Health Scope. 2018 August; 7(3):e62212. doi: 10.5812/jhealthscope.62212.

Published online 2018 August 12. **Review Article**

Evaluation of Health Literacy in the Iranian Population

Sakineh Dadipoor[1], Ali Ramezankhani[2], Teamur Aghamolaei[3], Fatemeh Rakhshani[2] and Ali Safari-Moradabadi[4,*]

[1]Mother and Child Welfare Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran
[2]Department of Public Health, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[3]Social Determinants on Health Promotion Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, Iran
[4]Student Research Committee, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

[*]*Corresponding author*: Ph.D. Student of Health Education and Health Promotion, Student Research Committee, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: alisafari_31@yahoo.com

Received 2017 January 22; **Revised** 2018 July 15; **Accepted** 2018 August 01.

Abstract

Objective: This systematic review and meta-analysis was conducted to assess the level of health literacy (HL) in the Iranian population.
Data Sources: Persian and English-language articles were identified through Embase, MEDLINE, CINAHL, PsycINFO, SID, Web of Science, and hand-searching (search dates for articles on health literacy, 1990 to February 2016).
Study Selection: Two reviewers independently selected studies that directly measured health literacy levels.
Data Extraction: Abstracted article information were categorized into evidence tables by one reviewer; information accuracy was checked by a second reviewer. Two reviewers independently evaluated the study quality by using predefined inclusion criteria, and jointly the overall strength of evidence evaluated by the research team.
Results: Twenty-eight relevant good- or fair-quality studies amongst 102 articles were identified, and 44 publications were assessed in full text. The researchers excluded 16 studies: Nine were reports with inadequate results and seven had low quality. Results of meta-analysis showed that better level of HL existed among 66 adults (62.47 to 69.53), 61.62 patients (53.40 to 69.84), 58.88 female (51.68 to 66.07), and 40.98 elderly (17.71 to 64.26).
Conclusions: Health Literacy of the Iranian population was inadequate and borderline. Therefore, the need to increase awareness and intervention to reduce poor HL in the Iranian population is crucial.

Keywords: Health Literacy, Health Literacy Questionnaire, Iranian Population, Systematic Review

1. Context

As a new concept, HL was introduced in 1974 for the first time in scientific publications related to health education. However, it did not receive significant attention for two decades. The term entered the health promotion domain in 1997 by Kick Busch (1). By definition, HL is one's capacity of achievement, interpretation and comprehension of primary healthcare information and services required for proper decision-making (2). It involves a collection of reading, listening, analysis, decision-making, and ability of applying these skills in health-related situations. It does not necessarily correlate with one's education level or general literacy (3-5). Health Literacy has been introduced by the World Health Organization (WHO), as a key determiner of healthcare. It has been recommended globally to create an association to constantly monitor and coordinate strategic activities, especially with the aim of promoting healthcare (6).

Although it is not yet clear how HL affects health-related outcomes, there is plenty of evidence that many undesirable health consequences are due to inadequate HL (7). According to the investigations of the U.S. healthcare strategy center, those with low HL have fewer chances of comprehending health staff's oral or written advice. They, therefore, experience a lower health state and pay more for doctors' visits and are hospitalized more often (8, 9). They are less successful in performing self-care acts (10) as well as preventive acts (11) and, therefore, pay higher medical costs (12).

The primary goal of developing HL is facilitating communicative healthcare and HIT strategies to promote health status and achieve equality in health service provision (13).

Since HL is currently part of general health and due to the impact of this issue on social health promotion as well as the lack of related systematic research in the Iranian context, the present researchers intended to conduct a systematic review and meta-analysis to analyze and synthesize the body of research that investigated HL on different population groups in Iran.

2. Methods

2.1. Search Methods

The data were collected from national and international Persian and Latin databases, including MEDLINE, CINAHL, PsycINFO, SID, and Web of Science. A manual search was carried out for journals, organizational reports or different scientific teams. The primary analysis of the body of research included the following key terms searched in Persian and English via the OR and AND operators: HL, Iran, Persian HL Questionnaire, Test of Functional HL in Adults, Questionnaire NVS, HELIA Questionnaire, and Functional HL.

2.2. Eligibility Criteria

These criteria included cross-sectional research, search strategy in the Iranian context, and search strategy of research published in Persian or English between year 1990 to the end of February 2016.

2.3. Data Abstraction

Abstracted article information was categorized to evidence tables by one reviewer; information accuracy was checked by a second reviewer. Two reviewers independently evaluated study quality assessment by using predefined inclusion criteria, and jointly the overall strength of evidence was evaluated by the research team.

2.4. Quality Assessment

The quality of included studies was assessed using the National Institutes of Health Quality Assessment tool for observational cohort and cross sectional studies (http://www.nhlbi.nih.gov/health-pro/guidelines/indevelop/cardiovascular-risk-reduction/tools/cohort). Reporting of studies was assessed using an adapted version of the STROBE statement, which is a checklist of items that should be addressed in articles, reporting on three main study designs: cohort, case-control, and cross-sectional. This is included in the online supplementary material (14). The articles were categorized in terms of the significance and relevance to the topic, and then each part of the article, which could be used later on, was determined. The strengths and weaknesses of each article were noted and an overall evaluation was done, accordingly.

2.5. Data Extraction

Articles to be included were described and presented according to certain criteria, including the main author, year of publication, purpose of research, settings, sample size, Strobe checklist score, target group, type of questionnaire, and subjects' HL. Subsequently, the researchers entered the data from the articles in the Excel software, according to the items already mentioned in data extraction section.

2.6. Criteria for Classification of Health Literacy Scoring

The basis for classification of HL was the instruments used in studies. In these instruments (TOFHLA, HELIA and NVS), according to the cut-off points, there were three levels of HL interpretation: inadequate, borderline and adequate, and the interpretation of the results was done on the basis of instrument scoring.

2.7. Risk of Bias in Individual Studies

In order to minimize publication bias, a comprehensive search was carried out in a variety of databases. Moreover, in order to evaluate the heterogeneity, the present researchers analyzed all the articles in terms of participants and results.

2.8. Data Analysis

To evaluate heterogeneity among studies, the Q test ($P < 0.1$) and I-square statistics were used. In presence of heterogeneity, a random effect model was applied to compute pooled effect size (ES). The pooled health literacy was presented as 95% confidence interval (CI). The potential publication bias was assessed using Egger's test ($P < 0.1$ as significantly). All statistical analyses were done with the Stata software, version 14 (Stata Corp LP, College Station, Texas, USA) and $P < 0.05$ was statistically significant.

3. Results

3.1. Results of the Search

Two review authors (AS and SD) screened a total of 102 abstracts for inclusion (Figure 1), and assessed 44 publications in full text. The authors excluded 16 studies: Nine were reports with inadequate results and seven had low quality (see Characteristics of excluded studies, Figure 1).

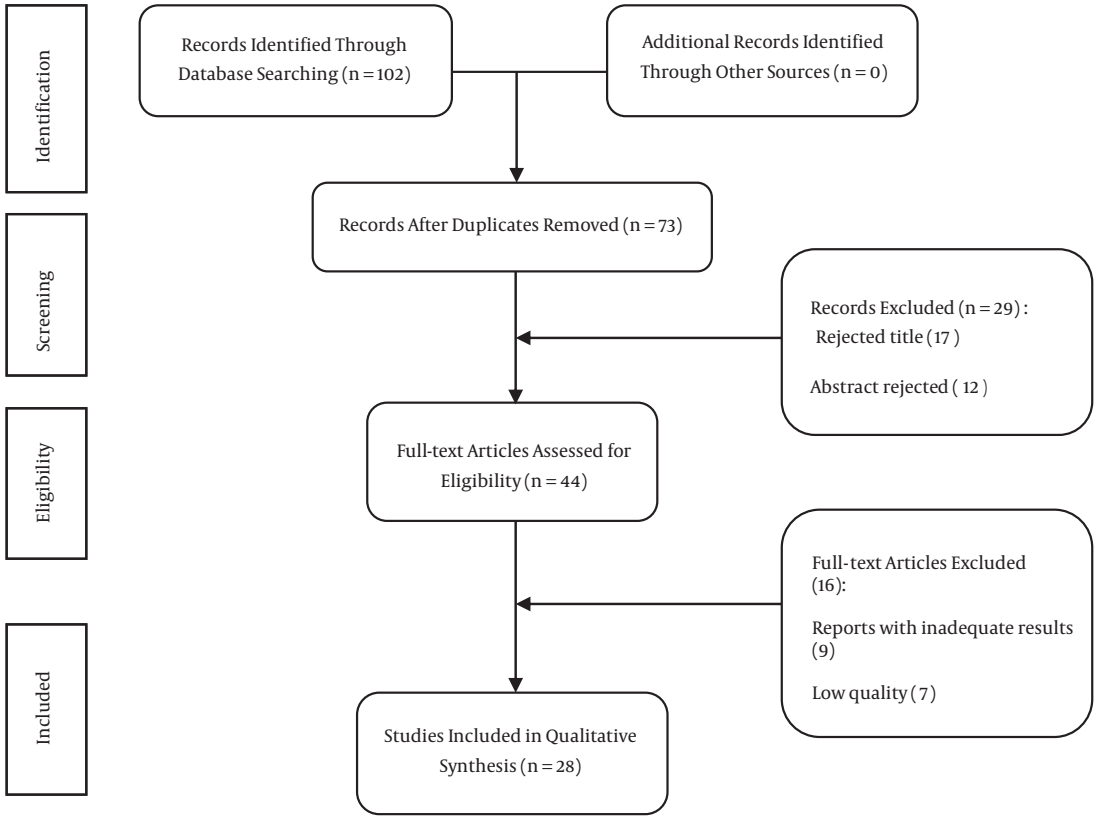

Figure 1. PRISMA flow diagram

3.2. Characteristics of Reviewed Studies

All the articles were considered as cross-sectional. Twenty-two studies used the TOFHLA questionnaire, five HELIA, and one study NVS. The sample size range was from minimum (N = 60) to maximum (N = 20571). Also, seven articles dealt with healthy adults; four addressed the elderly; ten pertained to hospitalized patients; five studied females and two had addressed HL among university students (see in Table 1).

3.3. Data Analysis Based on the Systematic Review

The strategy was to combine data of individual studies, according three levels of HL, as reported in Table 1 (inadequate, borderline, and adequate). All Iranian population-related studies assessed HL by self-administered questionnaires. According to the results, seven studies (N = 24247) reported adult-related HL, four studies (N = 914) assessed elderly-related HL, ten studies (N = 2204) conducted patient-related HL, and women-related HL was measured in five studies (N = 1007) and two studies were conducted on students (N = 868) (Table 2).

3.4. Data Analysis Based on Meta-Analysis Criteria (Mean and SD)

Seventeen studies were analyzed with the criteria for entering the meta-analysis. Estimation of meta-analysis results showed that the mean HL in the Iranian population was 59.96, CI 57.01 to 62.90. The researchers were able to combine data of five studies on adult-related HL (N = 24247) in a meta-analysis. According to the calculations, the mean HL in adults was estimated as 66, CI 62.47 to 69.53. Also the Q-test $P < 0.001$ and I^2 statistic was 99.8 (Table 3; Figures 2 and 3).

The Egger's test (Bias = 16.2, P = 0.003) found statistically significant publication bias (Figure 4).

4. Discussion

Results of this systematic and meta-analysis showed that HL in the Iranian population was borderline. Health literacy is a key factor involved in increasing social healthcare. The related literature in other populations worldwide also indicates a significantly inadequate level of HL.

Table 1. Characteristics of Studies According to Data Extraction in the Iranian Population

Authors	Sample Size	Target Group	Type of Questionnaire	Report Type	HL Level (Percentage to Total Sample Size)			Score of HL (0 - 100)	
					Inadequate	Average	Adequate	Mean	SD
Javadzadeh et al. (2013) (15)	525	Adult	TOFHLA	Self-administered	15.5	38	46.5	69.8	16.2
Tavousi et al. (2015) (16)	20571	Adult	HELIA	Self-administered	12	32.4	55.6	68.32	15.16
Tehrani Banihashemi et al. (2007) (17)	1086	Adult	TOFHLA	Self-administered	56.6	15.3	28.1	42.7	36
Afshari et al. (2014) (18)	285	Adult	HELIA	Self-administered	32.9	60.5	6.6	NR	NR
Haerian et al. (2015) (19)	380	Adult	TOFHLA	Self-administered	15.25	25.75	59	73.33	1.29
Izadirad and Zareban (2015) (20)	400	Adult	HELIA	Self-administered	34	34	32	NR	NR
Nekoei-Moghadam et al. (2012) (21)	1000	Adult	TOFHLA	Self-administered	4.8	53.8	41.4	74.4	9.1
Javadzade et al. (2012) (6)	354	Elderly	TOFHLA	Self-administered	79.6	11.6	8.8	29.07	30.45
Kooshyar et al. (2013) (22)	300	Elderly	TOFHLA	Self-administered	70	14	16	52.82	13.25
Reisi et al. (2014) (23)	60	Elderly	TOFHLA	Self-administered	80.7	10.9	8.4	NR	NR
Mohseni et al. (2015) (24)	200	Elderly	TOFHLA	Self-administered	52	31	17	NR	NR
Mollakhalili et al. (2014) (25)	384	Patient	TOFHLA	Self-administered	40.1	27	32.9	63.31	18.13
Khosravi and Ahmadzadeh (2016) (26)	250	Patient	TOFHLA	Self-administered	39.2	38	22.8	69.2	14
Malekzadeh et al. (2016) (27)	200	Patient	TOFHLA	Self-administered	49	22	29	NR	NR
Rafiezadeh Gharrehtapeh et al. (2015) (28)	100	Patient	HELIA	Self-administered	21	59	20	86.7	21.9
Tol et al. (2012) (29)	160	Patient	TOFHLA	Self-administered	19.4	46.9	33.7	57.40	15.87
Mohammadi et al. (2015) (30)	407	Patient	TOFHLA	Self-administered	70	11.8	18.2	43	28.7
Moeini et al. (2016) (31)	131	Patient	TOFHLA	Self-administered	73.3	16.4	10.3	48.22	7.73
Kohan et al. (2007) (32)	150	Women	TOFHLA	Self-administered	34	48	18	NR	NR
Peyman and Abdollahi (2016) (33)	120	Women	TOFHLA	Self-administered	30	42.5	27.5	51.4	12.3
Zareban and Izadirad (2016) (34)	247	Women	TOFHLA	Self-administered	33.2	34.4	32.4	NR	NR
Ghanbari et al. (2011) (35)	240	Women	TOFHLA	Self-administered	30	24.6	45.4	66.4	14.8
Peyman et al. (2015) (36)	250	Women	TOFHLA	Self-administered	82.8	6	11.2	58.78	9.55
Miri et al. (2016) (37)	75	Patient	TOFHLA	Self-administered	38.6	46.7	14.7	64.14	7.19
Darvishpour et al. (2016) (38)	257	Patient	TOFHLA	Self-administered	28.4	30	41.6	NR	NR
Qobadi et al. (2015) (39)	240	Patient	TOFHLA	Self-administered	27.65	12.75	59.6	NR	NR
Mahmoudi and Taheri (2015) (40)	368	Students	HELIA	Self-administered	25	38.31	36.69	NR	NR
Ramezankhani et al. (2015) (41)	500	Students	NVS	Self-administered	35.6	43.4	21	NR	NR

Table 2. Subgroup Systematic Review of HL in the Iranian Population

Sub Group	No. of Study	Sample Size	HL Level (Percentage to Total Sample Size)		
			Inadequate	Average	Adequate
Adult	7	24247	24.43	37.1	38.47
Elderly	4	914	70.57	16.87	12.56
Patient	10	2204	40.88	30.28	28.84
Women	5	1007	42	31.1	26.9
Students	2	868	30.3	40.86	28.84
Total	28	29240	41.63	31.24	27.12

In a systematic review of 85 studies in North America, Paasche-Orlow et al. reported 26% inadequate HL and 20% mean HL (42). Wagner et al. reported the HL of English adults as 4.11% (43). In their research on elderly patients with diabetes and hypertension in two American hospitals, Williams et al. estimated HL as inadequate since it was 44% in elderly diabetic patients and 49% in those with hypertension (7). The findings obtained by Ozdemir et al. in Turkey revealed that more than two-thirds of the subjects (97.1%) had low or average level of HL (44). In the Netherlands, HL was reported by Fransen et al. to be mostly inadequate and average (79%) (45). In Lee's investigation, about 30% of Taiwanese adults showed average or low level of HL (46).

Health Literacy has a direct relationship with community health and has a reverse relationship with medical ex-

Table 3. Subgroup Meta-Analysis of HL in the Iranian Population

	No. of Study	Sample Size	Mean (95% CI)	Heterogeneity	
				I^2 (%)	Q-Test
Group					
Adult	5	23562	66 (62.47 - 69.53)	99.8	< 0.001
Elderly	2	654	40.98 (17.71 - 64.26)	99.4	< 0.001
patient	7	1507	61.62 (53.40 - 69.84)	99.2	< 0.001
Women	3	610	58.88 (51.68 - 66.07)	98.1	< 0.001
Total	17	26333	59.96 (57.01 - 62.90)	99.8	< 0.001

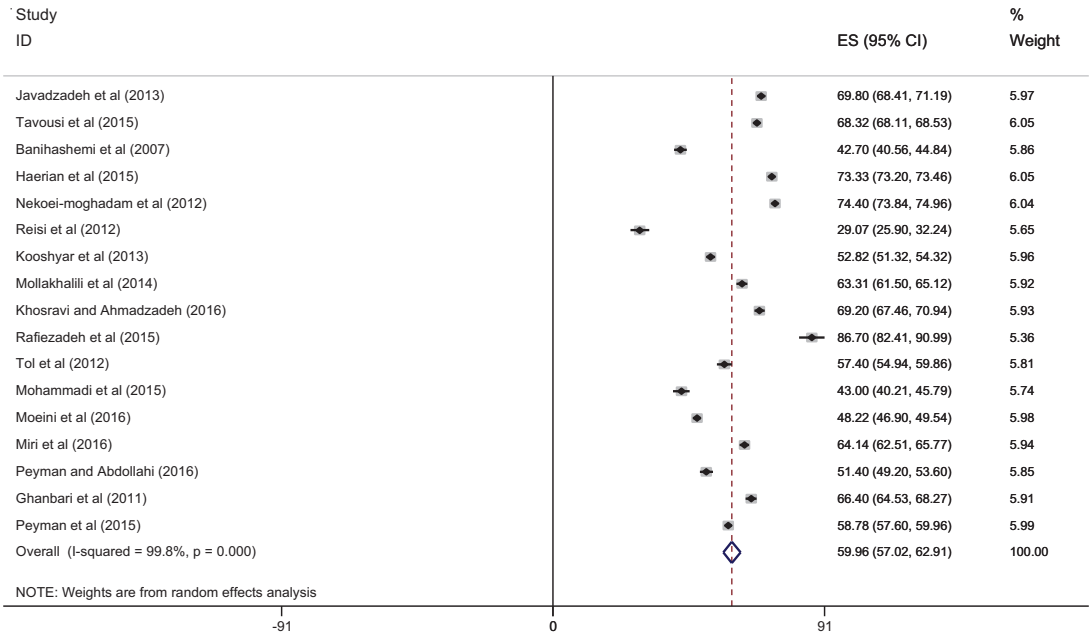

Figure 2. Forest plot of the Mean HL in the Iranian Population

penses. This is why in the recent years, most of developed health systems in the world dedicated much of their activities and sources to public education (47).

According to the present findings, elderly HL was low. Kutner et al. at the national level, in the United States, indicated that only 3% of the elderly had adequate HL (48).

In the study of Wagner et al. in the UK, 30% of the elderly with 60 years of age, had inadequate HL (43). The results of the Bostock and Steptoe study showed that 67.2% of the elderly had high health literacy, and 20.3% and 12.5% had low HL (49).

A variety of research has indicated that the low level of HL in the elderly is accompanied by consequences, including higher mortality rate (50), fewer preventive attempts, such as screening tests (51), showing certain high risk behaviors (52), and lower physical and mental health (53). On the other hand, according to previous reports, currently about 6% of the entire Iranian population are above 60 years of age. This rate is predicted to be 26% by 2050 in the Iranian population (54). Therefore, the wide range of inadequate HL of the elderly is a warning to authorities and healthcare policy makers. The need for more attention to HL seems to be essential in health promotion plans.

Considering the importance of old age and increasing elderly population, it has been suggested that special facilities, such as associations related to the needs of the elderly, and training courses with a focus on lifestyle and health literacy should be considered.

The findings related to the female population showed a borderline level of HL. In different studies, the HL of most

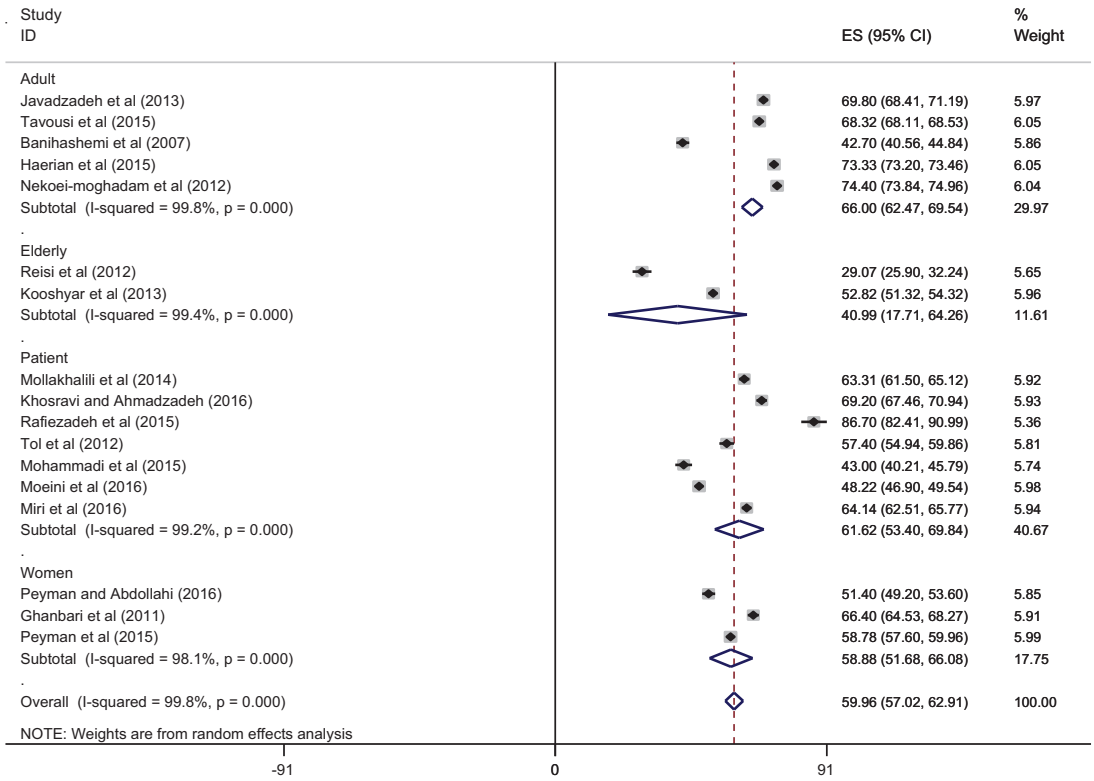

Figure 3. Forest plot of the Mean HL in a subgroup of the Iranian population

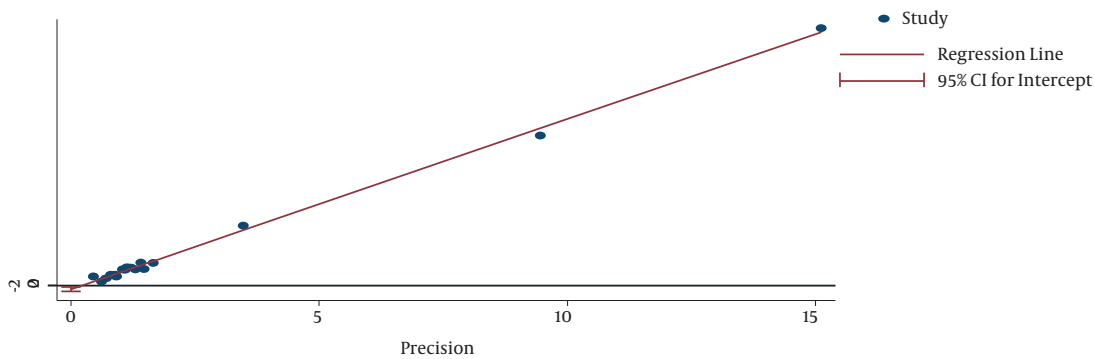

Figure 4. Egger's test funnel plot for publication bias

females was reported as borderline (5, 55). Jovic-Vranes and Bjegovic-Mikanovic in Siberia reported that 44% of females had inadequate and borderline HL (56). Also, Lee et al. found that approximately 29% of females had inadequate and marginal health literacy (57). Furthermore, HL is considered as a key element of female's involvement in health promotion activities and preventive acts for the themselves and their family. It is nearly impossible for a woman to make the right health-related decision for herself and her family when she is unequipped with proper healthcare knowledge (58).

A systematic review study by Berkman et al. examined the relationship between health literacy and health outcomes (59). Considering the importance of the relationship between HL and use of health outcomes, health care services and costs, it is crucial to consider population

health literacy levels.

Analysis of instruments showed that the most common instrument used in systematic and meta-analyses was TOFHILA. As highlighted by Haun et al. a proper healthcare instrument should assess multiple aspects of literacy, including interaction, reading comprehension, numeracy comprehension, information search, performance, decision making, evaluation, responsibility, self-efficiency, and diagnosis (60). However, this instrument only addresses reading comprehension, numeracy comprehension, and evaluation. On the other hand, this instrument was used for all groups (healthy or unhealthy). One reason for the low level of HL in Iranians might be that there is no instrument specifically designed for measuring HL. Therefore, development of HL measurement instruments for specific groups with a focus on three variables, including use of health information, perception of health state, and use of health services seems necessary.

5. Conclusion

The results showed that better HL existed among adults, patients, females and elderly, respectively. This research found that HL of the Iranian population was inadequate and borderline. Therefore, the need to increase awareness and intervention to reduce poor HL in the Iranian population is crucial. Therefore, attention to elderly and females that appear most likely to have low levels of HL is necessary. These strategies will not be achieved without recognition that HL is a serious concern. In fact, to increase the level of HL of the community, the simplification of information and understandable educational materials, communication strategies and assistance from health education professionals for planning, and the design of educational programs will be useful.

Acknowledgments

Ethical approval was obtained from the Ethical Board Committee of Shahid Beheshti University of Medical Sciences. The authors extend their gratitude to the Shahid Beheshti University of Medical Sciences for their support.

Footnote

Conflict of Interests: There was no conflict of interest to be declared.

References

1. Kindig DA, Panzer AM, Nielsen-Bohlman L. *Health literacy: a prescription to end confusion*. National Academies Press; 2004.
2. Seiden C, Zorn M, Ratzan S, Parker R. *National library of medicine current bibliographies in medicine: Health literacy*. National Institutes of Health; 2000.
3. Parker RM, Ratzan SC, Lurie N. Health literacy: a policy challenge for advancing high-quality health care. *Health Aff (Millwood)*. 2003;**22**(4):147–53. [PubMed: 12889762].
4. Nam S, Chesla C, Stotts NA, Kroon L, Janson SL. Barriers to diabetes management: patient and provider factors. *Diabetes Res Clin Pract*. 2011;**93**(1):1–9. doi: 10.1016/j.diabres.2011.02.002. [PubMed: 21382643].
5. Safari Morad Abadi A, Agha Molaei T, Ramezankhani A, Dadipoor S. The health literacy of pregnant women in Bandar Abbas, Iran. *J School Public Health and Institute Public Health Res*. 2017;**15**(2):121–32. eng.
6. Javadzade SH, Sharifirad G, Radjati F, Mostafavi F, Reisi M, Hasanzade A. Relationship between health literacy, health status, and healthy behaviors among older adults in Isfahan, Iran. *J Educ Health Promot*. 2012;**1**:31. doi: 10.4103/2277-9531.100160. [PubMed: 23555134]. [PubMed Central: PMC3577376].
7. Williams MV, Parker RM, Baker DW, Parikh NS, Pitkin K, Coates WC, et al. Inadequate functional health literacy among patients at two public hospitals. *JAMA*. 1995;**274**(21):1677–82. [PubMed: 7474271].
8. Baker DW, Gazmararian JA, Williams MV, Scott T, Parker RM, Green D, et al. Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *Am J Public Health*. 2002;**92**(8):1278–83. [PubMed: 12144984]. [PubMed Central: PMC1447230].
9. Baker DW, Parker RM, Williams MV, Clark WS, Nurss J. The relationship of patient reading ability to self-reported health and use of health services. *Am J Public Health*. 1997;**87**(6):1027–30. [PubMed: 9224190]. [PubMed Central: PMC1380944].
10. 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. [PubMed: 12132978].
11. Scott TL, Gazmararian JA, Williams MV, Baker DW. Health literacy and preventive health care use among Medicare enrollees in a managed care organization. *Med Care*. 2002;**40**(5):395–404. [PubMed: 11961474].
12. Howard DH, Sentell T, Gazmararian JA. Impact of health literacy on socioeconomic and racial differences in health in an elderly population. *J Gen Intern Med*. 2006;**21**(8):857–61. doi: 10.1111/j.1525-1497.2006.00530.x. [PubMed: 16881947]. [PubMed Central: PMC1831584].
13. Smith SK, Dixon A, Trevena L, Nutbeam D, McCaffery KJ. Exploring patient involvement in healthcare decision making across different education and functional health literacy groups. *Soc Sci Med*. 2009;**69**(12):1805–12. doi: 10.1016/j.socscimed.2009.09.056. [PubMed: 19846245].
14. Mangin D, Stephen G, Bismah V, Risdon C. Making patient values visible in healthcare: a systematic review of tools to assess patient treatment priorities and preferences in the context of multimorbidity. *BMJ Open*. 2016;**6**(6). e010903. doi: 10.1136/bmjopen-2015-010903. [PubMed: 27288377]. [PubMed Central: PMC4908882].
15. Javadzade H, Sharifirad G, Reisi M, Tavassoli E, Rajati F. Health literacy among adults of isfahan. *Iran J Health Syst Res*. 2013;**9**(5):540–9.
16. Tavousi M, Haeri Mehrizi A, Rafiefar S, Solimanian A, Sarbandi F, Ardestani M, et al. Health literacy in Iran: findings from a national study. *Payesh*. 2016;**15**(1):95–102.
17. Tehrani Banihashemi SA, Amirkhani MA. Health literacy and the influencing factors: a study in five provinces of Iran. *Strides Dev Med Educ*. 2007;**4**(1):1–9.
18. Afshari M, Khazaei S, Bahrami M, Merati H. Investigating adult health literacy in Tuyserkan City. *J Educ Community Health*. 2014;**1**(2):48–55.
19. Haerian A, Moghaddam MH, Ehrampoush MH, Bazm S, Bahsoun MH. Health literacy among adults in Yazd, Iran. *J Educ Health Promot*. 2015;**4**:91. doi: 10.4103/2277-9531.171805. [PubMed: 27462633]. [PubMed Central: PMC4946262].

20. Izadirad H, Zareban I. The relationship of health literacy with health status, preventive behaviors and health services utilization in Baluchistan, Iran. *J Educ Community Health*. 2015;**2**(3):43–50.
21. Nekoei-Moghadam M, Parva S, Amiresmaili M, Baneshi M. Health literacy and utilization of health services in Kerman urban area 2011. *Tolue Behdasht J*. 2012;**11**(14):123–34.
22. Kooshyar H, Shoorvazi M, Dalir Z, Hosseini M. Health literacy and its relationship with medical adherence and health-related quality of life in diabetic community-residing elderly. *J Mazandaran Univ Med Sci*. 2014;**23**(1):134–43.
23. Reisi M, Javadzade SH, Heydarabadi AB, Mostafavi F, Tavassoli E, Sharifirad G. The relationship between functional health literacy and health promoting behaviors among older adults. *J Educ Health Promot*. 2014;**3**:119. doi: 10.4103/2277-9531.145925. [PubMed: 25540792]. [PubMed Central: PMC4275619].
24. Mohseni M, Khanjani N, Iranpour A, Tabe R, Borhaninejad VR. The Relationship Between Health Literacy and Health Status Among Elderly People in Kerman. *Iran J Ageing*. 2015;**10**(2):146–55.
25. Mollakhalili H, Papi A, Zare-Farashbandi F, Sharifirad G, HasanZadeh A. A survey on health literacy of inpatient's educational hospitals of Isfahan University of Medical Sciences in 2012. *J Educ Health Promot*. 2014;**3**:66. doi: 10.4103/2277-9531.134804. [PubMed: 25077159]. [PubMed Central: PMC4113979].
26. Khosravi A, Ahmadzadeh K. Investigating health literacy Level of patients referred to Bushehr hospitals and recognizing its effective factors. *Iran South Med J*. 2016;**18**(6):1245–53.
27. Malekzadeh S, Azami M, Mirzaei M, Motamedi F. Comparative investigation of health literacy level of cardiovascular patients hospitalized in private and educational hospitals of Kerman City, Iran. *Acta Inform Med*. 2016;**24**(1):56–60. doi: 10.5455/aim.2016.24.56-60. [PubMed: 27041812]. [PubMed Central: PMC4789678].
28. Rafiezadeh Gharrehtapeh S, Tabarsy B, Hassanjani S, Razavi M, Amjady M, Hojjati H. Relationship between the health literacy with selfefficacy of the diabetic patient's type 2 referred to Gorgan city clinic in 2014. *J Diabetes Nurs*. 2015;**3**(2):30–42.
29. Tol A, Pourreza A, Tavasoli E, Rahimi Foroshani A. Determination of knowledge and health literacy among women with type 2 diabetes in teaching hospitals of TUMS. *J Hospital*. 2012;**11**(3).
30. Mohammadi Z, Tehrani Banihashemi A, Asgharifard H, Bahramian M, Baradaran HR, Khamseh ME. Health literacy and its influencing factors in Iranian diabetic patients. *Med J Islam Repub Iran*. 2015;**29**:230. [PubMed: 26478888]. [PubMed Central: PMC4606944].
31. Moeini B, Haji Maghsodi S, Kangavari M, Afshari M, Zavar Chahar Tagh J. Factors associated with health literacy and self-care behaviors among Iranian diabetic patients: A cross-sectional study. *J Communication Healthcare*. 2016;**9**(4):279–87.
32. Kohan S, Ghasemi S, Dodangeh M. Associations between maternal health literacy and prenatal care and pregnancy outcome. *Iran J Nurs Mid Res*. 2008;**12**(4).
33. Peyman N, Abdollahi M. The relationship between health literacy and self-efficacy physical activity in postpartum women. *J Health Lit*. 2016;**1**(1):5–12.
34. Zareban I, Izadirad H. Evaluation of health literacy, health status and health services utilization in women in Baluchistan region of Iran. *J Health Lit*. 2016;**1**(2):71–82.
35. Ghanbari S, Majlessi F, Ghaffari M, Mahmoodi Majdabadi M. Evaluation of health literacy of pregnant women in urban health centers of Shahid Beheshti Medical University. *Daneshvar*. 2012;**19**(97):1–12.
36. Peyman N, Amani M, Esmaily H. The relationship between health literacy and the theory of planned behavior on Breast Cancer Screening Programs among rural women in Roshtkhar, Iran 2015. *J Cell Immunother*. 2015;**1**(1-2):41–2.
37. Miri A, Ghanbari MA, Najafi A. The relationship between health literacy and the recovery rate of cardiovascular patients after bypass surgery. *J Health Lit*. 2016;**1**(2):83–91.
38. Darvishpour J, Omidi S, Farmanbar R. The relationship between health literacy and hypertension treatment control and follow-up. *Caspian J Health Res*. 2016;**2**(1):1–8.
39. Qobadi M, Besharat MA, Rostami R, Rahiminezhad A, Pourgholami M. Health literacy, negative emotional status, and self-care behaviors in dialysis. *J Fundam Ment Health*. 2014;**17**(1):46–51.
40. Mahmoudi H, Taheri A. Relation between information literacy and health literacy of students in Ferdowsi University of Mashhad. *Hum Info Interac*. 2015;**2**(2):31–41.
41. Ramezankhani A, Ghafari M, Rakhshani F, Ghanbari S, Azimi S. Comparison of health literacy between medical and non-medical students in Shahid Beheshti Universities in the academic year 92-93. *Pajoohandeh J*. 2015;**20**(2):78–85.
42. Paasche-Orlow MK, Parker RM, Gazmararian JA, Nielsen-Bohlman LT, Rudd RR. The prevalence of limited health literacy. *J Gen Intern Med*. 2005;**20**(2):175–84. doi: 10.1111/j.1525-1497.2005.40245.x. [PubMed: 15836552]. [PubMed Central: PMC1490053].
43. Wagner CV, Knight K, Steptoe A, Wardle J. Functional health literacy and health-promoting behaviour in a national sample of British adults. *J Epidemiol Community Health*. 2007;**61**(12):1086–90. doi: 10.1136/jech.2006.053967. [PubMed: 18000132]. [PubMed Central: PMC2465677].
44. Ozdemir H, Alper Z, Uncu Y, Bilgel N. Health literacy among adults: a study from Turkey. *Health Educ Res*. 2010;**25**(3):464–77. doi: 10.1093/her/cyp068. [PubMed: 20080808].
45. Fransen MP, Van Schaik TM, Twickler TB, Essink-Bot ML. Applicability of internationally available health literacy measures in the Netherlands. *J Health Commun*. 2011;**16 Suppl 3**:134–49. doi: 10.1080/10810730.2011.604383. [PubMed: 21951248].
46. Lee SY, Tsai TI, Tsai YW, Kuo KN. Health literacy, health status, and healthcare utilization of Taiwanese adults: results from a national survey. *BMC Public Health*. 2010;**10**:614. doi: 10.1186/1471-2458-10-614. [PubMed: 20950479]. [PubMed Central: PMC2967535].
47. Kickbusch I. Health literacy: an essential skill for the twenty-first century. *Health Educ*. 2008;**108**(2):101–4.
48. Kutner M, Greenburg E, Jin Y, Paulsen C. *The health literacy of America's adults: results from the 2003 national assessment of adult literacy. NCES 2006-483*. 2006.
49. Bostock S, Steptoe A. Association between low functional health literacy and mortality in older adults: longitudinal cohort study. *BMJ*. 2012;**344**. e1602. doi: 10.1136/bmj.e1602. [PubMed: 22422872]. [PubMed Central: PMC3307807].
50. Baker DW, Wolf MS, Feinglass J, Thompson JA, Gazmararian JA, Huang J. Health literacy and mortality among elderly persons. *Arch Intern Med*. 2007;**167**(14):1503–9. doi: 10.1001/archinte.167.14.1503. [PubMed: 17646604].
51. White S, Chen J, Atchison R. Relationship of preventive health practices and health literacy: a national study. *Am J Health Behav*. 2008;**32**(3):227–42. doi: 10.5555/ajhb.2008.32.3.227. [PubMed: 18067463].
52. Wolf MS, Gazmararian JA, Baker DW. Health literacy and health risk behaviors among older adults. *Am J Prev Med*. 2007;**32**(1):19–24. doi: 10.1016/j.amepre.2006.08.024. [PubMed: 17184964].
53. Wolf MS, Gazmararian JA, Baker DW. Health literacy and functional health status among older adults. *Arch Intern Med*. 2005;**165**(17):1946–52. doi: 10.1001/archinte.165.17.1946. [PubMed: 16186463].
54. Islamic Republic News Agency Social. *Elderly*. 2007. Available from: www.irna.com/en/news/line-8.html.
55. Dadipoor S, Ramezankhani A, Alavi A, Aghamolaei T, Safari-Moradabadi A. Pregnant women's health literacy in the South of Iran. *J Fam Reprod Health*. 2017;**11**(4):211–8.
56. Jovic-Vranes A, Bjegovic-Mikanovic V. Which women patients have better health literacy in Serbia? *Patient Educ Couns*. 2012;**89**(1):209–12. doi: 10.1016/j.pec.2012.06.001. [PubMed: 22749876].
57. Lee SY, Tsai TI, Tsai YW, Kuo KN. Health literacy and women's health-related behaviors in Taiwan. *Health Educ Behav*. 2012;**39**(2):210–8. doi:

10.1177/1090198111413126. [PubMed: 21742948].
58. Shieh C, Halstead JA. Understanding the impact of health literacy on women's health. *J Obstet Gynecol Neonatal Nurs*. 2009;**38**(5):601–10. quiz 610-2. doi: 10.1111/j.1552-6909.2009.01059.x. [PubMed: 19883483].
59. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: an updated systematic review. *Ann Intern Med*. 2011;**155**(2):97–107. doi: 10.7326/0003-4819-155-2-201107190-00005. [PubMed: 21768583].
60. Haun JN, Valerio MA, McCormack LA, Sorensen K, Paasche-Orlow MK. Health literacy measurement: an inventory and descriptive summary of 51 instruments. *J Health Commun*. 2014;**19 Suppl 2**:302–33. doi: 10.1080/10810730.2014.936571. [PubMed: 25315600].