population was reported adequate; around 80% of them reported that they had never any problem in understanding and reading educational pamphlets as well as the guidelines received from pharmacies or healthcare staff (functional health literacy). Also, a similar percentage reported that extraction of information from various sources was easy for them and they easily transferred this information to others and applied it to their daily lives (communication health literacy). Nevertheless, for half of them critical

health literacy was difficult, and they had problems in applicability, validity, and reliability of information as well as information collection for health decisions [3, 8, 11, and 12]. Based on the findings of the mentioned studies, it can be concluded that the measurement instrument, disease knowledge, setting of study and time can affect the health literacy. In other studies, the relationship between older age, low income, comorbidities, as well as functional constraints and low health literacy has also been reported (13).

Another finding of the current study was the extent of adherence to therapeutic regimen. In other studies, medication adherence and self-care adherence have been of interest, whose findings are to some extent in line with the current study findings. In a systematic review and meta-analysis on prospective epidemiological studies, it was found that a considerable portion of patients had no CVD medication adherence, and the relative risks of developing CVD in those with good medication adherence in comparison to their counterparts with poor medication adherence for statins and antihypertensive drugs were 0.85, and 0.81, respectively. The relative risk of all-cause mortality in those with good adherence in contrast to poor adherence for statins and antihypertensive drugs was 0.55 and 0.71. Eventually, investigation of the absolute and relative risk in this systematic review study showed that a considerable share of all CVD accidents (around 9% in Europe) can be due to poor CVD medication adherence alone. On the other hand, combination of the findings related to 2 million participants indicated that good adherence to cardiovascular treatments is associated with 20% reduction in the risk of CVD accidents and 35% reduction in all-cause mortality [14].

In the study by Dennison et al., it was reported that in HF patients, adherence to self-care did not increase during four months post admission [8]. In another study in Japan, it was found that adherence to healthy lifestyle is low in CVD patients; 60.7% of them still continued smoking after CVD accident [15]. For the inadequate adherence to therapeutic regimen and cares, some obstacles and problems have

been mentioned including lack of access to healthcare services, low self-efficacy, health beliefs (risk perception, perceived positives and negatives about the treatment), improper as well as non-personal treatments and cares, along with financial problems [14,16]. CVD patients should be able to manage life with their disease and acquire the sufficient literacy for managing situations and adhering to cares and treatments [15,16]. In order to increase adherence to treatment, use of remote nursing and training with multi-profession approaches can be useful. In the study by Keolling et al., the effect of SMS on improving medication and healthy diet adherence was observed [17].

An important finding of the current study was significant correlation between health literacy and adherence to therapeutic regimen. In the study by Dennison et al., it was found that in those with inadequate health literacy, there is a relationship between health literacy and trust in self-care [8]. In another study on HF patients, no relationship was found between health literacy and adherence to self-care behavior [3]. These descriptive findings can be attributed to the fact that health literacy is not always a predictor of adherence to self-care and the therapeutic regimen, and for this relationship other factors such as self-efficacy, patient knowledge and method of training to the patient should also be considered. In this regard, Dennison et al. observed that HF patients with a personal training session before discharge showed better adherence to self-care behaviors over 30 days in comparison to the patients who had received standard written information. Meanwhile, in a grand study of 605 subjects in structural equations modeling, the mediating role of self-efficacy was found for the relationship between literacy and adherence to self-care [8].

In another study, after modifying confounding variables, inadequate health literacy was significantly associated with poor adherence to practical guidelines for physical activity, but it had no relationship with adherence to practical guidelines associated with fruit and vegetable consumption. The findings of this study also showed that self-efficacy accounted for 32% of the relationship

between health literacy and adherence to guidelines related to physical activity [18]. In a meta-analysis, data merging indicated that there is a weak and positive significant relationship between health literacy and medication adherence. The findings also showed that health literacy may have a mediating relationship with other determinants of medication adherence [5]. Thus, future research should discover such associations. The future research can also evaluate the effect of interventions that promote all elements of health literacy (functional, communicational, and critical) using tele-nursing technology on adherence to therapeutic regimen while considering the cognitive factors and personal situation.

Limitations: the current study was cross-sectional-descriptive; as such, the health literacy and adherence to therapeutic regimen may change over time and based on different environmental conditions. This may compromise the generalizability of the findings. Also, a cross-sectional study did not allow us to have interpretation of causal relations. Thus, confirmation of causal relations between health literacy and adherence to therapeutic regimen requires further studies with high quality and interventional designs. Meanwhile, the current study was performed only on CVD patients, but concerning the role of health determinants such as achieving healthcare services and information, cultural minorities and other populations should also be examined.

Conclusion

The findings indicated that there was a positive and significant relationship between health literacy and adherence to therapeutic regimen. This highlights the fact that health literacy promotion can be an effective tool in enhancing the adherence to treatment behavior. Nurses can play a significant role in promoting health literacy and adherence to therapy regimen by considering cognitive factors such as risk perception, self-efficacy,

and other components of health literacy such as communicational and critical literacy.

Conflict of interests

The authors have no financial interest related to this article.

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