

Health Literacy among Rural Communities: A Large Cross-Sectional Study

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ABSTRACT

Background and Objective: A good picture of the Health literacy (HL) state in rural communities is essential to prevent and reduce the cost of treatment. The aim of this study is to estimate the HL of Iranian rural communities and identify related factors.

Materials and Methods: This cross-sectional study was conducted with multi-stage cluster sampling on about 5700 insured people living in rural areas of Iran in 2021. HL for Iranian Adults (HELIA) questionnaire and demographic information checklist were used to collect information. Bivariate and multivariable regression analyses were conducted to examine the factors associated with HL.

Results: Out of 5675 participants in the study, 35.9% were male, 18.6% had university education levels, and 24.1% were single. The overall average score of the HL Questionnaire was 59.64 ± 22.85 . Age, marital status, education level, number of insurance years, and annual visits were associated with HL ($p < 0.05$).

Conclusion: The level of HL in the rural communities of Iran was inadequate. Education level was the most critical factor related to HL. Due to the low literacy level, the production of simple, understandable, cheap, and available media and educational materials appropriate to the cultural, economic, and social characteristics of Iranian rural communities is recommended.

Paper Type: Research Article

Keywords: Health literacy; Rural; HELIA questionnaire; Iran

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Introduction

The World Health Organization has defined Health literacy (HL) as cognitive and social skills determining individuals' motivation and ability in achieving, understanding, and using information in a way that leads to maintaining and promoting their health (1). Health literacy in fact includes understanding the prescription of prescribed medications, medical education brochures, consent forms, the ability to use a complex medical system, reading and writing skills, analysis, decision making, as well as the ability to apply these skills in health situations (2, 3).

Health literacy plays an essential role in self-care. There is a relationship between HL and inappropriate and positive consequences on health; when a society has a high level of HL both the rate of diseases and the cost of treatment decreases in the society, but when the level of literacy in society is low, it leads to an increase in these chronic diseases and decreases the health of the society imposing the high medical cost on both patients and society (4).

It has been indicated by various studies that low HL can lead to poor physician-patient communication. In this case, understanding the information provided by the doctor becomes difficult for patients, to the extent that their health may be endangered (5). People with low HL do not understand the oral and written information provided by physicians and nurses, cannot act according to the necessary procedures and instructions such as medication programs, and cannot achieve health services (6).

In fact, many believe that low HL actually leads to health inequalities (7, 8). Moreover, the results of several studies indicated that HL affects the general state of health and quality of life related to health (9). Limited HL is stated not as a patient problem but a challenge for

health care providers and health systems (10). If the service providers are trying to overcome the adverse effects of low HL, the ability to diagnose patients with potential problem in literacy is important (11); thus the first step in most situations is to measure HL. Without measurement, the designed interventions may fail in addressing the factors associated with the failure (12). Therefore, given the importance of HL in the prevention and reduction of treatment costs, it is necessary to have a good picture of the HL situation of the community, in order to make a proper decision.

The results of studies conducted in Iran state that, HL in Iranians is limited in general. In the study of Tavosi et al., conducted in the urban population of Iran, it was indicated that 44% of Iranians living in urban areas have limited HL (13). In a study that was conducted to evaluate the level of HL in five provinces of Iran, the level of HL was 56.6% insufficient, 15.3% marginal, and 28.1% adequate, which means that the level of HL in Iran was generally low (14). Some studies showed that the region (urban vs. rural) where people live is related to their HL level (15-18). The limited studies that have been carried out on the rural population of Iran have generally been dedicated to a specific region (16, 19, 20). Given the importance of HL in preventing and reducing the treatment cost, it is necessary to have a good picture of the state of HL in society, in order to make the right decision. However, only a few studies have been conducted to show the HL status in Iran's rural areas. Therefore, this study was conducted to investigate HL in the rural population of Iran.

Materials and Methods

Study design

This cross-sectional study was conducted on

about 5700 insured people living in rural areas of Iran in 2021. Sampling was performed in a multi-stage cluster. First, the provinces of Iran were divided into five regions based on geographical area and one province was selected from each region. Then 12 villages from each province were randomly selected (a total of 60 villages). Afterward, 20 people from each village were randomly included in the study.

The sample size was determined to be 5700 participants based on the values of the parameters reported in the study conducted by Montazeri et al. (21) and using Cochran's formula. According to the study by Montazeri et al., the prevalence of inadequate HL was 56.6%. As a result, the minimum sample size was determined based on alpha 0.05, power 80, and with a withdrawal rate of 3%.

Participant and sampling

Sampling was performed in a multi-stage cluster method. First, the provinces of Iran were divided into 10 regions based on geographical area. Then one province was selected from the provinces in each region. Five provinces of East Azerbaijan (1202 questionnaires), Sistan and Baluchistan (1178 questionnaires), Fars (1263 questionnaires), Mazandaran (546 questionnaires), and Razavi Khorasan (1511 questionnaires) were selected. Afterward, 30 villages were selected from each province (a total of 300 villages were selected) using the list of villages in the health networks of the provinces. In the next step, 19 people from each village were randomly included to complete the questionnaires. In a way, the list of people in each village was prepared and then 19 people were randomly selected. Inclusion criteria included being 18 years of age or older and willing to participate in the study.

Tools of assessment

The information required in this study was collected using the HL for Iranian Adults (HELIA)

questionnaire and demographic information checklist. In previous studies, the validity and reliability of the HELIA questionnaire in Iran have been proven (22, 23). The HELIA questionnaire included 33 items; 4 items for reading skills, 6 items for access to health and disease information, 7 items for understanding health information, 4 items for health information assessment and, 12 items for decision-making and behavior related to health and the use of health information. A 5-point Likert scale was used to answer the questionnaire (5 if the person always performs health behavior, 4 for often, 3 for sometimes, 2 for rarely, and 1 for never). For this purpose, the raw score of each individual in the sub-measures was obtained from the sum of scores. The min-max normalization following formula was used to convert this score to a range of 0 to 100.

$$\frac{\text{Raw score obtained} - \text{Minimum possible raw score}}{\text{Maximum possible raw score} - \text{Minimum possible raw score}} \times 100$$

In order to calculate the total score, the subscales scores were collected based on the range from 0 to 100 and divided into the number of subscales (5 dimensions).

Statistical analysis

The normality condition of the quantitative variables was investigated by using the Kolmogorov–Smirnov test. Qualitative variables were expressed in frequency and percentage, and quantitative variables in mean (standard deviation) in the case of a normal distribution. Independent t-test and one-way ANOVA were used to compare differences between quantitative variables between qualitative variables. Multiple linear regression and multivariate regression were used to assess variables affecting the score of the total and dimensions HELIA questionnaire. Statistical analysis was conducted using the SPSS version 26. A P-value of less than 0.05 was considered significant.

Results

Out of 6000 people, 5675 people completed the questionnaires (response rate of 94.5%). Out of 5675 participants in the study, 35.9% were male (2035) and 64.1% were female (3640). About 18.6% of the participants had university education. 61.2% of the study participants were unemployed and 38.8% were employed (having a fixed job and income), 24.1% of the study participants were single and 75.9% were married. The average number of referrals to health centers in the last 3 months and the average number of referrals in last year were 2.95 ± 2.43 and 6.21 ± 6.06 , respectively.

The overall average score of the HL Questionnaire was 59.64 ± 22.85 . Average

reading dimension was 56.18 ± 30.09 , accessibility dimension was 58.30 ± 26.44 , comprehension dimension was 60.21 ± 25.62 , evaluation dimension was 56.31 ± 27.42 , and decision and behavior dimension were 62.21 ± 22.01 . The results also showed that the overall score of HL had a significant relationship with gender, marital status, and level of education and insurance coverage.

The study participants obtained information about HL from radio / television, the Internet, questioning physicians and health workers, asking friends and acquaintances, satellite networks, newspapers, pamphlets, educational brochures, and IVR, respectively (table1).

Table 1: presents the demographic variables and their relationship with health literacy.

Variables		Frequency (%)	HELIA Score	Statistic (P-value)
Gender	Male	2035 (35.9)	59.42±23.91	-.491 (0.624)
	Female	3640 (64.1)	59.74±22.24	
Marital Status	Single	1301 (24.1)	64.56±21.31	9.833 (<0.001)
	Married	4090 (75.9)	57.75±23.04	
Education Level	Illiterate	585 (10.6)	29.56±17.99	266.90 (<0.001)
	Sub-diploma	2178 (39.3)	55.18±21.18	
	Diploma	1714 (30.9)	65.60±17.67	
	University	1031 (18.6)	76.29±15.09	
	Other (Seminary)	34 (0.6)	33.81±16.59	
Job type	Unemployed	3382 (61.2)	55.03±21.98	-18.661 (<0.001)
	Employed	2143 (38.8)	66.46±22.43	
Rural insurance coverage	Yes	1822 (32.6)	70.83±19.78	28.59 (<0.001)
	No	3774 (67.4)	54.00±22.17	

Chi-Square tests were performed.

The average score of women in using information was significantly higher than men ($p < 0.05$). In other dimensions of HELIA questionnaire, there was no significant difference in scores between men and women. The results

also showed that in all dimensions of the HELIA questionnaire, the score of single people was significantly higher than married people ($p < 0.05$). Table (2)

Table 2: Relationship between health literacy dimensions and participants' demographic variables

Variables		Reading Skills	Information Access	Information Comprehension	Assessment and Judgment	Information Use	Total
Gender	Male	56.51±30.50	57.91±27.97	60.22±26.29	57.18±27.75	61.40±23.38	59.42±23.91
	Female	55.94±29.86	58.51±25.54	60.18±25.24	55.81±27.23	62.64±21.22	59.74±22.24
	t(p-value) T Test	0.671 (0.502)	-0.803 (0.422)	0.051 (0.959)	1.794 (0.073)	-1.981 (0.048*)	-0.491 (0.624)
Marital status	Single	62.62±26.38	64.72±23.91	64.63±23.54	63.04±25.56	65.64±22.06	64.56±21.31
	Married	53.85±30.94	56.06±26.88	58.44±26.00	53.80±27.53	60.75±21.76	57.75±23.04
	t(p-value) T Test	9.990 (<0.001)	11.015 (<0.001)	8.037 (<0.001)	11.115 (<0.001)	7.026 (<0.001)	9.833 (<0.001)
Education level	Illiterate	14.27±22.50	24.09±21.31	27.80±21.02	21.94±23.24	40.89±20.13	29.56±17.99
	Sub-diploma	49.89±28.14	52.02±24.53	56.02±24.25	51.10±25.97	59.33±20.90	55.18±21.18
	Diploma	66.14±21.96	66.49±20.31	65.89±20.53	63.06±21.36	65.60±19.09	65.60±17.67
	University	76.70±19.74	77.21±17.37	78.01±17.51	75.51±18.14	75.14±17.88	76.29±15.09
	Other (Seminary)	27.53±26.80	37.63±16.97	39.18±21.08	25.76±22.08	33.59±17.67	33.81±16.59
	F (p-value) ANOVA	736.37 (<0.001)	671.47 (<0.001)	557.70 (<0.001)	584.64 (<0.001)	322.14 (<0.001)	669.02 (<0.001)
Job type	Unemployed	50.09±29.81	53.03±25.55	55.31±24.82	50.52±26.91	58.97±21.08	55.03±21.98
	Employed	65.27±28.27	66.23±25.78	67.43±25.06	64.81±25.89	66.95±22.47	66.46±22.43
	t(p-value) T Test	-18.99 (<0.001)	-18.604 (<0.001)	-17.583 (<0.001)	-19.62 (<0.001)	-13.133 (<0.001)	-18.661 (<0.001)
Insurance coverage	Yes	69.81±25.86	70.26±22.89	72.95±22.08	68.68±24.02	71.01±20.74	70.83±19.78
	No	49.25±29.66	52.35±26.07	53.79±24.82	50.08±26.93	57.76±21.23	54.00±22.17
	t(p-value) T Test	26.448 (<0.001)	26.093 (<0.001)	29.093 (<0.001)	25.98 (<0.001)	21.942 (<0.001)	28.589 (<0.001)

The results presented Table 2 show that the level of HL of villagers with university education was higher than others in all dimensions of the HELIA questionnaire ($p < 0.05$). Also, all dimensions of HL in the villagers with insurance coverage were higher than the villagers without insurance coverage and these dimensions were

significantly higher in employed individuals ($p < 0.05$).

The results of this study indicated that the average number of referrals to health centers in the last 3 months and the average number of referrals last year have a significant relationship with different dimensions of HL ($p < 0.05$). Table (3)

Table 3: The relationship of dimensions of HELIA questionnaire with age

Variable	Age	Number of insurance years	Number of annual visits
Reading Skills	-0.471 (<0.001)	-0.091 (<0.001)	-0.012 (0.383)
Information Access	-.466 (<0.001)	-.101 (<0.001)	.037 (0.007)
Information Comprehension	-.420 (<0.001)	-.078 (<0.001)	.047 (0.001)
Assessment and Judgment	-.444 (<0.001)	-.045 (0.01)	.046 (0.01)
Information Use	-.352 (<0.001)	-.044(0.011)	.114 (<0.001)
Total	-.460 (<0.001)	-.077 (<0.001)	.063 (<0.001)

Pearson's correlation coefficient was performed.

The results of multiple regression analysis show that age, marital status, education level, number of insurance years, and number of annual visits were associated with HL (Table 4). A strong association was found between education (college education) and HL.

Table 4: Evaluation of variables affecting the score of HELIA questionnaire using linear multiple regression

Variable	Unstandardized Coefficients (SE)	Standardized Coefficients	t (p-value)
Gender	0.315 (0.879)	0.007	0.358 (0.721)
Marital Status	1.789 (0.763)	0.035	2.346 (0.019*)
Education Level	7.355 (0.400)	0.298	18.39 (<0.001*)
Job type	-0.327 (0.923)	-0.007	-0.354 (0.723)
Rural insurance coverage	-5.995 (3.584)	-0.024	-1.673 (0.094)
Age	-0.632 (0.024)	-0.463	-26.004 <0.001*)
Number of insurance years	0.176 (0.031)	0.091	5.649 (<0.001*)
Number of annual visits	0.354 (0.052)	0.104	6.823 (<0.001*)
Adjusted R Square=0.397; Assumptions of normality of residual, non-collinearity and independence of observations were established.			

The applied multivariate regression indicated that age, level of education, and number of insurance years with reading skills dimension; gender, age, level of education, number of years of insurance and number of annual visits with information access dimension; age, level of education, number of years of insurance and number of annual visits with information

comprehension; age, level of education, being covered by rural insurance, number of years of insurance and number of annual visits with assessment and judgment dimension; gender, age, level of education, number of years of insurance and number of annual visits are related to information use dimension of the HELIA questionnaire (Table 5).

Table 5: Evaluation of variables affecting the dimensions of HELIA questionnaire using multivariate regression

Dimensions	Gender	Marital Status	Education Level	Job type	Rural insurance coverage	Age	Number of insurance years	Number of annual visits
Reading Skills a	0.815 (0.367)	2.066 (0.151)	169.777 (<0.001)	0.105 (0.746)	2.477 (0.116)	348.783 (<0.001)	56.555 (<0.001)	1.424 (0.233)
Information Access b	4.681 (0.031)	0.853 (0.356)	153.496 (<0.001)	0.118 (0.732)	2.250 (0.134)	423.945 (<0.001)	31.641 (<0.001)	26.051 (<0.001)
Information Comprehension c	0.388 (0.533)	1.747 (0.186)	106.954 (<0.001)	0.088 (0.767)	3.059 (0.080)	261.507 (<0.001)	17.468 (<0.001)	42.807 (<0.001)
Assessment and Judgment d	0.855 (0.355)	0.144 (0.705)	124.403 (<0.001)	0.013 (0.911)	10.097 (0.001)	345.703 (<0.001)	60.147 (<0.001)	26.393 (<0.001)
Information Use e	4.759 (0.029)	2.069 (0.15)	52.605 (<0.001)	0.004 (0.947)	0.048 (0.827)	256.383 (<0.001)	11.678 (0.001)	70.003 (<0.001)

The numbers inside the cells of the table are statistic (F) and p-value.

a. R Squared = .436 (Adjusted R Squared = .434)

b. R Squared = .444 (Adjusted R Squared = .442)

c. R Squared = .351 (Adjusted R Squared = .349)

d. R Squared = .391 (Adjusted R Squared = .389)

e. R Squared = .271 (Adjusted R Squared = .269)

Discussion

This study was conducted to determine the HL among Rural Communities in Iran. Generally, the results showed that the level of HL among Rural Communities is very low. Meanwhile, the effect of HL on a person's health status, taking medication and following the doctor's instructions, participating in decision-making about treatment, expressing health concerns, how communicating with the doctor, awareness of their health, receiving preventive services, chronic disease control, use of medical services, etc. is approved (24). Therefore, a wide range of inadequate HL in rural areas, which is often hidden from view, is a warning to health officials and policymakers, and healthcare providers.

The results of various studies in other countries of the world also show a wide range of inadequate HL. For example, a systematic study by Dr. Orlow et al. in North America on 85 studies showed that 46% of people generally had low HL (10). The level of HL of the rural people of Kazakhstan was estimated at 8.09%, which had a significant difference from the city residents of 16.92% (17).

Wagner et al. reported an inadequate and borderline HL level in UK adults (25) and in the Shuai study, it was stated that about 30% of Taiwanese adults had borderline and lower HL (25). A study conducted in Iran in 2007, showed that 56.6% of people had inadequate HL and only 28.1% had adequate HL (26).

The study participants obtained information about HL from radio/television, the Internet, questioning physicians and health workers, asking friends and acquaintances, satellite networks, newspapers, pamphlets, educational brochures, and IVR, respectively. Based on these results, radio and television have played a significant role in obtaining HL information. Most studies have indicated that using non-print media such as radio and television plays a more important

role in providing health information in people with low HL. For example, a study by Williams et al. showed that non-print media is one of the most effective ways to provide the health message to people with inadequate HL (27).

In this study, asking physicians and health workers did not play a significant role in obtaining HL information. This indicates poor communication between health workers, and in some cases, it may be due to the use of technical terms.

The results of the study by Schellinger, which was conducted to determine functional HL and the quality of physician-patient communication in diabetic patients, showed that poor communication of functional HL in the field of general clarity and explanation of the care process indicates weakness in verbal communication, especially in technical areas of conversation between a doctor and a patient (28).

A study by Schwartzberg was conducted on the « communication techniques of health workers with patients with inadequate HL» showed that; less than 40% (39.5%) of health workers have used the method of patient feedback in training to identify the understanding of patients with low HL in their communication with the patient (29).

The results of this study showed a significant difference between HL level and marital status in villagers covered by rural insurance and single people had significantly better HL levels than married people. This may be because singles are younger in rural areas and have a higher level of education (30).

The results of this study showed a significant difference between the level of HL and employment status of villagers covered by rural insurance and employees had a significantly better level of HL than unemployed individuals. One of the reasons for this could be the income of employed people because several studies have shown that the prevalence of low levels of HL

is higher among people with lower education and income. A study conducted by Izadi et al. on women in Sistan and Baluchestan region also showed a relationship between HL and employment, so that inadequate HL was higher in housewives than in other occupations and employed people had better HL (9).

The results showed a significant difference between the level of HL and gender in the villagers covered by rural insurance and men had a significantly better level of HL than women. Most studies in the field of HL have shown that women have better HL, but the reason for the low level of HL in women can be the special cultural and social status of rural areas and their low level of literacy. Given the important and influential role of women on the health status and health promotion of society and family members, it is necessary to especially include them in HL promotion programs.

Based on the results of a study conducted on female patients referring to health centers and using a summary questionnaire to evaluate adult functional HL in Siberia, it was indicated that 44% of women had borderline and inadequate HL (31).

The results showed a significant difference between the level of HL and education in villagers covered by rural insurance. People with higher education had better HL. People with higher education better understand and use health information and instructions. Education was also considered an important factor in HL in other studies. This relationship has been observed in many studies (whether case studies, reviews, or national studies). For example, in their study, Mahmoud Nekouei Moghaddam et al. showed that there is a significant relationship between HL and the education of women and men, which is consistent with the results of the present study (32). Tehrani Bani Hashemi et al. also showed that the level of education has the

strongest relationship with the level of HL (26). A recent systematic review of HL conducted by the Health Care Research and Quality Agency in 2020 reported that low levels of HL were more pronounced in those with education less than a diploma; based on this report, school years are a strong predictor of HL (33). In a review study, Sanderzo et al. found that 66% of people with limited HL had a diploma or higher (34).

In this study, the researchers faced limitations, including the Covid-19 pandemic, which reduced the rate of response to the questionnaires, to such an extent that the researchers tried to solve this problem by performing face-to-face interviews. Due to the cross-sectional design of the study, it is not possible to highlight the causality of some factors. Considering this limitation, it is suggested to use structural equation models and longitudinal studies in future studies.

Conclusion

Generally, the results of this study showed that the level of HL is inadequate. On the other hand, people with low levels of HL have useless services than what they actually need. These people may receive ineffective care because they do not fully understand the guidelines of health care providers. Therefore, they may need more visits to achieve the same goal of the same treatment. This in turn increases costs and wastes parts of the health budget. Hence the production of simple and understandable media and accessible, cheap educational materials appropriate to the cultural, economic, and social characteristics of individuals; providing capable human resources familiar with the category of HL and having communication and educational skills in the health system and education and culture through mass media, especially television and radio is suggested for improving the HL of villagers.

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Reference

- Chen W, Ren H, Wang N, Xiong Y, Xu F. The relationship between socioeconomic position and health literacy among urban and rural adults in regional China. *BMC Public Health*. 2021;21(1):527. <https://doi.org/10.1186/s12889-021-10600-7> PMID:33731069 PMCID:PMC7972343
- Nutbeam D, Lloyd JE. Understanding and responding to health literacy as a social determinant of health. *Annu Rev Public Health*. 2021;42(1):159-73. <https://doi.org/10.1146/annurev-publhealth-090419-102529> PMID:33035427
- Tehrani H, Vali M, Nejatian M, Moshki M, Charoghchian Khorasani E, Jafari A. The status of depression literacy and its relationship with quality of life among Iranian public population: a cross sectional study. *BMC psychiatry*. 2022;22(1):1-9. <https://doi.org/10.1186/s12888-022-04251-0> PMID:36100889 PMCID:PMC9472397
- Stormacq C, Van den Broucke S, Wosinski J. Does health literacy mediate the relationship between socioeconomic status and health disparities? *Integrative review*. *Health promotion international*. 2019;34(5):e1-e17. <https://doi.org/10.1093/heapro/day062> PMID:30107564
- Dameworth JL, Weinberg JA, Goslar PW, Stout DJ, Israr S, Jacobs JV, et al. Health literacy and quality of physician-trauma patient communication: opportunity for improvement. *Journal of Trauma and Acute Care Surgery*. 2018;85(1):193-7. <https://doi.org/10.1097/TA.0000000000001934> PMID:29664890
- Kripalani S, Jacobson TA, Mugalla IC, Cawthon CR, Niesner KJ, Vaccarino V. Health literacy and the quality of physician-patient communication during hospitalization. *Journal of hospital medicine*. 2010;5(5):269-75. <https://doi.org/10.1002/jhm.667> PMID:20533572 PMCID:PMC3468649
- Farin E, Ullrich A, Nagl M. Health education literacy in patients with chronic musculoskeletal diseases: development of a new questionnaire and sociodemographic predictors. *Health education research*. 2013;28(6):1080-91. <https://doi.org/10.1093/her/cyt095> PMID:24113084
- Karamali M, Yaghoubi M, Parandeh A. Scientific Mapping of Papers Related to Health Literacy Using Co-Word Analysis in Medline. *Iranian Journal of Health Education and Health Promotion*. 2021;9(3):280-95. <https://doi.org/10.52547/ijhehp.9.3.280>
- Rajah R, Hassali M, Murugiah M. A systematic review of the prevalence of limited health literacy in Southeast Asian countries. *Public Health*. 2019;167:8-15. <https://doi.org/10.1016/j.puhe.2018.09.028> PMID:30544041
- Paasche-Orlow MK, Wolf MS. Promoting health literacy research to reduce health disparities. *Journal of health communication*. 2010;15(S2):34-41. <https://doi.org/10.1080/10810730.2010.499994> PMID:20845191
- Batterham RW, Hawkins M, Collins P, Buchbinder R, Osborne RH. Health literacy: applying current concepts to improve health services and reduce health inequalities. *Public health*. 2016;132:3-12. <https://doi.org/10.1016/j.puhe.2016.01.001> PMID:26872738
- La Vonne AD, Zun LS. Assessing adult health literacy in urban healthcare settings. *Journal of the National Medical Association*. 2008;100(11):1304-8. [https://doi.org/10.1016/S0027-9684\(15\)31509-1](https://doi.org/10.1016/S0027-9684(15)31509-1) PMID:19024227
- Tavousi M, HAERI MA, RAFIEFAR S, SOLIMANIAN A, SARBANDI F, ARDESTANI M, et al. Health literacy in Iran: findings from a national study. 2016.
- Tehrani Banihashemi S-A, Haghdoost AA, Amirkhani MA, Haghdoost AA, Alavian S-M, Asgharifard H, et al. Health Literacy and the Influencing Factors: A Study in Five Provinces of Iran. *Stride Dev Med Educ*. 2007;4(1):1-9.

15. Xie Y, Ma M, Zhang Y, Tan X. Factors associated with health literacy in rural areas of Central China: structural equation model. *BMC health services research*. 2019;19(1):300. <https://doi.org/10.1186/s12913-019-4094-1> PMID:31077197 PMCID:PMC6509858
16. Golboni F, Nadrian H, Najafi S, Shirzadi S, Mahmoodi H. Urban-rural differences in health literacy and its determinants in Iran: A community-based study. *The Australian journal of rural health*. 2018;26(2):98-105. <https://doi.org/10.1111/ajr.12378> PMID:29214687
17. Shayakhmetov SS, Toguzbayeva KK, Ismailova AA, Tabibi R, Derbishaliev ZK, Dzhusupov KO. Health Literacy of Rural Population of Kazakhstan. *Iranian journal of public health*. 2020;49(7):1269-77. <https://doi.org/10.18502/ijph.v49i7.3580> PMID:33083293 PMCID:PMC7548489
18. Wang W, Zhang Y, Lin B, Mei Y, Ping Z, Zhang Z. The Urban-Rural Disparity in the Status and Risk Factors of Health Literacy: A Cross-Sectional Survey in Central China. *International journal of environmental research and public health*. 2020;17(11). <https://doi.org/10.3390/ijerph17113848> PMID:32485790 PMCID:PMC7312746
19. Nezhadhossein MR, Barati LS, Faraj S, Lolo S, Parvin S, Nejad Rasouli MA. Health Literacy of Rural and Urban Communities in Behbahan, Iran. *J Health Res Commun*. 2018;4(3):1-11.
20. Baraie B, Pashaei T, Kakemam E, Mahmoodi H. Health literacy and its predictors among urban and rural adults in Bijar County. *Journal of education and health promotion*. 2020;9:181. https://doi.org/10.4103/jehp.jehp_116_20 PMID:32953909 PMCID:PMC7482634
21. Montazeri A, Tavousi M, Rakhshani F, Azin SA, Jahangiri K, Ebadi M, et al. Health Literacy for Iranian Adults (HELIA): development and psychometric properties. 2014.
22. 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. *Health Monitor Journal of the Iranian Institute for Health Sciences Research*. 2014;13(5):589-99.
23. Tavousi M, Haeri-Mehrzi A, Rakhshani F, Rafiefar S, Soleymanian A, Sarbandi F, et al. Development and validation of a short and easy-to-use instrument for measuring health literacy: the Health Literacy Instrument for Adults (HELIA). 2020;20(1):656. <https://doi.org/10.1186/s12889-020-08787-2> PMID:32397970 PMCID:PMC7216550
24. Lee S-YD, Tsai T-I, Tsai Y-W, Kuo KN. Health literacy, health status, and healthcare utilization of Taiwanese adults: results from a national survey. *BMC public health*. 2010;10(1):1-8. <https://doi.org/10.1186/1471-2458-10-614> PMID:20950479 PMCID:PMC2967535
25. Von Wagner C, Knight K, Steptoe A, Wardle J. Functional health literacy and health-promoting behaviour in a national sample of British adults. *Journal of Epidemiology & Community Health*. 2007;61(12):1086-90. <https://doi.org/10.1136/jech.2006.053967> PMID:18000132 PMCID:PMC2465677
26. Tehrani Banihashemi S-A, Haghdoost AA, Amirkhani MA, Alavian S-M, Asgharifard H, Baradaran H, et al. Health literacy and the influencing factors: a study in five provinces of Iran. *Strides in development of medical education*. 2007;4(1):1-9.
27. Williams MV, Baker DW, Parker RM, Nurss JR. Relationship of functional health literacy to patients' knowledge of their chronic disease: a study of patients with hypertension and diabetes. *Archives of internal medicine*. 1998;158(2):166-72. <https://doi.org/10.1001/archinte.158.2.166> PMID:9448555
28. Schillinger D, Bindman A, Wang F, Stewart A, Piette J. Functional health literacy and the quality of physician-patient communication among diabetes patients. *Patient education and counseling*. 2004;52(3):315-23. [https://doi.org/10.1016/S0738-3991\(03\)00107-1](https://doi.org/10.1016/S0738-3991(03)00107-1) PMID:14998602
29. Schwartzberg JG, Cowett A, VanGeest J, Wolf MS. Communication techniques for patients with low health literacy: a survey of physicians, nurses, and pharmacists. *American journal of health behavior*. 2007;31(1):S96-S104. <https://doi.org/10.5993/AJHB.31.s1.12>
30. Sudhakar S, Aebi ME, Burant CJ, Wilson B, Wenk J, Briggs FB, et al. Health literacy and education level correlates of participation and outcome in a remotely delivered epilepsy self-management program. *Epilepsy & Behavior*. 2020;107:107026. <https://doi.org/10.1016/j.yebeh.2020.107026> PMID:32249034 PMCID:PMC7242156
31. Jovic-Vranes A, Bjegovic-Mikanovic V. Which women patients have better health literacy in Serbia? *Patient education and counseling*. 2012;89(1):209-12. <https://doi.org/10.1016/j.pec.2012.06.001> PMID:22749876
32. Nekoei-Moghadam M, Parva S, Baneshi M. Health literacy and utilization of health services in Kerman urban area 2011. *Tolooebehdasht*. 2013;11(4):123-34.
33. Walters R, Leslie SJ, Polson R, Cusack T, Gorely T. Establishing the efficacy of interventions to improve health literacy and health behaviours: a systematic review. *BMC public health*. 2020;20(1):1-17. <https://doi.org/10.1186/s12889-020-08991-0> PMID:32605608 PMCID:PMC7329558
34. Sanders LM, Federico S, Klass P, Abrams MA, Dreyer B. Literacy and child health: a systematic review. *Archives of pediatrics & adolescent medicine*. 2009;163(2):131-40. <https://doi.org/10.1001/archpediatrics.2008.539> PMID:19188645