

Health Literacy among Iranian adults: findings from a nationwide population-based survey, 2015

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Abstract

Background: Low health literacy (HL) is associated with elevated risks for poorer access to care, adverse health outcomes, and increased hospitalization and health costs.

Aims: This study aimed to determine the level of HL among the general adult population in the Islamic Republic of Iran.

Methods: Using a cross-sectional study during 2014–2015 with a multistage cluster sampling approach, we administered a pilot-tested standardized questionnaire to assess different domains of HL (i.e., reading, comprehension, communication/decision-making and Interpretation/judgment skills, individual and social empowerment, health information access, health information use and health knowledge) among 8439 (3935 males) individuals aged 18–60 years. Data were collected through face-to-face interviews. Descriptive statistics and multivariable linear regression method using SPSS (20) were applied to identify the factors associated with HL among Iranian adults.

Results: The mean HL level was 10.2±3.8 (out of 20). Only 18% (95% confidence interval [CI]: 17.15–18.78) of the participants had adequate HL, while 45.7% (95% CI: 44.64–46.78) had inadequate, and the 36.3% (95% CI: 35.21–37.33) had moderate HL. In the adjusted linear regression model, education level (the smallest $\beta = 4.35$, $P < 0.001$), age ($\beta = 0.01$, $P = 0.002$), female sex ($\beta = 0.45$, $P < 0.001$), residency in rural areas ($\beta = 0.26$, $P < 0.001$) and having permanent job ($\beta = 1.03$, $P < 0.001$) were significantly associated with more HL.

Conclusions: Our findings highlighted that the Iranian adult population has an insufficient level of HL, which calls for comprehensive upstream and downstream educational plans to improve levels. These educational plans should pay special attention to certain sub-populations (e.g., illiterate populations) and HL domains (e.g., individual empowerment).

Keywords: Health literacy, adult, Iranian Health Literacy Questionnaire, Iran.

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Introduction

Health literacy (HL), defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” is an increasingly recognized public health concept that mediates the association between health and education (1,2). HL is a tool to empower people to take better control of their health and eventually lead to the development of social capital (3–5). HL also influences the efficiency and effectiveness of health education and promotion programmes and is one of the most important determinants of noncommunicable diseases prevention (3). Indeed, studies suggest HL to be a stronger predictor of health compared to other individual characteristics such as income, occupation, educational attainment, and age (3,6).

Furthermore, inadequate HL is associated with increased workplace incidents, hospitalization and re-admission rates, morbidity and premature death, engagement in risky behaviours (e.g., substance use), and a decrease in self-care and participation in screening and disease prevention programmes (1,3). Therefore, it is essential to provide health policy-makers with reliable estimates of HL to help inform decision-making procedures. While educational levels have an undeniable role in individuals’ HL levels, several other factors such as age, environment, income, ethnicity as well as communication skills with healthcare providers have been identified to be influential on people’s HL (7,8).

Insufficient HL levels vary greatly across different settings, varying from 54.3% in Germany to 58% in Turkey and 28.5% in England (9–11). Lower levels of HL are often observed in the developing settings such as the Middle Eastern context (12). In the Islamic Republic of Iran – one of the most populated countries in the Middle East – several studies have reported overall insufficient HL levels, ranging from 41% in adults in the central province of Yazd to 68% in the South Eastern province of Baluchistan (13). Previous studies have also indicated varying levels of HL among different subpopulations of patients (e.g., 70% insufficient HL in diabetic patients [14]) and age groups (e.g., 79.6% insufficient HL among older adults [15]). However, the existing body of evidence often suffers from sampling biases (e.g., small sample size, restricted sub-populations, certain geographic areas)

and has focused on specific aspects of HL (e.g., using TOFHLA that measuring patients' ability to read and understand the concepts of texts in Health centers). Moreover, the only nation-wide study was with a reasonable sample size on literate and urban individuals aged 18–65 years (16) that did not cover illiterate and rural areas. Therefore, the present study aimed to determine the level of HL in the Islamic Republic of Iran with an eye for addressing the existing gaps and limitations in the literature. Using the validated Iranian Health Literacy Questionnaire (IHLQ) (17), we aimed to assess all of the important domains of HL and factors associated with HL in the urban and rural adult population across nine major provinces in the country.

Methods

Sampling and data collection

This cross-sectional household survey was conducted in nine provinces (out of 31) in the Islamic Republic of Iran from May 2014 to December 2015. Using a multi-stage sampling scheme, 8950 individuals were recruited, 8439 (3935 males, 4469 females and 35 undefined) of whom were deemed eligible for this analysis. Samples were divided equally between rural and urban areas as well as males and females. All provinces were stratified into three levels of low, moderate, and high literacy based on the most recent Statistical Center of Iran's provincial literacy rates (18). The distribution of population in provinces of all three groups is not uniform and most populations were in the provinces listed in the third group. Therefore, we tried to select provinces based on proportion-to-size to be the representative of the whole country, and thus more provinces were selected from this group. One province from low literacy level (i.e., Sistan & Baluchestan), two provinces from the moderate level (i.e., Kerman and Markazi), and six provinces from the high literacy level (i.e., Mazandaran, Qom, Booshehr, Yazd, Isfahan, and Qazvin) were randomly selected. Primary sampling units (PSU), consisting of 30 subjects each, were randomly defined from rural and urban areas in the selected provinces. Based on the population size of selected cities and villages, one to three PSU were enrolled. The sample size of this study was calculated to estimate the level of HL with a maximum 5% deviation with 95% confidence in each stratum and each sub-group.

Participants were included if they were aged 18–60 years, Iranian, and able to communicate in Farsi. A systematic random sampling frame was undertaken to inform the selection of households in each municipal area (19). If the house appeared to be occupied but no-one was home, interviewers would return at another time. If no resident was available on the return visit, there was no eligible individual in the house, or the eligible respondent refused to participate in the study, an adjacent house was approached. Face-to-face interviews were conducted at the door of their home for 15–30 minutes (with around 20 minutes for most samples). Participants were briefed about the objectives of the study. The questionnaire was self-administered for literate participants and interviewer-administered (gender-matched) for those who were illiterate.

Questionnaire

Data were collected using the Iranian Health Literacy Questionnaire (IHLQ) (17). This questionnaire – validated for use in the Iranian context – consists of 53 items in nine HL domains: health information access (5 items), health information use (6 items), reading skills (5 items), comprehension skills (8 items), interpretation/judgment skills (6 items), communication and decision-making skills (8 items), health knowledge (5 items), individual empowerment (6 items), and social empowerment (4 items). In our previous study, in which we validated our questionnaire, Kaiser-Meyer-Olkin (KMO) coefficient was equal to 0.95, Bartlett's test for sphericity was statistically significant ($P < 0.001$) and

Cronbach's alpha was more than 0.7 (0.71–0.9). Also, Intra Class Coefficient (ICC) for each construct varied between 0.60–0.81.

Data analysis

Dependent variable: health literacy

The current analysis explores factors associated with HL, which was treated as a categorical variable for descriptive purposes and as a continuous variable for the regression analyses. The main dependent variable in this study was HL in order to allow policy-makers a more accurate understanding of it. The score of construct was calculated based on a Likert scale 0–3 or 0–4, then the final score of each construct was changed to a scale from 0 to 20. Overall HL score was determined by aggregating correct answers from all questions and ranged between 0–20. Scores were then categorized into three groups: inadequate (<10), moderate (10–14) and adequate (>14) HL.

Independent variables

Independent variables included age, sex, education (illiterate, elementary and secondary education, high school and diploma, or college/university education), residency (urban or rural), and occupation (student school/university, housewife/homemaker, retired, unemployed, temporary job, or permanent job). We defined permanent job as a relatively stable employment with a regular salary in the last year, and temporary job as part-time employment with a low confidence to continue working during in the last year.

Statistical analysis

Univariate and multivariable linear regression models were constructed to investigate the determinants of HL among the general Iranian population. Categorical variables were offered to the multifactorial model using a series of indicator variables. For example, job had 7 categories. We selected one type of job as reference, and created 6 binary variables which took values of 0 and 1. To achieve a higher generalizability of the results, HL was standardized using the literacy level (according to the 2011 Population and Housing Census of Iran) of participants as the most important predictor. To estimate the national and sub-national HL scores, the clustering effect and the sampling weights were computed and applied to all of the descriptive and analytical statistics using random effects models. All analyses were done using SPSS version 20, and p-values less than 5% were considered as statistically significant.

Ethical considerations

Verbal informed consent was obtained from the participants after explaining the goals of the study and assuring the privacy. Also, questionnaires were designed anonymously. This study obtained the ethics clearance (Ref. No: 300. 12690) from the Health Department of the Ministry of Health and Medical Education (MoHME).

Results

Demographic characteristics

Of the 8950 questionnaires, 8439 (response rate = 94.3%) were considered appropriate for the analysis. The mean age of the participants was 36.7±11.5 (36.16±11.33 for females and 37.33±11.80

for males). 47% (n = 4469) of the participants were male and 42.1% (n = 3557) of participants were living in rural areas. 35.3% (n = 2974) of the participants had completed elementary or secondary school and 10.8% (n = 908) were illiterate. Most participants were housewives (43.6%), 24.9% had a permanent job and 4.7% were retired (Table 1). The prevalence of literacy among males was significantly higher than females (92.4% vs. 86.4%; $P < 0001$). The prevalence of illiteracy in rural and urban areas was 15.5% and 7.3%, respectively. In addition, 13.8% of rural and 27.3% of urban participants had a university degree.

Health literacy status

Figure 1 displays different HL levels across males and females. The mean HL level was 10.2 ± 3.8 (on a scale of 0–20). Standardized HL level was classified into three categories: inadequate (<10), moderate (10–14) and adequate (>14) HL. Overall, 45.7% of the participants had inadequate and 18% had adequate HL scores. More than 95% of the illiterate participants had an inadequate HL level, and only 41% of those with a university degree had an adequate HL level (Figure 2). Regarding HL domains, the highest score of inadequate and adequate HL was related to “individual empowerment” (73.2%) and “communication and decision-making skills” (46.3%), respectively (Figure 3).

Association of HL and independent variables

The crude score of HL decreased with the increase in age, while it significantly increased with age in adjusted models ($P = 0.01$). In the crude model, the mean score of HL of females was less than that of males; while it was reversed in the adjusted regression model and HL of females was more than males ($P = 0.01$). There was a significant association between literacy level and HL level both in the crude and adjusted models, and this association increased with higher literacy level. In the adjusted regression model, people with a permanent job had a significantly higher level of HL than other occupational categories. In the crude model, HL score of city dwellers was higher than that of villagers by 0.80. However, in the adjusted model, HL score of rural residents was higher than that of city dwellers by 0.26, which is statistically significant ($P < 001$) (Table 2).

Discussion

This study was a comprehensive study of HL in the Islamic Republic of Iran using a culturally specific, reliable, and valid questionnaire capable of revealing a more realistic image of HL. A systematic review and meta-analysis showed that the most common instrument used in measuring HL in the country was TOFHLA. This instrument only addresses reading and numeracy comprehension, and evaluation (20). As noted by Haun et al., a proper HL instrument should measure multiple aspects of literacy, including interaction, numeracy comprehension, reading comprehension, information search, decision-making, evaluation, responsibility, self-efficiency, and diagnosis (21). Test of Functional Health Literacy in Adults (TOFHLA) only addresses reading and numeracy comprehension, and evaluation. Our study was performed using IHLQ whose constructs were based on the health promotion approach and has the features of a good HL instrument.

We found that 46% of the participants had low HL levels, which was associated with certain socio-demographic characteristics including age, sex, education, occupation status and residency (rural, urban). Our findings were consistent with an existing body of international and national evidence.

The findings of several national studies suggesting a relatively low level of HL in the Islamic Republic of Iran (14,15,20,22,23). For instance, in a study on HL among the literate urban population in the country was found that >44% of the participants had inadequate and 16% had adequate HL levels (16).

Our finding that only 18% of the participants of this nationwide study had sufficient HL is of concern given the impact of limited HL on people's ability to promote, protect and manage a healthy lifestyle. This has critical implications for Iranian healthcare professionals and policy-makers, such as the ministries of education, culture, health and medical education, and nongovernmental organizations (NGOs) to design a comprehensive health promotion programme to systematically improve HL across all societal and economic levels.

As expected and observed in previous studies (10,16,23–27), HL was significantly associated with higher levels of education. This has significant implications for health sectors given that individuals with no to little educational attainments have been shown to be five times more likely to engage in unhealthy behaviours. This could elevate their chance of developing poorer health outcomes and widening the health gap between the least and most educated sub-populations of the population (28).

Although the most important variable influencing HL in this study was the level of education, and those with higher education had a better HL, less than 50% of the respondents with college/university degree and around 20% of those with high school education had adequate HL. This indicates that in addition to general education, the attendance on specific courses in the fields of health skills and health promotion in formal education are crucial to improve communities' HL and health skills.

We also observed that people with permanent jobs had higher levels of HL, which is consistent with the findings of similar studies in Australia (29), Japan (30) and Italy (31). It is possible that people with permanent jobs had better access to health information in their work environments and had more financial resources to access the healthcare system and health workers. It could also be attributed to the higher educational attainments required to secure a permanent job (15,32), which may contribute to people's socio-economic status and thus higher HL levels (9). We have found that some male respondents selected 'housewife' as their job. This was because their wives were employed and they took the responsibility of managing the house and children. We understood that this happen in families where the wife has a good salary.

In the present study, the adjusted HL among Iranian females was slightly higher than males, which is in line with the results of other similar studies (23,32–35). Such a difference could be due to the greater use of health information resources by females, higher rates of reporting health issues and seeking care, as well as their familiarity in navigating the healthcare system. Moreover, most females included in our study were housewives/homemaker (77.7%) and are more likely to be exposed to educational materials on health broadcasted on multimedia.

Moreover, HL level was slightly higher with an increase in age. This is inconsistent with the results of other studies, which were conducted using TOFHLA (16,23,26,27,29,36,37). This may be due to differences in the types of questionnaires used. TOFHLA measures the abilities of individuals in

clinical behaviours. This may also be due to the higher familiarity of youth with new technology. The results of the present study are also consistent with the findings of Barber et al., which used the Rapid Estimate of Adult Literacy in Medicine (REALM) questionnaire (29). This consistency can be due to the increased experience of individuals in dealing with health-related determinants and the improvement of their communication, judgment, and decision-making skills, which come with an increase in age. It can be noted here that the IHLQ has relative similarity in content with the REALM questionnaire.

In this study, HL level in rural populations was higher than city dwellers, which is inconsistent with the findings of Banihashemi et al. (23,38). This could be due to the differences between the questionnaires used in the two studies. In IHLQ, the ability to access and use health resources is specifically assessed in domains of HL. The use of health-related resources is more prevalent in rural than in urban areas. Rural populations have more and easier access to physicians and healthcare workers – two important sources of health information. Despite the need for further studies, this difference may be due to the family physician programme. At the time we conducted the study, the family physician programme had been active for only 10 years in the rural areas of the Islamic Republic of Iran.

Limitations

Although the sample was large and nation-wide, the home-based nature of the sample and unavailability of potential participants may, to some extent, limit the study's generalizability and introduce a degree of bias in the findings. Moreover, social desirability bias could not be ruled out due to the self-reported nature of the data. The anonymity of the questionnaires and the use of experienced interviewers, however, may have encouraged the participants to provide honest responses. On the other hand, the high response rate in our study (~94%) suggests the suitability of the questionnaire and the proper implementation of the research process. Moreover, the large sample size and diversity of sampling points in this study can increase the trustworthiness of the results. Overall, given the scope of the study, we believe our findings have important implications for both health research and policy in the Islamic Republic of Iran.

Conclusion

The present study was the first comprehensive study on HL assessment using the IHLQ in the Islamic Republic of Iran. It showed that 46% of adults have a low HL level. This can affect the ability of people in promoting, maintaining, and managing their health. Therefore, at policy-making and decision-making levels, strategic planning for increasing HL should focus more on increasing literacy in the population, providing permanent job opportunities, improving both individual empowerment, health information access, health information use and interpretation/judgment skills, and targeting urban areas. Given the different results yielded from different HL tools, future HL studies in the country could benefit and should utilize culturally sensitive and context-specific HL tools.

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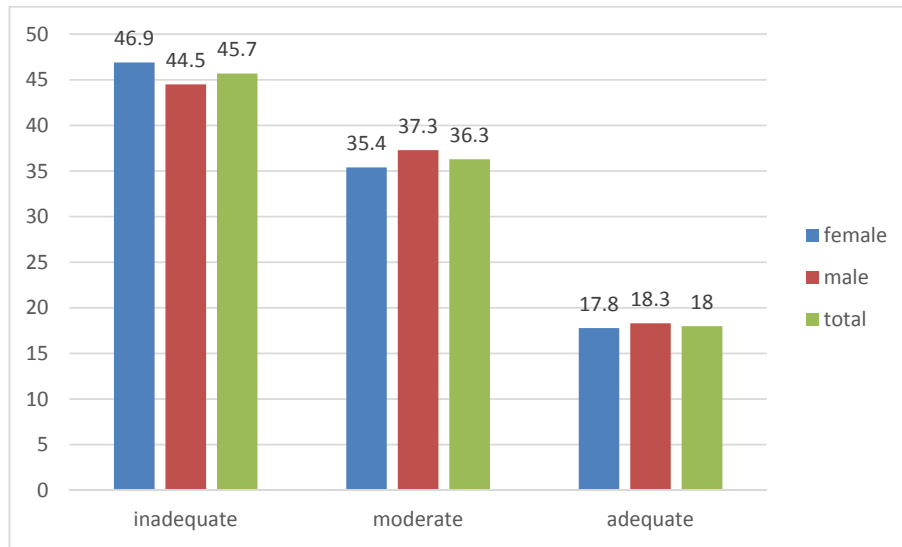
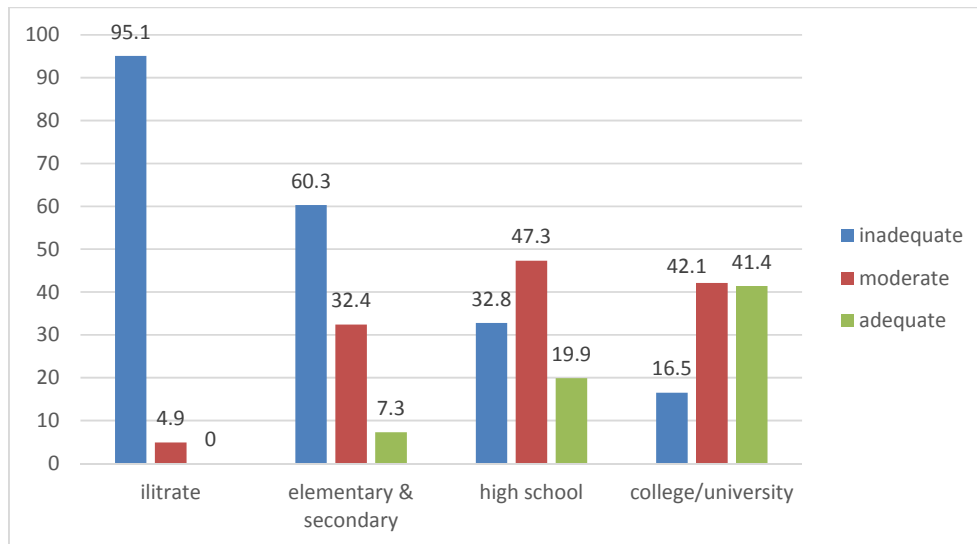


Figure 1: Percentage of health literacy levels in Iranian adults (n=8381), 2015

*P value for comparison the distribution of HL among different gender is: <0.001



*P value for comparison the distribution of HL among different education level is <0.001

Figure 2: The health literacy levels of Iranian adults according to education level, 2015,

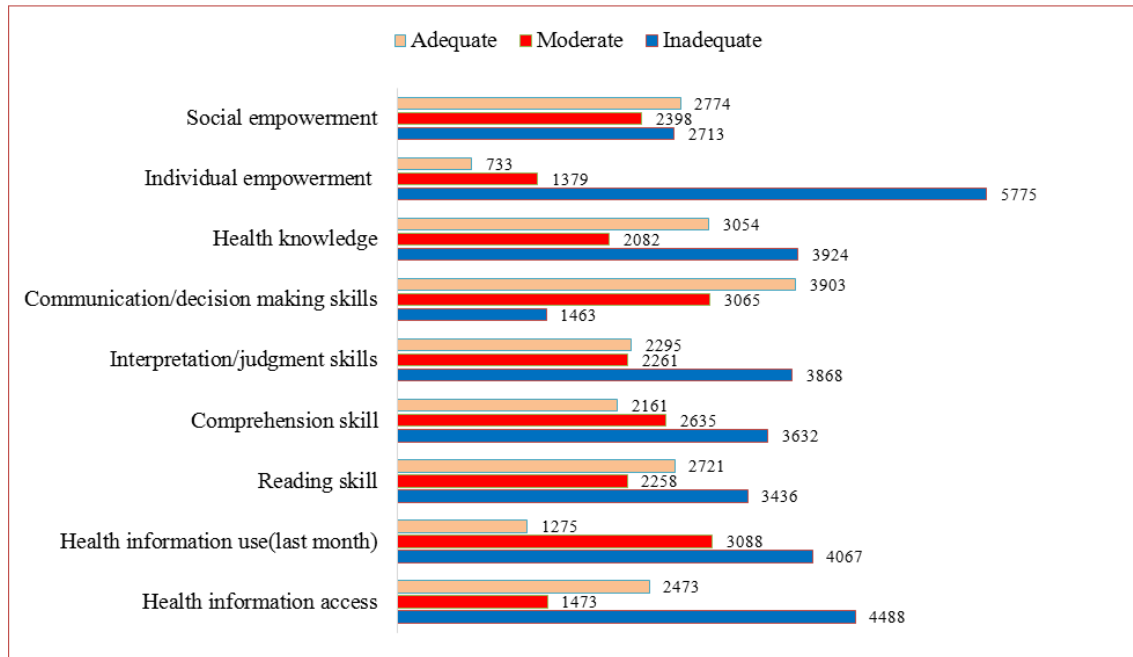


Figure 3: Frequency of health literacy domains scores among Iranian adults (n = 8434)

Table 1: Demographic characteristics of participants in a nationwide survey of health literacy in the Islamic Republic of Iran

Demographic variables		Female	Male	Total	P
Number (%)		4469 (53.2)	3935 (46.8)	8404(100)	0.41
Age	(Mean ± SD)	36.16±11.33	37.33±11.80	36.7±11.5	<0.001
Residency (N=8038)	Urban	2578 (57.7)	2288 (58.2)	4482 (58.0)	0.61
	Rural	1819 (42.3)	1646 (41.8)	3556 (42.0)	
Occupation status (N=8363)	Student (school/university)	288 (6.5)	371 (9.5)	659 (7.9)	<0.001
	Housewife /homemaker	3458 (77.7)	193 (4.9)	3651 (43.7)	
	Retired	56 (1.3)	342 (8.7)	398 (4.8)	
	Unemployed	89 (2)	351 (9)	440 (5.3)	
	Permanent job	345 (7.7)	1731 (44.3)	2076 (24.8)	
	Temporary job	216 (4.9)	923 (23.6)	1139 (13.6)	
Education Level	Illiterate	607(13.6)	298(7.6)	905(10.8)	<0.001
	Elementary and secondary	1631(36.5)	1339(34.1)	2970(35.3)	
	High school college/university education	1392(31.2)	1317(33.5)	2709(32.3)	
		834(18.7)	977(24.9)	1811(21.6)	1

Table 2: Crude and Adjusted Association between Health literacy and independent variables in crude and adjusted models among Iranian adults

Variables	HL score	simple linear		Adjusted	
		β	P	β	P
Age		-0.06	<0.001	0.01	0.002
Sex					
Female	10.1	-	<0.001	-	-
Male	10.4	0.27		-0.45	<0.001
Education					
Illiterate	4.9	-	-	-	-
Elementary and secondary education	9.2	4.23	<0.001	4.35	<0.001
High school	11.3	6.35	<0.001	6.63	<0.001
college/university education	13.1	8.15	<0.001	8.48	<0.001
Occupational status					
Student (school/university)	11.7	-	-	-	-
Permanent job	11.4	-0.37	0.03	1.03	<0.001
Retired	10.3	-1.41	<0.001	0.57	0.009
housewife/homemaker	9.6	-2.13	<0.001	0.40	0.008
Unemployed	9.1	-2.62	<0.001	-0.50	0.01
Temporary job	9.8	-1.94	<0.001	0.09	0.56
Residency					
Rural	9.8	-	-	-	-
Urban	10.6	0.80	0.001	-0.26	<0.001

Table Appendix: Adjusted Association between constructs of Health literacy and independent variables in adjusted models among Iranian adults

Variables	HIA		HIU		RS		CS		IJS		CDS		HK		IE		SE	
	<i>B</i>	<i>P</i>	<i>B</i>	<i>P</i>	<i>B</i>	<i>P</i>	<i>B</i>	<i>P</i>	<i>B</i>	<i>P</i>	<i>B</i>	<i>P</i>	<i>B</i>	<i>P</i>	<i>B</i>	<i>P</i>	<i>B</i>	<i>P</i>
Age	0.17	0.001	0.19	0.001	-0.09	0.003	-	0.10	-0.04	0.2	0.13	0.001	0.25	0.001	0.02	0.5	-0.03	0.20
Sex																		
Female	1.70	0.05	4.5	0.001	1.6	0.06	4.7	0.001	4.0	0.001	3.7	0.001	2.6	0.003	4.8	0.001	1.1	0.20
Male	-		-		-		-		-		-		-		-		-	
Education																		
Illiterate	-		-		-		-		-		-		-		-		-	
Elementary and	11.71	0.001	14.9	0.001	69.5	0.001	44.2	0.001	44.2	0.001	29.8	0.001	23.7		17.6		9.1	
High school	22.61	0.001	28.6	0.001	63.4	0.001	67.3	0.001	67.3	0.001	41.2	0.001	35.3		33.9		12.5	
college/universit	33.65	0.001	40.8	0.001	50.6	0.001	85.6	0.001	85.6	0.001	50.5	0.001	43.7		45.6		15.4	
Occupational																		
Student	5.9	0.001	1.09	0.60	1.15	0.2	3.8	0.10	7.01	0.10	0.8	0.6	0.15	0.9	4.0	0.40	1.8	0.2
Permanent job	7.2	0.001	5.5	0.001	12.47	0.001	15.6	0.001	12.15	0.001	10.5	0.001	8.2	0.001	9.1	0.001	1.9	0.12
Retired	4.9	0.008	4.25	0.06	8.3	0.001	8.8	0.001	7.23	0.001			5.2	0.007	8.7	0.001	1.06	0.50
Housewife	3.9	0.001	5.05	0.004	7.7	0.001	8.1	0.001	8.2	0.001	7.2	0.001	4.3	0.004	-0.86	0.6	0.80	0.75
Temporary Job	-0.07	0.10	2.39	0.16	6.23	0.001	7.1	0.001	8.9	0.001	3.8	0.04	4.2	0.004	5.7	0.001	0.50	0.70
Unemployed	-		-		-		-		-		-		-		-		-	
Residency																		
Urban	-		-		-		-		-		-		-		-		-	
Rural	0.68	0.20	5.7	0.001	0.32	0.32	0.5	0.6	0.4	1.4	1.7	0.02	0.4	0.5			3.8	0.001

HIA = Health information access. HIU = Health information use. RS = Reading skills. CS = Comprehension skills. IJS = Interpretation/judgment skills. CDS = Communication and decision-making skills. HK = Health knowledge. IE = individual empowerment. SE = Social empowerment