Health Literacy And Health-Related Quality of Life Among Patients With Cardiovascular Disease in Tagus Valley Regional Health Hospital, Portugal: A Cross-Sectional Study

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Research Article

Keywords: Health Literacy, Health-related Quality of Life, Cardiovascular Disease

Posted Date: December 21st, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-1166731/v1>

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Abstract

Purpose The aims of this study were to examine the association between health literacy (HL) and health-related quality of life (HRQoL) and to investigate the possible determinants of both variables among patients with cardiovascular diseases in Tagus Valley Regional Health Hospital, Portugal.

Methods A descriptive cross-sectional study was conducted among 28 patients with CVD. A convenient sampling technique was used to enrol the study participants. Data were collected using a validated Portuguese version of Short Assessment of Health Literacy (SAHPLA-23) and a validated Portuguese version of Short Form Health Survey (SF-36v2). The multiple linear regression was used to investigate the possible associated variables and the association between HL and HRQoL by using SPSS version 25.

Results The results showed the majority of patients with CVD had inadequate HL (89.3%). The majority of the participants had poor HRQoL with Physical Component Score (PCS) scored lower (38.77 ± 9.9) than the Mental Component Score (MCS) (44.13 ± 9.9). Educational level was found to be associated with HL. Level of education, employment status, family history of CVD and history of readmission because of CVD were the variables found to be associated with the PCS. However, no variable was found to be associated with the MCS of QoL. HL was shown to be the best predictor of the PCS ($\beta=0.518$, $p=0.002$) while the history of readmission because of CVD was identified as the second-best predictor of the PCS ($\beta=-0.373$, $p=0.022$).

Conclusions Health literacy was significantly associated with the PCS of HRQoL.

Introduction

Cardiovascular diseases (CVD) is a group of disorders of the heart and blood vessels that become the primary cause of death globally[1]. CVD is also the leading cause of mortality in Europe as a whole responsible for over 3.9 million death a year or 45% of all death and the main forms of CVD are ischaemic heart disease (IHD) and stroke[2]. In addition, one study of CVD burden in Portuguese speaking countries from 1995 to 2016 also confirmed that among CVD, IHD was the leading cause of death in all Portuguese speaking countries in 2016[3].

According to the Portugal Health Profile 2019, IHD has been placed as a second major health problem that contributes to the mortality rate in Portugal after stroke and around one-third of all deaths in Portugal can be attributed to behavioural risk factors[4]. Acute coronary syndrome (ACS) is a type of CVD which is used to describe symptoms of IHD[5]. Up to 2016, The Portuguese Registry of Acute Coronary Syndrome (ProACS) has recorded 45141 cases of ACS in Portugal[6]. Of the overall population, 44% of cases were STEMI, mostly male (71%) and with a mean age of 66 years. Over the years, there was a significant improvement in compliance with international guidelines, in terms of both diagnostic and therapeutic procedures, as well as for medication. In particular, the rate of reperfusion in STEMI increased to 84%, mainly by the primary percutaneous coronary intervention (only 5.2% were treated with thrombolysis in

2016). Improvements in treatment were accompanied by a reduction in in-hospital mortality from 6.7% in 2002 to 2.5% in 2016 in the overall population.

It has been confirmed that CVD affects the quality of life of patients. One study conducted by Nordon, et al which employed 3725 patients with ACS found that 12 months after ACS, participants in this study declared a rather good QoL, despite daily limited mobility, pain and discomfort[7]. Another study conducted by Dessotte, et al[8] in Brazil explored the HRQoL in patients admitted after the first episode of ACS found that higher scores of QoL were seen in the social functioning dimension and role emotion domains while the domains were perceived as more compromised were role physical, mental health and vitality. Moreover, it was identified that female participants and those who had been treated for any other CVD condition had lower HRQoL.

CVD and particularly myocardial infarction (MI), also carry a significant economic burden, through productivity losses (indirect costs) associated with temporary absence from work[9]. One study which investigated the indirect costs of MI in Portugal found that the costs to society of disability-generated productivity losses exceed ten million euros in the first year after MI[9].

Reducing the burden of CVD requires long-term interventions and sustainable solutions. Therefore, it is very important to find strategies to reduce the burden of CVD. For instance, improving health literacy among patients can be one of the solutions offered by health professionals to achieve better patients' HRQoL and reduce the burden of CVD. However, this area has not been yet well studied and documented particularly among patients with CVD. Therefore, the aims of this study were to identify the health literacy level and HRQoL among patients with CVD and to investigate the possible determinants of both variables and furthermore to determine the correlation between HL and HRQoL.

Methods

Study participants and sampling procedure

From November 2020 to January 2021, a cross-sectional study was conducted by using a convenient sampling technique in Tagus Valley Regional Health Hospital, Portugal. All patients with CVD who were admitted to the cardiology unit during the study period fulfilling inclusion criteria were consecutively included in the study. The inclusion criteria were as follows: all patients with CVD who were admitted to the cardiology unit and be able to give their consent, age of at least 18 years, willingness to participate, having Portuguese as a native language and were able to read and write. Patients with cardiac insufficiency and those who were unable to give their consent due to inability to speak or altered mentation were excluded.

Measurement

Health literacy

The Short Assessment of Health Literacy for Portuguese-Speaking Adults (SAHLPA-23) was used to measure HL. The SAHLPA-23 shows adequate reliability (Cronbach's $\alpha > 0.7$) [10]. This self-administered tool is a valid construct instrument that consists of 23 questions that take less than 15 minutes to be completed[10]. All the correct responses score 1 point and all other responses score 0 points. Participants scoring ≤ 19 (80%) can be categorized as having inadequate HL. On the other hand, participants scoring > 19 (80%) can be categorized as having adequate HL[11].

HRQoL

HRQoL was measured by using Short Form 36 Items Health Survey (SF-36v2) developed by Ferreira in 2000[12]. This is a general assessment of the HRQoL from the patient's perspective. The survey is administered as a questionnaire and can be self-administered or completed through an interview. The SF-36v2 addresses eight domains which are physical functioning, role-physical, bodily pain, general health perceptions, vitality, social functioning, role emotional and mental health[13]. It takes 10 minutes for the participants to answer all the questions. The validity test conducted by Ferreira[14] obtained Cronbach's alpha 0.60 (social function), 0.87 (physical function and general health) Reproducibility (1 week): r between 0.45 (pain) and 0.79 (physical performance) and alpha coefficient of division into half between 0.45 (mental health and general health) and 0.84 (pain).

Statistical Analysis

Descriptive analyses were performed by considering absolute and relative frequencies (%) for categorical variables and mean with their standard deviation for numerical variables. Confidence intervals of 95% (95%CI) were also estimated. Health literacy, socio-demographic variables, support system and clinical variables were treated as dichotomous variable to evaluate their association by utilizing Fisher's exact test due to the small sample size. HRQoL variable has two main components which are Physical Component Score (PCS) and Mental Component Score (MCS). Both variables were treated as continuous variables. The normality test was performed before doing the bivariate analysis. Independent sample t-test and ANOVA were performed to determine the association between socio-demographic, support system and clinical variables with PCS and MCS of HRQoL as a dependent variable.

Multiple linear regression was used to evaluate the association between HL (as a dichotomous variable) and HRQoL (as a continuous variable). A p-value < 0.05 was used as an indicator of statistical significance. In this multivariate analysis, the sociodemographic, support system and clinical variables were treated as possible confounders and included in the first model using a forward selection process. In the second model of regression, the HL variable was included. Furthermore, because of the small sample size, the determinant coefficient (adjusted R square) was used to determine the significant effect of the HL variable toward HRQoL by determining the significant predictors. Collected data were analyzed using the Statistical Package for the Social Sciences (SPSS), for Windows Version 25 (IBM SPSS Corp, 2012).

Results

A total of 28 patients with CVD from the Cardiology unit were included in this study. The mean age of the participants was 61.4 ± 14.7 years, mostly male 22(78.6%), married 21(75.0%), with primary educational level 14(50.0%), retired 17(60.7%) and living with a spouse 14(50.0%) as presented in Table 1.

The majority of the participants had been admitted with MI 17(60.7%) and more than half of those who were diagnosed with MI underwent revascularization procedure 9(32.1%). Two-thirds of the participants reported having a family history of CVD 21(75%) and hypertension was the common family history of CVD 16(57.1%). Most of the participants had been hospitalized for the first time because of CVD 18(64.3%) and almost one-third of participants had comorbidity 8(28.6%). Moreover, all of the participants reported physical health problems and the most common physical complaint reported was chest pain 23(82.1%). The mean heart rate, BP systolic and BP diastolic of the participants were 67.75 ± 8.9 points, 125.43 ± 18.4 points, and 68.04 ± 9.5 points, respectively.

Table 1 Participants Characteristics

Variables	N	%
Age	Mean 61.4±14.7years	
<45 years old	4	(14.3)
46-65 years old	9	(32.1)
66-85 years old	14	(50.0)
>86 years old	1	(3.60)
Gender		
Male	22	(78.6)
Female	6	(21.4)
Marital status		
Married	21	(75.0)
Single	3	(10.7)
Widow	1	(3.6)
Divorced	3	(10.7)
Educational level		
Primary education	14	(50.0)
Secondary education	11	(39.3)
Higher education/university	3	(10.7)
Employment status		
Active worker	10	(35.7)
Retired	17	(60.7)
Unemployed	1	(3.6)
Living arrangement		
Alone	6	(21.4)
With spouse	14	(50.0)
With spouse and children	7	(25.0)
With other families	1	(3.6)
Medical Diagnosis		
Arrhythmia	1	(3.6)

Myocardial Infarction	17	(60.7)
Revascularization	9	(32.1)
No-revascularization	8	(28.6)
NSTEMI	3	(10.7)
STEMI	1	(3.6)
Unstable angina	4	(14.3)
Pacemaker Implantation	1	(3.6)
Prosthetic Aortic valve	1	(3.6)
Family history of CVD		
Yes	21	(75.0)
Hypertension	16	(57.1) *
Dyslipidemia	9	(32.1) *
DM	4	(14.3) *
Ischemic Heart Disease	7	(25.0) *
Obesity	3	(10.7) *
No	7	(25.0)
Presence of comorbidity		
Yes	8	(28.6)
No	20	(71.4)
Admission history		
First admission	18	(64.3)
Readmission	10	(35.7)
Physical complaint		
Chest pain	23	(82.1) **
Dyspnea	5	(17.9) **
Local pain	2	(7.1) **
Lower limb oedema	1	(3.6) **
Tachycardia or bradycardia	1	(3.6) **
Feeling dizziness, vertigo, fainting	2	(7.1) **

Heart Rate (HR)	67.75±8.9
BP Systolic	125.43±18.4
BP Diastolic	68.04±9.5

One patient can have more than one history of CVD in the family*

One patient can have more than one physical complaint**

Bivariate Analyses of Factors Associated Health Literacy

Table 2 presents the distribution of HL according to socio-demographic and clinical variables. Health literacy showed a mean of 11.2±7.5 points, with more than three-fourths of participants categorized as inadequate HL 25(89.3%). Based on the bivariate analyses indicated that the educational level was the only variable that was significantly associated with HL (p=0.023).

Table 2 Bivariate Analyses of Factors Associated Health Literacy

Variables	Health Literacy			
	Adequate HL		Inadequate HL	
Socio-demographic	n	%	n	%
Gender	p=1.000			
Male	3	(10.7)	19	(67.9)
Female	0	(0)	6	(21.4)
Age group	p=0.560			
< mean (61 years old)	2	(7.1)	10	(35.7)
≥ mean (61 years old)	1	(3.6)	15	(53.6)
Marital Status	p=1.000			
Unmarried	1	(3.6)	6	(22.2)
Married	2	(7.4)	19	(67.9)
Living arrangement	p=0.530			
Alone	1	(3.6)	5	(17.9)
With family	2	(7.1)	20	(71.4)
Educational level	p=0.023			
≤12 years	1	(3.6)	24	(85.7)
>12 years	2	(7.1)	1	(3.6)
Employment Status	p=0.284			
Unemployed	1	(3.6)	17	(60.7)
Employed	2	(7.1)	8	(28.6)
Support System to obtain health information				
Family	p=1.000			
Yes	2	(7.1)	19	(67.9)
No	1	(3.6)	6	(21.4)
Peer	p=0.551			
Yes	3	(10.7)	18	(64.3)
No	0	(0.0)	7	(25)
Environmental	p=0.536			

Yes	3	(10.7)	17	(60.7)
No	0	(0.0)	8	(28.6)
Source of Health Information	p=1.000			
Other	1	(3.6)	11	(39.3)
Ask health professionals	2	(7.1)	14	(50)
Clinical Variables				
Family History of CVD	p=0.145			
Yes	1	(3.6)	20	(71.4)
No	2	(7.1)	5	(17.9)
Presence of comorbidities	p=0.536			
Yes	0	(0.0)	8	(28.6)
No	3	(10.7)	17	(60.7)
Admission History	p=1.000			
First Hospitalization	2	(7.1)	16	(57.1)
Rehospitalization	1	(3.6)	9	(32.1)
Physical complaint	p=1.000			
<2	1	(3.6)	12	(42.9)
≥2	2	(7.1)	13	(46.4)

Bivariate Analyses of Factors Associated HRQoL

The mean score of the PCS of HRQoL was lower (38.77 ± 9.9 points) than the MCS (44.13 ± 9.8 points). The acceptable point of the HRQoL is 50, which means that most of the participants had poor HRQoL. Table 3 shows the means of both scores of HRQoL according to the sociodemographic and clinical variables. The PCS was lower in the group of participants with primary educational level ($p=0.007$), unemployed ($p=0.017$), had a family history of CVD ($p=0.018$) and had been rehospitalized because of CVD also was found significantly associated with the PCS ($p=0.045$). In contrast, none of the socio-demographic or clinical variables was associated with the MCS.

Table 3 Bivariate Analyses of Factors Associated HRQoL

Variables	Physical component		Mental component	
	Mean	(95%CI)	Mean	(95%CI)
Socio-demographic				
Gender	p=0.584*		p=0.530*	
Male	38.22	-12.02-6.90	43.51	-12.31-6.49
Female	40.78	-10.26-5.15	46.42	-11.47-5.65
Age group	p=0.098**		p=0.114**	
<45 years old	49.41	37.34-61.49	48.61	38.30-58.91
46-65 years old	37.65	29.21-46.09	46.71	40.58-52.84
66-85 years old	36.06	31.27-40.85	40.18	34.18-46.18
>86 years old	44.19	-	58.38	-
Marital Status	p=0.992*		p=0.742*	
Unmarried	38.74	-9.07-8.97	43.04	-10.40-7.50
Married	38.78	-10.38-10.29	44.49	-13.78-10.87
Living arrangement	p=0.838*		p=0.733*	
Alone	38.02	-10.46-8.56	42.89	-11.03-7.86
With family	38.97	-13.19-11.29	44.47	-16.65-13.48
Educational level	p=0.007**		p=0.066**	
Primary	33.47	28.33-38.60	41.33	34.94-47.71
Secondary	42.84	37.92-47.75	44.57	39.86-49.27
Higher education	48.59	23.75-73.43	55.63	49.80-61.45
Employment Status	p=0.017*		p=0.211*	
Unemployed	35.54	-16.33- (-1.75)	42.38	-12.77-2.96
Employed	44.58	-16.21-(-1.88)	47.29	-12.12-2.31
Support System to obtain health information				
Family	p=0.707*		p=0.952*	
Yes	39.19	-11.91-8.59	44.07	-12.49-13.02
No	37.52	-10.66-7.33	44.33	-8.71-9.23
Peer	p=0.261*		p=0.730*	

Yes	39.99	-12.37-2.54	4.64	-10.78-14.70
No	35.08	-13.71-3.89	45.60	-6.98-10.90
Environmental	p=0.190*		p=0.546*	
Yes	40.34	-12.18-1.22	4.89	-13.84-8.76
No	34.86	-13.84-2.88	42.32	-11.08-5.99
Source of Health Information	p=0.937**		p=0.496**	
Printed media	38.56	29.59-47.54	39.07	29.74-48.39
Internet	37.75	26.91-48.58	43.62	37.72-49-51
Ask health professionals	39.33	34.94-42.59	45.66	39.49-51.82
Clinical Variables				
Family History of CVD	p=0.018*		p=0.118*	
Yes	36.29	1.28-18.54	42.45	-1.98-15.43
No	46.20	1.82-17.99	49.17	-1.83-15.27
Presence of comorbidities	p=0.205*		p=0.421*	
Yes	34.98	-5.02-15.62	41.72	-5.12-11.88
No	40.28	-3.08-13.68	45.09	-5.11-11.87
Admission History	p=0.045*		p=0.135*	
First Hospitalization	41.52	0.18-15.25	46.21	-1.94-13.58
Rehospitalization	33.81	-0,98-16.40	40.39	-3.25-14.88
Number of physical complaints	p=0.124*		p=0.438*	
<2	41.87	-1.69-13.26	42.55	-10.65-4.75
≥2	36.08	-1.74-13.31	45.50	-10.52-4.62

Independent t-test*

One way ANOVA**

Linear Regression Analyses of Predictors of HL and HRQoL

The result revealed that HL was the best predictor of PCS ($\beta=0.518$) and the admission history because of CVD was the second-best predictor of PCS ($\beta=-0.373$). The result indicated that having adequate HL were more likely to have higher of PCS (unstandardized β 16.238) and those patients who had less

number of readmission because of CVD were more likely to have higher PCS which means more likely to have better PCS of HRQoL (unstandardized β -7.534).

Table 4 Regression Analyses

Variable	Unstandardized β	Standardized β	t	p	Model Statistic
Physical Component Score (PCS)					
Model 1 Health literacy	16.439	0.525	3.144	0.004	Model F=9.882, adjusted R^2 =0.248, p=0,004
Model 2 Health literacy	16.238	0.518	3.386	0.002	Model F=8.837, adjusted R^2 =0.367, p=0.022
Admission history because of CVD	-7534	-.373	-2.433	0.022	

From table 4, the model 1 shows that 24.8% of the variance in the average of the PCS is explained by the effect of the HL variable (adjusted R^2 =0.0248, p=0.004). When the variable of admission history was incorporated in the regression model, the adjusted R^2 increased by 11.9%. According to model 2, 36.7% of the variance in the average of PCS among patients with CVD is explained by the combined effect of two predictors which were HL and the variable of admission history because of CVD (adjusted R^2 =0.367, p=0.022).

Discussion

In this study, we have identified the predictors for health literacy, HRQoL and the association between these two variables. The findings of our present study found that the majority of the study participants had inadequate health literacy. Our result is in line with one study conducted by Sorensen, et al[15] which investigated health literacy in Europe by comparing results among eight European countries. From the study conducted by Sorensen, et al, even though the mean of health literacy scores varied between countries, it mentioned that there were a specific group of people who were vulnerable to have limited health literacy. This vulnerable group can be found among people with poor health status, high use of health care services, low socio-economic position, lower education and older age. Comparing to the characteristics of this present study participants, most of those participants who had inadequate health literacy were at an older group of age, had attended lower education and had poor health status because of CVD.

In this present study, the mean of HL was 11.2 ± 7.5 , which represented a lower HL than one study conducted by Pires, et al[10] which scored 18.3 ± 3.8 by recruiting participants from the Lisbon, Tagus

Valley and Central Portugal regions in 2014. There is around 7 points gap between these two studies, one possible reason for this condition could be due to the different types of sample characteristics between these two studies. In our study, the patients who had been admitted in the cardiology unit were mostly at the age of 66-85 years, unemployed, and had attended primary school whereas the study conducted by Pires, et al[10] employed general population of Portuguese citizen out of which most of the participants were young people at the age of 18-30 years old, employed and had attended secondary school and higher education. This is due to the fact that the level of HL tends to be lower with the advancement of age and the lower level of education[16].

Another aim of this study was to identify the level of HRQoL among patients with CVD. Our result indicated that the study participants had poor HRQoL in the physical component than the mental component of HRQoL. A similar result was also shown in a previous study conducted in Denmark[17] which employed patients in cardiac rehabilitation. With regard to the dimension of QoL, the vitality dimension was identified as a dimension with the lowest score. These results were consistent with one study conducted by Kucharsska-Newton, et al[18] which had investigated the pattern of change in functional status among patients with CVD. The study found that a decline in functional status was observed on average 2 years prior to a myocardial infarction hospitalization and on average 3 years prior to stroke or heart failure hospitalization. According to our findings, most probably the functional status had declined due to the nature of diseases which was evidenced by the low score of the physical component with the vitality dimension scored the lowest. In addition, one possible reason why the mental component scored higher than the physical component could be due to the high score of the social functioning dimension. Our findings revealed that social functioning was identified as the dimension of HRQoL with the highest score. The social functioning dimension is related to the ability of the participants to interact with other people in their environment. A study conducted by Harandi, et al[19] found that social support had a moderate effect size on mental health. Thus, it can be concluded that positive social communication with family members and friends reduces anxiety and develops the feeling of security. People with more positive social relations and higher social support enjoy more efficient communication skills, which directs them away from depression and other mental problems.

The contribution of health literacy to improve the HRQoL has been widely investigated in recent studies [17, 20-23]. Our study indicated that health literacy was statistically significant and was the best predictor of the physical component of HRQoL even though it was not associated with the mental component of QoL. Our findings demonstrated a correlation between HL and HRQoL among patients with CVD, as seen in several previous studies [17, 21, 22, 24, 25].

The situational determinants such as family support, peer support, environment and media use were also investigated as independent variables that become the strength of this study. However, it is also important to acknowledge the limitations of the study. Due to the difficult situation of pandemic COVID-19 in this region and hospitalit was very difficult to collect enough sample size as we expected. Therefore, only a small sample size could be collected. However, this study still could be the baseline for future research with larger sample size.

Conclusion

Poor health literacy was associated with poor HRQoL of adult patients with CVD. The results indicated that improving health literacy levels for adults with CVD could be beneficial particularly to improve HRQoL.

Declarations

Acknowledgement

Thank all participants recruited in this study and all the nurses who helped to gather data of this study.

Author contribution

WW, JA, and MJE designed and implemented the entire study.

Funding

No funds, grants, or other support was received.

Conflict of Interest

The authors declare that they have no conflicts of interest.

Ethical approval

This study was approved by the Medical Ethics Committee of Tagus Valley Regional Health Hospital.

Informed consent

Prior to do the survey, we introduced the purpose and content of the research to all participants and they all signed a written informed consent form.

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