

Evaluation of Health Literacy of Type 2 Diabetic Patients Referred to Diabetes Clinic of Arak City and Related Demographic Factors

ABSTRACT

Background and Objective: Type 2 diabetes is a non-communicable disease with silent epidemics and a growing health problem. Due to the role of health literacy in control of diabetes, in this study, the level of health literacy and its relationship with demographic factors will be examined in Emam Reza Clinic of Arak.

Materials and Methods: In this descriptive-analytical cross-sectional study, 201 diabetic patients who had referred to the diabetes clinic of Imam Reza Clinic in Arak in 1398 were entered in the study by available sampling method. The Health Literacy Questionnaire (HELIA) was completed by the physician in an interview with patients. data was entered into statistical software spss23 and analyzed with statistical tests (Mann–Whitney Test, and Kruskal–Wallis).

Results: The Means age of patients was 57.37 ± 12.93 years. Most patients (62.7%) were women. The average total health literacy was 55.20 ± 22.14 . The highest literacy level was in the accessibility dimension 60.03 ± 32.73 (and the lowest in the reading dimension 46.45 ± 21.73). Health literacy was lower in the elderly and higher in men and people living in the city ($p = 0.0001$). Health literacy also increases with education and it is higher in Employees and students ($p = 0.0001$).

Conclusion: According to the results of study, the level of health literacy in diabetic patients is low and it is related with age, gender, education, occupation and place of residence of diabetic patients. promoting health literacy of patients, it is necessary to help control of diabetes and prevent its chronic complications.

Paper Type: Research Article

Keywords: “type 2 diabetes mellitus”, “Health Literacy”, “Demographic factors”

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Introduction

Diabetes is the most common chronic metabolic disease in the world, which its prevalence is increasing with regard to lifestyle change (1). The World Health Organization has declared it as a latent epidemic due to the increasing trend of the disease in the world (1-3). According to estimates conducted, the number of diabetic patients in Iran will reach 5981000 by 2030 and every year 155 thousand new cases is added to the statistics of diabetic patients. Of the effective factors in the prevention and control of this disease is having sufficient knowledge about the disease and applying this knowledge. The concept of health literacy is now raised as a global issue and discussion. Due to the role of health literacy in how the people make decisions in health-related fields is considered as an important tool to promote community health (3-6). There are many reasons indicating that many of the health-related unpleasant consequences are due to inadequate health literacy (4-6).

Health literacy is the amount of a person's capacity to acquire, understand and interpret information, access health information, evaluate health information and services, and the ability to use and make the right decisions to improve her/his health. Health literacy involves a set of skills in reading, listening, analyzing, and the ability to apply these skills to make health-related decisions which does not necessarily depend on general reading ability of the person and is something beyond that.

Low level of health literacy is common in chronic patients such as diabetes and exposes these persons to the risks and complications of this disease (2). Low health literacy is accompanied with a variety of adverse health consequences and inappropriate use of health services, the need for more hospitalization and emergency services, lack of timely use of drugs,

disease progression, failure to visit a physician on time and not understanding the physician's recommendations and lack of understanding the health messages (7). These people have little knowledge about the condition of their disease and use less preventive services.

Patients with inadequate health literacy often do not have a correct and accurate understanding of what the doctor says (8). Improving the health literacy of diabetic patients contributes to a better understanding of information related to diet, insulin injection, and the control of blood sugar level; and leads to behavioral changes for the active participation of patients in the treatment of the disease (9). According to the results of the study of Khodabakhshi-Koolae et.al, whatever the level of health literacy of patients with type 2 diabetes is higher, their quality of life is higher (10).

Health literacy limitation is different in diabetic patients range from 7.3% in Switzerland to 82% in Taiwan. Health literacy in type 2 diabetic patients in different countries and in measurement with different measuring instruments is wide and different (11). Over the past few decades that the concept of health literacy has emerged, this question has been raised that how and in what ways health literacy can affect people's health (12).

The results of various studies have shown the relationship between demographic and socio-economic factors with health literacy (13-16). How demographic factors relate to the level of health literacy in different cities and populations with different ethnicity, culture and customs is sometimes different and in conflict with each other. The question is to what extent the level of health literacy in diabetic patients is affected by demographic variables. In this study, the level of health literacy in type 2 diabetic patients referred to Imam Reza Diabetes Clinic in Arak city and its relationship with

demographic variables was measured using the HELIA health literacy questionnaire.

Materials and methods

In this descriptive-analytical cross-sectional study, 201 diabetic patients were studied. The study population was type 2 diabetic patients referred to the diabetes clinic of Imam Reza hospital in Arak city in 1398. The HELIA health literacy questionnaire was completed by a physician through an interview with a patient. Health Literacy for Iranian Adults (HELIA) questionnaire which was made by Montazeri et.al in 2014 (5-6), has 33 5-choice questions (on the Likert scale: always, most of the time, sometimes, rarely, never) and examines people's health literacy in 5 dimensions (areas) of reading, access, understanding, evaluation, decision making and behavior. The score of this questionnaire is from zero (the worst) to 100 (the best). The validity of this scale is evaluated using heuristic factor analysis method and its reliability is evaluated by calculating the internal correlation coefficient. The Cronbach's alpha amount of the questionnaire was 0.72 - 0.89 and its reliability was estimated 0.77, which indicates that the validity and reliability of the instrument are desirable. The sample size was considered 200 according to the mean and standard deviation of health literacy in the population of Markazi province, which was reported 14.95 ± 68.33 in the study of health literacy measurement for Iranian adults. Patients' demographic information was collected using a researcher-made checklist. After completing the questionnaires and collecting data, they were entered into SPSS23 statistical software and analyzed using Mann-Whitney Test and Kruskal-Wallis test.

Result

The mean of patients' age was 12.93 ± 57.37 years. The mean duration of having diabetes in patients

was 7.28 ± 9.64 years (in the range of one month to 40 years). The mean and standard deviation of the number of visits to health centers in the year was 3.18 ± 5.43 times. In the study of diabetes complications, the most complications were related to ocular complications (18.4%) of 37 patients. Demographic characteristics of patients are presented in Table 1.

Table 1. Demographic characteristics of type 2 diabetic patients referred to Imam Reza Diabetes Clinic in Arak

N	%	Variable	Variable
75	37.3	Male	Gender
126	62.7	Female	
105	52.2	Primary	Level of Education
37	18.4	intermediate	
34	16.9	High school	
25	12.4	College education	
46	22.9	Employee	Job
2	1	Unemployed	
111	55.2	Housewife	
37	18.4	Retire	
5	2.5	Student	
8	4	Single	Marital status
183	91	Married	
10	5	divorced	living alone
15	7.5	Yes	
186	92.5	No	Place of residence
137	68.2	City	
41	20.4	Village	
23	11.4	Suburbs	Diabetes in first-degree relatives
117	58.2	Yes	
84	41.8	No	comorbidity
92	45.8	Yes	
109	54.2	No	Having a glucometer
156	77.6	Yes	
45	22.4	No	Ability to pay for treatment
41	20.4	Good	
107	53.2	Medium	
53	26.4	Weak	Access to health centers
53	26.4	Good	
123	61.2	Medium	
25	12.4	Weak	Family support
41	20.4	Good	
124	61.7	Medium	
36	17.9	Weak	

In expressing the ways of accessing health information, 191 patients (95% of patients) mentioned how to access health information through physicians and medical staff.

The mean total health literacy of patients out of 100 points was 55.20 with a standard deviation of 22.14. The highest level of literacy in the access dimension is 21.73 ± 60.03 and the lowest level in the reading dimension is 46.45 ± 73.32 . Totally, 66.2% of patients had limited

health literacy (insufficient and not enough). As shown in Table 2, the health literacy deficit score (mean health literacy score -100) in the reading dimension, 53.55 points, in the access dimension 39.97 points, in the understanding dimension, 40.75 points, in the evaluation dimension 45.81 points, in decision and behavior dimension 43.92 points and generally the health literacy deficit is 44.8 (55/20-100) points.

Table 2. Health literacy level of type 2 diabetic patients referred to Imam Reza Diabetes Clinic in Arak

Dimensions of Health Literacy	SD	Mean	Insufficient		Not Enough		Enough		Excellent	
			%	N	%	N	%	N	%	N
Reading skills	32.73	46.45	61.7	124	3.5	7	21.4	43	13.4	27
Access	21.73	60.03	41.3	83	17.4	35	28.4	57	12.9	26
Understanding	25.35	59.25	38.3	77	24.9	50	16.4	33	20.4	41
Assessment	24.8	54.19	52.2	105	12.4	25	22.9	46	12.4	25
Decision Making and Using health information	15.98	56.08	41.3	83	29.4	59	23.9	48	5.5	11
Total Health Literacy	22.14	55.20	43.8	88	22.4	45	21.4	43	12.4	25

The results of Kruskal-Wallis test show that the mean level of health literacy in the dimensions of reading, access, understanding, evaluation, and decision-behavior, and generally the overall health literacy score in different age groups are statistically significantly different from each other and has a statistically significant decrease

with increasing the age. As shown in Table 3, in the study of the mean total health literacy in different age groups, the highest level of health literacy is related to the age group under 45 years (16.31 ± 72.27) and the lowest level of health literacy is related to the age group over 60 years (22.3 ± 46.81).

Table 3. Comparison of health literacy levels in different age groups in type 2 diabetic patients referred to Imam Reza Diabetes Clinic in Arak

Dimensions of Health Literacy	45<		45-60		60>		P value
	SD	Mean	SD	Mean	SD	Mean	
Reading skills	21.3	74.39	31.43	46.14	31.7	35.44	0.0001
Access	18.4	73.52	19.25	61.74	22.9	52.41	0.0001
Understanding	20.54	75.34	23.55	61.96	25.3	49.34	0.0001
Assessment	18.42	73.79	21.57	55.25	24.2	44.90	0.0001
Decision Making and Using health information	14.2	64.31	14.67	56.69	16.9	51.97	0.0001
Total Health Literacy	16.31	72.27	20.22	56.36	22.3	46.81	0.0001

As shown in Table 4, the results of the Mann-Whitney test showed that the mean level of health literacy in the dimensions of reading, access, understanding, evaluation, and decision-

behavior and generally the overall health literacy score between the two genders were statistically significant and it is higher in men.

Table 4: Comparison of health literacy levels by gender in patients with type 2 diabetes referred to Imam Reza Diabetes Clinic in Arak

Dimensions of Health Literacy	Female		Male		P value
	SD	Mean	SD	Mean	
Reading skills	32.31	35.86	24.9	64.25	0.0001
Access	20.88	54.59	20.14	69.16	0.0001
Understanding	25.71	52.46	21.23	70.66	0.0001
Assessment	23.71	47.17	19.82	66	0.0001
Decision Making and Using health information	15.66	52.24	14.45	62.52	0.0001
Total Health Literacy	21.69	48.46	17.97	66.52	0.0001

The results of Kruskal-Wallis test (Table 5) show that the mean health literacy in the dimensions of reading, access, understanding, evaluation, and decision-behavior and generally the overall

health literacy score in residents of different regions are statistically significantly different from each other and it is more in urban areas.

Table 5: Comparison of health literacy levels based on the place of residence in type 2 diabetes patients referred to Imam Reza Diabetes Clinic in Arak

Dimensions of Health Literacy	City		Village		Suburbs		P value
	SD	Mean	SD	Mean	SD	Mean	
Reading skills	32.34	52.18	27.81	34.14	34.99	34.23	0.001
Access	19.82	65.57	20.23	45.93	22.29	52.17	0.0001
Understanding	24.41	56.06	22.34	43.72	23.28	52.32	0.0001
Assessment	22.41	60.21	22.01	40.39	23.93	42.93	0.0001
Decision Making and Using health information	15.21	59.80	14.13	49.03	15.89	46.46	0.0001
Total Health Literacy	20.93	60.57	19.43	42.64	22.15	45.62	0.0001

The results of Kruskal-Wallis test (Table 6) show that the mean health literacy in the dimensions of reading, access, comprehension, evaluation, decision-behavior and generally the overall score of health literacy in different educational levels are statistically significantly different from each other and health literacy also increases with increasing the level of education.

The results of Kruskal-Wallis test show that the mean health literacy in the dimensions of reading, access, understanding, evaluation, decision-behavior and generally the overall score of health literacy in different occupations are statistically significantly different from each other and it is higher in employees and students. More information is described in Table 7.

Table 6: Comparison of health literacy level based on education in type 2 diabetic patients referred to Imam Reza Diabetes Clinic in Arak

Dimensions of Health Literacy	Primary		intermediate		High school		College education		P value
	SD	Mean	SD	Mean	SD	Mean	SD	Mean	
Reading skills	19.46	21.25	15.32	60.30	16.02	75.18	10.31	92.75	0.0001
Access	15.53	46.26	13.54	64.07	15.14	78.18	14.62	87.16	0.0001
Understanding	17.07	4141.7	11.68	66.21	15.96	83.29	17.7	90	0.0001
Assessment	16.73	37.85	15.45	60.47	15.30	75	9.69	85.25	0.0001
Decision Making and Using health information	11.88	47.324	12.32	57.99	13.38	67.15	12.6	74.91	0.0001
Total Health Literacy	13.22	38.38	11.76	61.81	12.4	75.76	9.4	86.01	0.0001

Table 7: Comparison of mean of health literacy based on job in type 2 diabetic patients referred to Imam Reza Diabetes Clinic in Arak

Dimensions of Health Literacy	Employee		Housewife		Housewife		Retire		Student		P value
	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	
Reading skills	23.63	73.09	22.09	34.37	27.65	29.56	27.38	59.96	6.25	81.25	0.0001
Access	18.45	76.63	8.83	43.75	17.65	50.48	22.51	67.11	11.25	73.33	0.0001
Understanding	18.2	8.82	10.10	42.85	22.16	47.84	23.11	67.47	18.79	60	0.0001
Assessment	17.08	72.96	13.25	34.37	21.12	42.96	20.68	61.65	14.38	83.75	0.0001
Decision Making and Using health information	14.95	65.71	2.94	33.33	13.38	49.58	15.22	63.28	9.94	67.5	0.0001
Total Health Literacy	16.92	73.84	11.44	37.73	18.07	44.07	19.91	63.89	4.33	73.16	0.0001

Discussion

The level of health literacy of type 2 diabetic patients referred to the public clinic in Arak city and its relationship with demographic variables was measured in this study. The mean and standard deviation of age of patients was 12.93 ± 57.37 years. 62.7% of the patients were women. Most of the patients had primary education and were housewives and married and had a history of diabetes in first degree relatives. According to the results of the study of Noroozi et.al, diabetic patients were mostly women, illiterate and housewives and in the age range of 48 to 58 years, which is consistent with the results of the present study (17).

In the present study, most patients obtained

their information about the disease through physician and treatment staff. The results of the study of Abbas Zadeh et.al also showed that the source of obtaining information in 58% of diabetic patients is through physician and health centers, which is consistent with the present study (18). As obtained from the results of the study, most patients are willing to get the necessary information about their disease from the physician and health staff and expect the physician to provide them the necessary information; but, they are not always successful in obtaining and processing information from the physician, and on the other hand, due to the limited time of the visit, adequate and necessary training is

not provided by the physicians. It is suggested to use the presence opportunity of patients in hospitals and clinics to educate patients and increase their level of knowledge about disease management and increase the level of applied knowledge of patients to manage the disease during the waiting room and presence in medical centers with the presence of trained personnel.

The mean and standard deviation of patients' health literacy was 22.14 ± 55.20 . The highest level of literacy in access dimension was 21.73 ± 60.03 and the lowest level in reading dimension was 46.45 ± 73.32 . 66.2% of patients had limited health literacy and only 33.8% had good and desired health literacy. According to the results of the study by Noroozi et.al, only 13.8% of diabetic patients had adequate health literacy. The results of another study showed that only 28.7% of diabetic patients had adequate health literacy (17). According to the results of khosravi's study, the health literacy of diabetic patients with the mean of 66 was in the borderline [16]. In summarizing the results of the studies, it is clear that the health literacy of diabetic patients, especially in certain groups such as housewives and the elderly with less education, is low and there is a need for serious interventions in this area.

In comparing the level of health literacy of patients in different age groups, it was found that the overall score of health literacy in different age groups is statistically significantly different from each other and health literacy decreases with increasing the age. According to the results of the study by Ansari et.al, health literacy in the elderly is low and the low level of education is the most important factor (19). These findings, as well as the findings of a study by Sabooteh et.al (20), are consistent with our study which health literacy was lower in the elderly population. According to the results of

the study by Abbas Zadeh et.al, health literacy increases with increasing the age of diabetic patients (18), which is in contradiction with the present study. According to the results of the study by Noroozi et.al, health literacy was insufficient in all age groups of diabetic patients (17). Educational programs should be considered regardless of their age, education and income to improve patients' health literacy (21).

In this study, the level of health literacy had a significant relationship with the gender and place of residence of patients and it has been higher in men and residents of cities. Also, patients' health literacy increased with the increase of patients' education level and was more among students and employees in terms of occupation. According to the study by Bodur et.al, health literacy scores were better in people with higher education and higher income. Also, the literacy score of people who had administrative jobs and were employees, was higher than housewives, self-employed individuals and workers, which is confirmed by the present study (22). It seems that more access of patient to health centers in cities will be effective in improving their health literacy level.

According to the results of a study by Ansari et.al, the level of health literacy was positively correlated with people's education. Having a person with a university education in the family, higher education of the spouse, higher level of income was associated with a higher health literacy score (19).

The results of Borji et al.'s study showed that the level of health literacy increases with increasing education and decreases with increasing the age, and urban elderly with chronic disease and positive hospitalization history had more health literacy and health literacy in employed and retired people was more than housewives (23).

According to the results of the present study, health literacy in married people was lower than single. The results of Nowruz et al.'s study were also in confirmation of the present study (17). According to the results of the study by Khosravi et.al, the level of health literacy had significantly relation with age, gender, education level, membership in the diabetes association and occupation (16) and it was higher in older age, male gender and higher education and was lower in housewives and self-employed individuals, which its results are completely consistent with our study (16).The diabetes association is a non-governmental and people-oriented organization that people with diabetes refer there for education and learning, not for treatment. Sometimes group meetings are held and diabetic patients meet with each other, during these meetings, they also benefit from experiences (16) and therefore it is a good opportunity to increase knowledge and help empower them in disease management and making correct decision to manage their disease.

Conclusion

According to the results of this study, 66.2% of diabetic patients had limited health literacy (insufficient and not enough) and only 33.8% had adequate health literacy (sufficient and excellent). Patients' health literacy was related to patients' age, gender, marital status, occupation, education, and place of residence.

Recommendations: It is necessary to pay attention to health literacy promotion interventions in the society as an important factor in changing the lifestyle. It is possible to use the presence opportunity of patients in hospitals and clinics to educate patients and increase their level of knowledge about disease management, and for this purpose, tariffs for education and counseling services can be institutionalized.

It is possible to use the advantages of information and communication technologies, especially social networks and national media, to convey health information.

Health literacy studies should be performed in different diseases and in various populations and medical centers, and interventions should be performed on the factors affecting health literacy and modifiable factors.

In future studies, special attention should be paid to the socio-economic criteria of patients, social support and the level of health literacy of patients' families.

In the present study, the Iranian health literacy questionnaire (Dr. Montazeri et.al) was used as a health literacy screening tool. It is suggested that in future studies, other health literacy tools and questionnaires are used to assess and compare health literacy in different groups.

Limitations: Since these tools are self-reporting, the results may not be strong enough to determine the respondent's behaviors. This study was performed as a single-center. It is recommended that future studies are conducted in a multi-center manner with a larger sample size.

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References

1. Ghoreishi M-S, Vahedian-shahroodi M, Jafari A, Tehranid H. Self-care behaviors in patients with type 2 diabetes: Education intervention base on social cognitive theory. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*. 2019;13(3):2049-56. <https://doi.org/10.1016/j.dsx.2019.04.045>
2. Ghoreishi M-S, Vahedian-Shahroodi M, Esmaily H, Tehrani H. Predictive Factors Related To Self-Care Behaviors among Type2 Diabetic Patients by Using Social Cognitive Model. *Iranian Journal*

- of Health Education and Health Promotion. 2018;6(3):241-50. <https://doi.org/10.30699/acadpub.ijhehp.6.3.241>
3. Zarcadoolas C, Pleasant A, Greer DS. Understanding health literacy: an expanded model. *Health Promot Int.* 2005;20(2):195-203. <https://doi.org/10.1093/heapro/dah609>
 4. Kamalipour M, ashkani N, Choobin N, Esmaeel Zadeh Z. Evaluation of Adults Health Literacy in Jahrom. *Journal of Preventive Medicine.* 2019;6(1):25-19. <https://doi.org/10.29252/jpm.6.1.25>
 5. Ali Montazeri, Mahmoud Tavousi, Fateme Rakhshani, Seyed Ali Azin, Katayoun Jahangiri, Mahdi Ebadi, et al. Health Literacy for Iranian Adults (HELIA): development and psychometric properties. *Payesh.* 2014; 13 (5) :589-599. (Persian)
 6. Mahmoud T, Mahdi E, Esmaeil F, Leila J, Akram H, Mina H, et al. Health literacy measures: A systematic review of the literature. *payeshj.* 2015;14(4):485-96.
 7. S A, Gurtoo A, M S, Ap MK. Level of Health Literacy Among Type 2 Diabetic Persons and its Relation to Glycemic Control. *J Assoc Physicians India.* 2019;67(4):59-62.
 8. E SSBaL. Associations Between Health Literacy, Diabetes Knowledge, Self-Care Behaviors, and Glycemic Control in a Low Income Population with Type 2 Diabetes. *Diabetes Technology & Therapeutics.* 2011;13(3): 35-41. <https://doi.org/10.1089/dia.2010.0160>
 9. Schillinger D, Grumbach K, Piette J, Wang F, Osmond D, Daher C, et al. Association of Health Literacy With Diabetes Outcomes. *JAMA.* 2002;288(4):475-82 <https://doi.org/10.1001/jama.288.4.475>
 10. Khodabakhshi-Koolaei A, Bahari M, Falsafinejad MR, Shahdadi H. The Relationship of Quality of Life with Health Literacy in Male Patients with Type II Diabetes: A Cross-sectional Study in HARSIN City, 2015. *Journal of Diabetes Nursing.* 2016;4(4):10-20
 11. Abdullah A, Liew SM, Salim H, Ng CJ, Chinna K. Prevalence of limited health literacy among patients with type 2 diabetes mellitus: A systematic review. *PLOS ONE.* 2019;14(5):e0216402. <https://doi.org/10.1371/journal.pone.0216402>
 12. Joveini H, Rohban A, Askarian P, Maheri M, Hashemian M. Health literacy and its associated demographic factors in 65-year-old, literate adults in Bardaskan, Iran. *Journal of Education and Health Promotion.* 2019;8(10):244
 13. Saatchi M, Panahi M, Ashraf Mozafari A, Sahebkar M, Azarpakan A, Baigi V, et al. Health Literacy and Its Associated Factors: A Population-Based Study, Hormuz Island. *Iranian Journal of Epidemiology.* 2017;13(2):136-44.
 14. Mohamadi S, Amiri M, Marzban A. Factors related to uncontrolled diabetes in Bushehr, Iran, 2017-18. *The Journal of Shahid Sadoughi University of Medical Sciences.* 2019;26(10):857-66.
 15. Banihashemi S AT, Amirkhani MA, Haghdoost AA, Alavian S M, Asgharifard H, Baradaran H, et al. Health literacy and the Influencing Factors: A study in five provinces of Iran. *Journal of Strides Development Medical Education.* 2012;4(1):1-9.
 16. Khosravi A, Kh A, Sh A, Tahmasbi R. Health literacy levels of diabetic patients referred to Shiraz health centers and its effective factors. *Health Inf Manage.* 2015;12(2):205.
 17. Noroozi M, Madmoli Y, Derikvandi M, Saki M, Moradi kalboland M. Investigating health literacy level and its relation with some factors in patients with type 2 diabetes in Ahvaz -2018. *Journal of Health Literacy.* Spring 2019; 4(1): 43-52. <https://doi.org/10.22038/jhl.2019.39813.1049>
 18. AbbasZadeh Bazzi M, Karimiaval M. Relationship between Health Literacy and Self-Care Behaviors in Diabetic Patients Type II Referred to the Center of Diabetes Control and Prevention in Zabol. *Journal of Health Literacy.* Spring 2018; 3(1): 10-19. <https://doi.org/10.22038/jhl.2018.10927>
 19. Ansari H, Almasi Z, Ansari-Moghaddam A, Mohammadi M, Peyvand M, Hajmohammadi M, et al. Health Literacy in Older Adults and Its Related Factors: A Cross-Sectional Study in Southeast Iran. *Health Scope.* 2016;5(4):e37453. <https://doi.org/10.17795/jhealthscope-37453>
 20. Sabooteh S, Shahnazi H, Mostafavi F. Health Literacy Status and Its Related Factors in the Elderlies in Dorood, Iran. *Journal of Education and Community Health.* 2019;6(1):41-7. <https://doi.org/10.29252/jech.6.1.41>
 21. Mahmoud Tavousi, AliasgharHaeri Mehrizi, shahram Rafiefar, Atoosa Solimanian, Fateme Sarbandi, Mona Ardestani, et al. Health literacy in Iran: findings from a national study. *Health Monitor Journal of the Iranian Institute for Health Sciences Research.* 2016;15(1):95-102.
 22. Bodur AS, Filiz E, Kalkan I. Factors affecting health literacy in adults: a community based study in Konya, Turkey. *International Journal of Caring Sciences.* 2017;10(1):100-9. <https://doi.org/10.17362/DBHAD.2017.2.01>
 23. Borji M, Tarjoman A, Otaghi M, Salimi E, Naseri A. Health Literacy Level and its Related Factors among the Elderlies in Ilam in 2015. *Iran Journal of Nursing.* 2017;30(108):33-43. <https://doi.org/10.29252/ijn.30.108.33>