Functional, Communicative and Critical Health Literacy Among Patient with Diabetes Type2 Referred to The Diabetes Clinic

ABSTRACT

Background and Objective: Diabetes is a chronic disease that can cause acute and debilitating complications such as cardiovascular disease, blindness, and kidney failure. Inadequate self-care and health literacy are major barriers to diabetes management and affect patients' participation in self-care activities. This study aims to evaluate the patient's health literacy status with type 2 diabetes in three areas of function, communication, and criticism and to determine the relationship between these factors and self-care behaviors in patients with diabetes.

Materials and Methods: A cross-sectional study was conducted on 118 diabetic patients referred to diabetes clinic 2019 through a regular random sampling approach. The level of health literacy and its subscales in patients was assessed by a Functional, Communicative, and Critical Health Literacy standard questionnaire. In order to analyze the data, descriptive statistics including mean, standard deviation, and frequency and analytical statistics such as independent t-test and one-way analysis of variance, Chi-square test, and multivariate linear regression were performed by SPSS software version 16.

Results: the mean score for total health literacy was 25.51±5.7, which is rated as average. The results showed a significant relationship between functional health literacy and communication health literacy (r = -0.481), communicative and critical health literacy (r = 0.726), and between functional and critical health literacy (r = -0.426). Total health literacy had a statistically significant relationship with functional health literacy (r = 0.456), communication (r = 0.496), and critical health literacy (r = 0.534).

Conclusions: Considering that communication, critical and functional health literacy is related to total health literacy and preventive behaviors in diabetic patients, treatment seems necessary.

Paper Type: Research Article

Keywords: health literacy, diabetes type2, Chronic illness

▶ **Citation:** Masoudiyekta L, Musavi Ghahfarokhi M, Maqsoodi F. Functional, Communicative and Critical Health Literacy Among Patient with Diabetes Type2 Referred to The Diabetes Clinic. *Journal of Health Literacy*. Autumn 2021; 6(3): 55-63.

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Received: 06 June 2021
Accepted: 20 September 2021
Doi: 10.22038/jhl.2021.60178.1201

Introduction

health literacy including a set of skills includs reading, listening, analysis, decision, and application of these skills in health-related situations. An Individual's capacity is considered as a basic constituent of health literacy and is influenced by different factors including culture, language, and properties of health-related situations which are adjusted through education (1). In recent decades, increased attention toward health literacy has been accompanied by an increased emphasis on individual responsibility for health promotion and maintenance as well as self-management of chronic illnesses. Efficient personal care and follow-up is particularly important to control diabetes (2). According to estimations made by the World Health Organization (WHO), the prevalence of type 2 Diabetes in Iran is about %6.8 (3). Health-related information is considered as a significant aid for patients for proper understanding and cooperation in health-related situations. Nowadays, health-related information has been made more accessible upon the expansion and availability of the internet. Thus, patients' skills in understanding and using health-related information may play a significant role in their health-related behavior. These skills have been recently conceptualized as health literacy (4). WHO defines health literacy as the social and cognitive skills, which are necessary for individuals' motivation and potential in acquisition, understanding, and proper use of information for health extension and maintenance (5). Nutbeam offered a model of health pattern in three levels including functional literacy, which is the most basic level, entailing reading and writing skills that allow the person to efficiently operate in daily life situations. The second category is communicational literacy including advanced skills to extract health information from different situations and apply them. Critical literacy is a more advanced skill which is applicable for critical analysis of information and their use for exerting higher control in different life situations and events (1).

Diabetes is a chronic disease that can cause acute and debilitating complications such as cardiovascular disease, blindness, and kidney failure (6). The literature on diabetes reports that patients with low levels of functional literacy possess to show weak and limited knowledge about their disease (7). The result of some studies has shown that a low level of health literacy affects impressive changes in patients' behaviors and result in unpleasant consequences. The results of these studies indicate that patients with inadequate health literacy have weaker health status and more hospitalization (6, 8). Also, the mortality rate is almost double among them. These patients are less likely to follow preventive care and they don't benefit equally from health services in comparison with other people (9).

In Souza's study, conducted on a patient population with low levels of functional literacy, higher diabetes side effects have been illustrated. Also, these patients didn't perform well in communicating with their doctors (10). The relationship between patient and doctor follows self-managerial behavior and is accompanied by the results obtained from diabetic care. Besides, the trusting relationship between patient and doctor leaves a potentially beneficial impact on self-efficiency, adherence, and diabetic consequences (11). Ishikawa, Takeuchi & Yano (2008), developed a scale for assessing three levels of health literacy among patients in a specialist clinic inside an educational hospital (12). High level of health literacy is essential in Iran due to the high incidence and high prevalence of diabetes

in Iran and significant effect of health literacy and its dimensions on promoting preventive behaviors, self-care abilities, and successful treatment decisions among diabetic patients.

Having a sufficient degree of health literacy is different among individuals based on an individual's social and living environment such as health-care service providers, health-care systems, media, and society. In this study, an instrument has been developed based on psychoanalysis for measuring functional, communicative, and critical aspects of health literacy among type 2 diabetes patients referring to a diabetes clinic.

Material and Methods

Study design and data collection procedure

The present study is a cross-sectional study that applies descriptive statistics and analytics to study the functional, communicative, and critical health literacy among type 2 diabetes patients referring to diabetes clinic located inside Dezful Medical University's affiliate hospital from October 2019 to December, 2019. Before starting to gather the required data, ethical code and recommendation letters have been asked from the Ethics committee of Dezful Medical University and further coordination has been made with the hospital's nursing manager and clinic's chairman after offering the necessary certificates. The sampling method was regular random sampling which has been conducted among a population of type 2 diabetes patients. The criteria for entering the study included 1) being diagnosed with type 2 diabetes, approved by the specialist doctor of this center; 2) being diagnosed with diabetes for more than one year; 3) older than 25 years; 4) having favorable physical conditions for answering study questions; and 4) lack of any mental or cognitive disease. The exclusion criteria included: 1) lack of inclination to cooperate; 2) deficient questionnaires; 3) acute disease and being hospitalized during the study, 4) having diabetes files in diabetic clinic center, and 5) being diagnosed with type 1 diabetes.

The sample was equal 154 and it was estimated using following formula:

Sample size= .

The sample in this study has been selected using the regular random sampling approach (13). For ethical considerations, participants have voluntarily entered the study and those who were not willing to take part in this study were excluded; therefore, the final sample was with 118 patients in this study.

Instruments and measures

For sampling, two researcher colleagues explained the study's objectives and questionnaire after paying a visit to the clinic and all the study participants received voluntary cooperation form. Then, the survey questionnaires have been completed and the data have been gathered through individual interviews and using patient files.

Data collection instruments included Functional, Communicative, and Critical Health Literacy (FCCHL) standard questionnaire, researcher-made demographic survey, and clinical information. A Dutch translation of FCCHL was conducted by Ishikawa (12), and it was used to assess health literacy skills. The response options of the item for communicative and critical health in the adapted version are no longer based on the occurrence of behavior ("never" to "often") but on experienced difficulty in performing health literacy behavior ("easy" to "rather difficult"). The FCCHL-Dutch consists of 14 statements with 4 points Likert scales (1–4). The statements ask how often (never to often) patients have trouble with reading or

understanding leaflets from healthcare providers/hospital or pharmacy (functional health literacy; 5 items), have difficulty (easy to rather difficult) performing certain actions in relation to health information (communicative (5 items) and critical (4 items) health literacy. Mean scale scores were obtained by summing (reversed) item scores and dividing them by the total number of items, resulting in a score ranging from 1 (low health literacy) to 4 (high health literacy). Patients had to fill in at least 4 items of the functional and communicative health literacy scales and 3 items of the critical health literacy scale to get a scale score. Two translation and re-translation instruments have been used to evaluate the content validity of the instrument and they have been evaluated by 10 experts. Then, the modifications have been applied, and finally, all questionnaire items gained a score from 0.8 to 1 in three main fields of clarity, relation, and simplicity. Internal consistency has been used to define the reliability of the study instruments. To this end, two questionnaires have been filled in by 30 of the study participants, and Cronbach's alpha has been used to study the internal consistency of the instruments. Cronbach's alpha values for the FCCHL questionnaire based on a whole and three subscales of functional, communicative, and critical were 0.80, 0.91, 0.82, and 0.78, respectively. It confirms the internal consistency of the study instrument.

Data analysis

For data analysis, descriptive statistics including mean, standard deviation, and frequency distribution tables have been used. Besides, inferential statistics such as independent t-test, one-way ANOVA, Chi-two test, and multivariate linear regression in SPSS software (version 19) have been used. The significance level has been considered less than 0.05.

Ethical issues

This study was approved by the Ethics Committee affiliated to Dezful of Medical Sciences University (Ethics Code: IR.DUMS.REC 1396. 7). In this study, researchers were committed to ethical issues of obtaining informed consent from the participants, respect for voluntary participation and inform the participants about the purpose of the study.

Result

In this descriptive-analytical study, 118 patient with type-2 diabetes participated who referring to the diabetes clinic in Ganjouyan hospital, Dezful . The participants were 36-84 years old and their mean age was 59.619.51. The average Glycated hemoglobin (HbA1C) was %7.221.72 Patients'' demographic information is included in Table 1.

Table1. demographic characteristics of study participants

variable		Mean± SD / frequency	%
Age		59.61±9.51	
Illness Duration (years)		8.6±28.87	
HbA1C		7.1±22.72	
Sex	female	67	56.8
	male	51	43.2
Marital status	married	116	98.3
	widow	2	1.7
Education	illiterate	21	17.8
	elementary	74	62.7
	Intermediate / high school	10	8.5
	Diploma	10	8.5
	College education	3	2.5
Complications of diabetes	Nephropathy	93	78.8
	Neuropathy	25	21.2
total		118	100

The results illustrated that all these three components of health literacy are in a normal distribution. The mean, minimum, and maximum health literacy scores of the participants were 25.515.7, 0.00, and 42, respectively. The mean health literacy score of the participants in three areas including functional, communicative, and critical were 5.62, 11.316.61, and 9.232.81, respectively. Among them, the functional aspect of health literacy gained the minimum score among all (Table 2).

Table 2; mean and standard deviation (SD) of patients' health literacy subscales including functional, communicative, and critical

Health Literacy	Mean± SD	Minimum	Maximum
Functional HL	5.2±6	0	15
Communicational HL	11.16± 3.61	0	15
Critical HL	9.32±2.81	0	12
Total HL	25.51±5.7	0	42

In terms of functional health literacy of %61.9 of the patients (n=73) were rated as weak, %5.1 (n=6) were rated as average, and %33.1 (n=39) were rated as good. Concerning the communicative subscale of health literacy, %2.5 of the patients (n=3) were rated weak, %16.1 (n=19) as average, and %81.94 (n=96) as good. Considering critical subscale of health literacy, %11.0 of patients (n=13) was rated as weak, %28.8 (n=34) as average, and %60.2 (n=71) as good. In terms of total health literacy, %0. 8 (n=1) were rated as weak, %78.8 (n=93) as average, and %20.3 (n=24) were rated as good (Table 3).

in this study, an independent T-test has been used to examine the correlation between mean health literacy scores in different subscales (i.e. functional, communicative, and critical) and their gender. The results of this test showed a significant

Table 3: Number of patients in each subscale of health literacy (functional, communicative, and critical)

Health Literacy	inadequate	marginal	Adequate
Functional HL	73 (61.9)	6 (5.1)	39 (33.1)
Communicational HL	3 (2.5)	19 (16.1)	96 (81.94)
Critical HL	13 (11)	34 (28.8)	71 (60.2)
Total HL	1 (0.8)	93 (78.8)	24 (20.3)

statistical correlation between functional and communicative subscales of health literacy and gender (p=0.02). The results of the ANOVA test showed that there was a significant correlation between degree with the mean score on three subscales of health literacy, i.e., functional, communicative, and critical (p0.001). However, no significant statistical correlation has been observed between mean health literacy scores in three subscales of functional communicative, critical and total health literacy with variables such as marital status and diabetes side effects (Table 4).

The results suggested that there's a significant correlation between functional and communicative health literacy (r=-0.481), communicative, critical health literacy (r=0.726), and functional and critical health literacy (r=-0.426). Moreover, there was a significant statistical correlation between total health literacy and its subscales, including functional (r=0.456), communicative (r=0.496), and critical (r=0.534). It is noteworthy that there's a significant statistical correlation between gender and subscales of health literacy including functional (r=0.181), communicative (r=0.37), and critical (r=0.255). However, there wasn't any significant statistical correlation between age and total health literacy. There wasn't any significant statistical correlation between health literacy and its subscales and duration of diabetes diagnosis, and Glycated hemoglobin (Table 5).

Table 4: univariate analysis of the correlation between study variables with functional HL, communicative HL, critical HL, total HL

variable Mean± SD		Functional HL		Communicational HL		Critical HL		Total HL	
		P-Value	Mean± SD	P-Value	Mean± SD	P-Value	Mean± SD	P-Value	
gender	female	3.29 (4.77)	0.002*	10.28(4.14)	0.002*	9.92(3.96)	0.184*	25.54(5.58)	0.637*
	male	6.65 (6.45)		12.33(2.32)		9.16(3.96)		26.10(6.80)	
Marital status	married	5.20(6.02)	0.962	11.20(3.62)	0.394	9.50(3.31)	0.67	25.92(6.31)	0.448
	widow	5(7.07)		9(1.41)		8.5(2.12)		22.5(3.53)	
education	illiterate	14(4.53)	<0.001	6.38(3.00)	<0.001	1.82(5.33)	<0.001	25.71(6.17)	0.001
	elementary	2.54(3.52)		11.91(2.98)		10.20(3.10)		24.62(5.76)	
	Intermediate / high school	2.4(2.95)		13.30(2.16)		11.40(1.34)		27.10(4.90)	
	Diploma	7.8(5.84)		12.70(1.82)		10.30(1.56)		30.80(6.08)	
	College education	10(8.66)		14(1.73)		12(0)		36(10.39)	
Complications of diabetes	Nephropathy	4.94(6.00)	3.72	11.45(3.52)	0.102	9.70(3.29)	0.167	26.10(5.93)	0.42
	Neuropathy	6.16(6.03)		10.12(3.82)		8.68(3.24)		24.96(7.53)	

Table 5: correlation between functional HL, communicative HL, critical HL, total HL, and duration of diabetes, glycated hemoglobin, and age

	Age	Functional HL	Communicational HL	Critical HL	Total HL	duration	HbA1C
Age	1	r= 0.181	r= -0.37	r=0.255	r=-0.173	r=0.293	r=-0.063
		P= 0.05	P<0.001	P=0.005	P=0.061	P=0.001	P=0.5
Functional HL	r= 0.181	1	r= -0.481	r=- 0.426	r=- 0.456	r= 0.172	r= -0.08
	P= 0.05		P<0.001	P<0.001	P<0.001	P= 0.062	P= 0.39
Communicational HL	r= -0.37	r= -0.481	1	r= 0.726	r= 0.496	r= -0.324	r= -0.051
	P<0.001	P<0.001		P<0.001	P<0.001	P<0.001	P=0.581
Critical HL	r= 0.255	r= -0.426	r= 0.726	1	r= 0.534	r= -0.313	r= 0.073
	P=0.005	P<0.001	P<0.001		P<0.001	P=0.001	P=0.434
Total HL	r= -0.173	r= 0.456	r= 0.496	r= 0.534	1	r= -0.186	r= -0.009
	P=0.061	P<0.001	P<0.001	P<0.001		P=0.044	P=0.927
Duration of diabetes	r= 0.293	r= 0172	r= -0.324	r= -0.313	r= -0.186	1	r= -0.055
	P=0.001	P=0.062	P<0.001	P=0.001	P=0.044		P=0.555
HbA1C	r= -0.063	r= -0.186	r= -0.186	r= -0.186	r= -0.186	r= -0.186	1
	P=0.5	P=0.044	P=0.044	P=0.044	P=0.044	P=0.044	

Discussion

According to the study results, the mean score for total health literacy was 25.86 which is rated as average and was similar to the results obtained by Yarmohammadi (2019) who rates type 2 diabetes patients' health literacy as average (13). In Jandrof et al. (2019), most of the patients diagnosed with chronic retinal disease, especially, diagnosed with diabetic macular edema had either insufficient or problematic health literacy. Factors influencing this weak and insufficient health literacy in this group of retinopathy patients included factors such as poor eyesight, low income, and low

socioeconomic status in Denmark (14). Stellefron et al. (2018) reported an average electronic health literacy score for those diagnosed with Chronic Obstructive Pulmonary Disease (COPD) (15). On the contrary, Hejimans et al. (2015) found that the average health literacy score of chronic patients was quite well (16).

Similarly, we studied different dimensions of health literacy. Communicative health literacy among type 2 diabetes patients gained the highest mean score and functional health literacy gained the lowest score among all other health literacy subscales. In Hejimans et al. (2015) functional subscale of health literacy gained the highest score among patients diagnosed with chronic disease (16). A higher score for the functional subscale of health literacy in the pervious study may be related to a longer duration of chronic disease among the patients and higher experience with health literacy information. According to our study, most of the type 2 diabetes patients had a low degree which may justify their lower functional health literacy; while their communicative health literacy was higher. The communicative subscale of health literacy attempts to clarify patients'' understanding and transfer of disease-related information with other people. Thus, based on this definition, the patients included in this study possessed a higher level of communicative and social skills which require extracting information and discussing them together. The effective relationship between patient and doctor e.g. shared treatment decisions, requires sufficient levels of total and communicative health literacy (11).

It is noteworthy that according to the results of the present study, there is a significant correlation between total health literacy and its subscales, i.e. functional, communicative, and critical. Furthermore, all health literacy subscales are positively correlated. This positive correlation illustrates that individuals with higher levels of health literacy were empowered with higher skills from the functional subscale of health literacy including information and knowledge of the disease, skills included within communicative subscales such as information extraction and problem-solving skills. Saeed et al (2017), have shown that patients with poor communicate with their healthcare providers show the low level of optimal self-monitoring and interpretation of information (8).

Besides, our study found that there is a statistically significant correlation between study variables such as degree, duration of diabetes diagnosis, and total health literacy score and its three subscales (i.e. functional, communicative, and critical). Therefore, those with higher degrees, lower age, and more years of diabetes diagnosis gained a higher score on the health literacy scale. Similarly, Hejimans et al. (2015) found that subjects with higher age, lower degree, gained lower scores on heath literacy subscales (i.e. functional, communicative, and critical). That's because these people are less equipped to make decisions for their daily life, self-protection, and control on health and disease (16). The results of Khoie, Jafari, and Alipour (2018) which sought to define the health literacy level of those referring to addiction treatment centers in Qom city and its correlation with demographic variables, showed that there was a significant negative correlation between health literacy, higher age, and lower degree (17). Other results obtained in this study illustrated that two subscales of health literacy, i.e. functional and communication were significantly correlated with the individual's gender. Specifically, the mean score on these subscales was higher for male subjects compared with female subjects. Higher health literacy among male participants in two functional and communicative dimensions may relate to the higher education degree

of male participants compared with female participants. Accordingly, Ansari et al. (2020) found that type 2 male diabetes patients referring to diabetes clinics gained significantly higher scores in health literacy compared with their female counterparts (7). Kamalipour et al. (2019) found higher health literacy levels among female participants compared with male participants; however, these results may be related to a higher degree of female participants compared with their male counterparts in this specific study (18). Moreover, in Ansari et al. (2020), married people had a significantly lower health literacy compared with single individuals. Lack of family-related responsibilities, higher time available for learning from different information resources, updating this information, and disease follow-up has been mentioned as the main results for higher health literacy among single subjects in these studies (7). That's while Marzangi et al. (2018) showed a higher level of health literacy among married subjects compare with single subjects among those diagnosed with heart disease; however, marriage wasn't the only factor influencing increased or decreased health literacy (19).

Part of our study's results showed that there wasn't any significant correlation between study variables, i.e., glycosylated hemoglobin, duration of diabetes diagnosis, and diabetes complications with health literacy and its subscales. On the contrary, Olesen et al. (2017) found a significant statistical correlation between glycosylated hemoglobin and health literacy among type 1 diabetes patients (20). Regarding these issues in our study, low sample size, different culture, applying medical documentation instead of direct physical examination can be affected.

Limitation: Among the limitations of this study, we can refer to a small sample that was compatible with our inclusion criteria. Besides, neuropathy and nephropathy have been studied based on the patient's file and test results, or documented examinations recorded in his/her medical file. Moreover, health literacy has been examined through patients' self-report questionnaires instead of using objective scales. Moreover, the use of objective approaches for assessing an individual's communicative subscale of health literacy is more preferred and it is better to assess it in terms of a long-term relationship between patient and doctor in health care centers. In future studies, it is suggested to use the effect of other variables and causal relationships between them and health literacy. And introduce effective solutions to increase health literacy and its dimensions.

Conclusion: According to the results obtained in this study, %78.8 of type 2 diabetes patients had average health. Besides, most of the patients performed low in the functional domain. Accordingly, it is better to study the health literacy of diabetes patients by relevant health care practitioners and to discover patients'' weaknesses in each of the subscales of health literacy and promoting them through teaching methods compatible with variables influencing individual's health literacy. Diabetes clinics and associations are considered as good opportunities for the promotion of health literacy and all its subscales.

Conflict of Interest: The authors declare that they have no conflict of interest

Funding: There is not any funding

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