

# Gender-based Inequalities in Health literacy among an Iranian Kurd Population: Results of a Community Survey

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## Research article

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# Abstract

**Background :** Health literacy, as a social determinant of health, has a decisive role in providing different populations with healthcare services in an equal manner. Our aim in this study was to investigate the contribution of socio-demographic factors to functional health literacy (FHL) in a population of Iranian adults and identify differences in the contribution of these factors across genders.

**Methods :** This community-based cross-sectional study was conducted in 2015 to 2016 in Sanandaj, Iran. Multistage cluster sampling was employed to recruit 1000 people older than 18 (response rate = 89.2%) from 35 urban and 10 rural health care centers. Test of functional health literacy in adults (TOFHILA) was used to assess FHL. In order to measure inequality in FHL, concentration index decomposition was used.

**Results:** In total, 869 respondents (response rate: 86.9%) with a mean age (standard deviation; SD) of 33.68 (13.0) completed TOFHILA questionnaire. More than half of participants were women (57.5%). Participants demonstrated an average TOFHILA score of 51.9. Women demonstrated slightly higher TOFHILA scores (52.2 [SD: 0.46]) compared to men (50.7 [SD: 0.4]). However, the concentration index for gender was 10.9% suggesting gender contributed only moderately to TOFHILA scores. Comparatively, 54.3% of TOFHILA differences were attributed to geographic location. Among women, place of residence, monthly income, age, education level and being head of household contributed to 43%, 32%, 13%, 11.5% and 11% of FHL inequality, respectively. Among men, however, place of residence (45.2%), size of household (15.1%) and monthly income (13.5%) contributed most to inequality in FHL.

**Conclusions:** Although gender was not the strongest contributing factor for FHL inequalities, poor FHL was mostly concentrated among men. Different factors were attributed to FHL inequality by gender, as discussed inside. Understanding these differences may assist in identifying and targeting interventions towards men and women with low levels of FHL. Our findings shed light the critical role of social determinants of health (SDH) in promoting the health literacy of populations, particularly in developing countries like Iran.

## Background

Health literacy (HL) is defined as the personal characteristics and social resources needed for individuals and communities to access, understand, appraise and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course(1, 2). HL has been considered as a determinant of health in clinical settings, public health, and contemporary society (2). Addressing HL barriers has been highlighted as a population level strategy for health promotion (3-6). Low HL among individuals, patients and the wider community contributes to poor health outcomes (7, 8). However, addressing HL barriers in the delivery of health information and services has the potential to improve health outcomes for those with poorer HL abilities (9).

HL is a multidimensional concept that consists of seven dimensions of functional health literacy (FHL), factual and procedural knowledge, awareness, attitude and critical and affective dimensions (10). Abilities

related to reading, writing and numeracy are essential parts of FHL for effective daily function (11). FHL is made up of two parts. The first is 'numeracy skills', the ability to understand and act on numerical directions given by the health care provider. The second is 'comprehension' referring to the ability to read and understand the printed medical information, for example, patient rights and responsibilities written on the insurance or informed consent forms (12). In the literature, low HL and health disparities are considered as two significantly intertwined public health challenges (13, 14), in a way that a significant overlap is reported in socio-demographic characteristics of those who are at risk for low HL and health disparities (13).

Health literacy disparities have also been observed between men and women(15, 16). Some population groups demonstrate lower functional health literacy, including older adults, individuals with lower education levels, those living in rural communities and economically disadvantaged individuals (16, 17). In terms of gender, women have demonstrated a higher level of HL than men in understanding medical forms, directions on medication bottles, and written information offered by health care providers (16), and also engagement in preventive health behaviors (18). Therefore, gender may be associated with health literacy (19). Previous research suggests higher education level, adequate income and having a consistent place to receive care with significant positive effects on HL among women (16).

Although in the Middle East and North African (MENA) region countries a number of studies have been carried out to investigate health literacy measures (20-24), among older adults and patients with chronic diseases (22), as well as the determination of HL (25), few studies have previously investigated the contribution of different socio-demographic factors to HL, and the associations between gender and health literacy in the region. Also, a majority of previous studies has only investigated the associations between socio-demographic characteristics and HL. So, there is lack of efforts in quantifying the differences in HL by the factors like gender, age and place of residence. From 2015 to 2016, a community survey was conducted to investigate the level of FHL and its associated factors in Sanandaj, Iran. In a previously published paper, urban-rural differences in the FHL and its determinants was reported (25). Analyzing the data for that paper, a question arose for us that "were there gender inequalities in the FHL in this population?" In this manuscript, we tried to answer to this question through quantifying the disparities within HL by the factors (education, gender, income, age, and place of residence) that are indicative of health disparities. The following questions guided our study: 1) what socio-demographic factors may be contributed to functional health literacy in the population of Sanandaj, Iran? 2) What differences may be in the contribution of these factors across genders?

## **Methods And Materials:**

### **Design and setting**

As mentioned above, this study was part of a cross sectional study investigating urban–rural differences in health literacy and its determinants in Iran. A detailed description of the research can be found in the project report (25). The study was conducted from September 2015 to March 2016 in health care centers (HCCs) in Sanandaj, the center of Kurdistan province, western Iran. Although about 97% of inhabitants are

from the Kurd ethnic group- an ancient Iranian ethnicity- with Kurdish language, a majority of the population in the County can understand and speak fluent Persian, the official language of the country. The population under study was the people older than 18 covered by the healthcare system in urban and rural areas of the County. According to the structure of primary healthcare system in Iran, there are health houses in each village and rural health centers which cover 1200 and 7000 inhabitants, respectively. HCCs provide primary and secondary health care services in Iran. Similar to the rural health-houses and health centers, the health posts and health centers in urban areas provide their populations with primary health care services (26, 27).

## **Participants and sampling**

Multistage cluster sampling was employed to recruit 1000 people older than 18 years from 35 urban and 10 rural HCCs. Assuming a rate of 55% for adequate functional health literacy (FHL) (28), and 0.95 confidence level, the sample size was calculated using the formula  $n = Z^2PQ/d^2$  (29), where (the prevalence of FHL = 0.55),  $Q = 0.45$  and  $d = 0.04$ . In order to consider the design effect variance inflation factor, the sample size was multiplied by 1.5 ( $n = 892$ ). Finally, anticipating a non-response rate of 10% (Final sample size= Effective sample size / (1- non response rate anticipated), the final sample size was set to ~992 which was rounded to 1000.

Based on the health records of population in the HCCs, twenty-three individuals were randomly selected from each center and were then contacted by the health care providers of the HCCs via phone call and invited to participate in the study (the response rate = 89.2%). In the case of accepting the invitation, the participants were set an appointment in locales convenient to them.

## **Data collection**

At the time of appointments, the trained interviewers referred to the locales, and collected data applying TOFHLA (Test of Functional Health Literacy in Adults) questionnaire. Data were collected through face-to-face interviews ensuring participants who may experience difficulties in reading health information and completing questionnaires were still able to participate. This data collection method helped us to ensure participants with diverse health literacy needs to not be inadvertently excluded. At the beginning of the interview sessions, the interviewers explained to the participants the purpose of the study and their rights as participants, and all those participated in the study signed an informed consent form.

## **Measurements**

Data were collected applying the following instruments:

**Socio-demographic Characteristics Form.** Participants were asked to report their age, marital status (married/single), educational status, current occupation, the number of family members living in the home, whether they (parent in the household) were the head of household (the main income earner) (Yes/No), having one or more hospitalization in the previous 10 years (Yes/No), having one or more chronic diseases (Yes/No) and monthly household income.

## TOFHLA

We used the Persian version (28) of the full-length TOFHLA questionnaire to assess the functional health literacy of participants. The TOFHLA consists of two parts; (i) reading comprehension (50-item) in which some questions are asked about preparation for an upper gastrointestinal series, the patient rights and responsibilities section of a medical application form, prescription container labels and discharge instructions, and (ii) numerical ability (17-item) in using actual hospital forms and labeled prescription vials. It tests a patient's ability to comprehend directions for taking medicines, monitoring blood glucose, keeping clinic appointments, and obtaining financial assistance. Patients are presented with cue cards or labeled prescription bottles and asked to respond to oral questions regarding information about the cards or bottles (30). Scores for the TOFHLA range from 0 to 100 and are categorized as; 0 to 59 inadequate, 60 to 74 marginal and 75 to 100 adequate functional health literacy (31).

### Data analysis

Analyses of descriptive characteristics (mean, standard deviation and frequency) were undertaken by gender. Independent t-tests and chi-square tests were used to identify gender differences in sociodemographic characteristics. Splitting data by gender and adjusting for sociodemographic factors, stepwise backward regression was used to estimate the relationships between socio-demographic variables (as explanatory variables) and TOFHLA scores (as outcome variables). In the regression analysis, we used collinearity diagnostics test to test for multicollinearity, which represented the variance inflation factor (VIF)(32). In both the tests for FHL among men and women, the VIF factors were from 1 to 5. We found some multicollinearities, but as the factors did not exceed 10, so we consider them to be acceptable for our further analysis.

### *Concentration index decomposition*

There are a number of methods used to measure socioeconomic inequalities in health. A common approach, namely the Concentration Index Decomposition (CID), involves comparing two different groups (in this case, men and women) on the basis of an outcome measure (in this case, functional health literacy). Interpretation is based on the rate ratio or the rate difference of the outcome variable between the two groups. When percentiles are used, the ratio or difference often refers to quintiles. Although relatively easy to construct and interpret, the rate ratio and rate difference methods mask the extent of the inequality between the two groups. Alternatively, it is possible to use concentration indices to measure inequality in one variable over the distribution of another (33). CID has previously been used to measure socioeconomic-related health inequality in different populations (33-35). In the present study, a concentration index (CI) was used to assess the inequalities in functional health literacy (as outcome variable) between different socio-demographic groups (age, marital status, educational status, occupation, number of family members, being the head of the household, having a history of hospitalization for at least one time in the previous 10 years, experience of suffering from a chronic disease and monthly income). CI is a way to quantify the socioeconomic inequality of health by taking into account every

individual's level of health and every individual's rank in the socioeconomic domain (36). All analyses were performed using Stata v. 13 (Stata Corp, Texas, USA).

## Results:

The data on 869 respondents were included into statistical analysis. Participant characteristics are shown in Table 1. The mean ( $\pm$ SD) age of participants was 33.68 ( $\pm$ 13.0), ranging from 18 to 98 years. More than half of participants were men (57.3%), and 84.8% of participants had adequate functional health literacy. Nearly two-thirds were married (62%) and 68.6% reported an education level of high school or greater.

Using chi-square and t-tests, differences between male and female participants were observed in education level, likelihood of being the 'head of household', geographic location and income. Compared to men (mean =  $50.7 \pm 0.4$ ), women (mean =  $52.23 \pm 0.46$ ) demonstrated a greater level of TOFHLA score ( $p < 0.001$ ).

Please insert table1 here

All sociodemographic variables displayed in Table 1 were included in a regression model to determine associations with TOFHLA scores. Using a Backward Stepwise Regression approach, variables demonstrating a  $p$ -value  $> 0.2$  were removed, leaving the final model displayed in Table 2. As presented in Table 2, older age ( $\beta -0.17$  [95%CI (-0.21- -0.13)], being the head of household ( $\beta 3.62$  [95%CI (3.44 - 3.89)], rural location ( $\beta 1.80$  [95%CI 1.67-1.93]) and lower monthly income ( $\beta 2.11$  [95%CI 1.99-2.23]) were associated with lower levels of FHL in women. Similarly, rural location ( $\beta 2.21$  [95%CI 2.12-2.34]) and lower monthly income ( $\beta 2.22$  [95%CI 2.13-2.34]) were also associated with lower FHL in men. Greater size of household ( $\beta -0.93$  [95%CI -0.99- -0.86]) and having  $\geq 1$  chronic condition ( $\beta -3.56$  [95%CI -3.71- -3.45]) were associated with lower TOFHLA score in men, but not women.

Please insert Table 2 here

As illustrated in Figure 1 (x-axis shows cumulative percentage of functional health literacy and y-axis shows the cumulative population proportion), the majority of higher scores for functional health literacy is placed under the line of equality, showing that the higher levels of health literacy are more prevalent among women.

Please insert Figure 1 here

The decomposition of inequality in health literacy is presented in Table 3. In the total population, 54.3% of functional health literacy inequality was attributed to geographic location. The contribution of gender, age, size of household, and being head of household were 10.9%, 11%, 12.5%, and 16.7%, respectively.

Please insert table 3 here

The gender-based differences in the decomposition of functional health literacy inequality are shown in Table 4. Among women, age, education level, head of household, place of residence and monthly income

contributed to 32%, 11.5%, 11%, 43% and 13% of FHL inequality, respectively. Also, the greatest contributing factors to the inequality were age and place of residence. Among men, however, size of household (15.1%), place of residence (45.2%) and monthly income (13.5%) were attributable to FHL inequality, and the greatest inequality was attributed to place of residence.

Please insert table 4 here

Figures 2 and 3 illustrate gender inequality in FHL among urban and rural participants, respectively. As figures 2 and 3 show, the majority of higher scores for FHL is placed under the line of equality, showing that among both urban and rural participants the higher levels of FHL are more prevalent among women.

Please insert Figures 2 and 3 here

As 54% of inequality in FHL were attributed to the place of geographic location, we chose to perform a further analysis to investigate the decomposition of inequality in FHL by this variable. Table 5 shows the decomposition of FHL by geographic location. For residents of urban areas, a majority of the FHL inequality was attributable to gender (26.9%), marital status (17.7%), head of household (-16.9%) and monthly income (-41.8%). Among rural inhabitants, in contrast, size of household (20.4%), head of household (40.5%) and monthly income (-16.5%) were the greatest contributing factors to FHL inequality. Also, monthly income (in all respondents) and head of household (in rural participants only) contributed to FHL, inversely.

Please insert table 5 here

## Discussion

The aim of this study was to investigate the contribution of sociodemographic characteristics to functional health literacy scores across gender in an Iranian Kurd population. Women in our study demonstrated a higher average in functional health literacy scores than men. However, our results showed that the concentration index for gender (contribution: 10.9%) did not explain the highest variance for inequalities in health literacy, and instead, geographic location (rural/urban), played the greatest role in contributing to inequality in FHL. Our results showed that to successfully remove disparities in HL, there is a need to improve the HL of men and rural inhabitants by about 11% and 54%, respectively. Among women, place of residence (43%), age (32%), monthly income (13%), education level (11.5%), and head of household (11%) were the factors affecting the FHL inequality, respectively. In contrast, among men, place of residence (45.2%), sizes of household (15.1%) and monthly income (13.5%) were attributable factors to FHL inequality, respectively. We, also, found that various sociodemographic factors were contributed differently to FHL depending on geographic location.

In accordance with the present results, previous studies have demonstrated greater levels of FHL in women, compared to men (15, 16). However, some studies find either no (37) or partial (13) differences in HL by gender. A study of health literacy in Korean adults suggested that the higher HL in women was associated with a higher level of education and having a consistent place to receive care (16), which is

similar to those found in our study. Although we found geographic location, age and monthly income with greater contribution to FHL, compared to gender, our findings still confirms those reported by Lee et al., who suggested gender differences in health literacy as an international phenomenon (16). Fleary et al., in a previous study emphasized that one general HL intervention for all groups in a society may not take effect (13). Therefore, while designing gender-specific health literacy promotion intervention programs, healthcare providers and health promotion specialists should take into account the most disparate groups within the factors with high contribution to disparities in HL (13). In other words, in such gender-specific interventions, there should be a great focus on clear communication criteria particularly for those who inhabited in rural areas, are the head of household, and with lower monthly income and education level.

Our study indicated that lower income was associated with poorer FHL. These results are consistent with previous research which established a relationship between low HL and income inequalities (5, 38). Previous studies have also shown that lower income may negatively affect HL and thus increase the risk of poor health outcomes (7). Research has demonstrated that disadvantaged social and socioeconomic conditions may not only be contributed to low health literacy, but HL may also mediate the relationship between social disadvantage and poor health outcomes (35). Previous studies showed consistently lower levels of HL among minor ethnicities, compared to other people with the same educational attainment, income, gender and age (39, 40). Furthermore, low income and low educational attainment are intertwined (41). A lower income can limit educational opportunities and a lower level of education may similarly limit economic opportunities; therefore both are associated with inequality of HL and difficulties in understanding health information. People with lower levels of education/income are more likely to have stressors that make practicing HL difficult (42). Thus, health policymakers and stakeholders are suggested to plan for improving health outcomes in disadvantaged groups within the population through clear communication of health information in ways that meet the needs of those with inadequate FHL. Such planning needs deliberate and consistent efforts to weave the best practices of communication into the culture of the community. In the planning process, the policymakers should take into account the continual evaluation of HL promotion practices in terms of effectiveness and efficacy through community surveys. Literature shows associations between lower HL and poorer health outcomes and lower use of health care services (43), as well as misunderstanding discharge instructions or unintentional medication discrepancies (44). So, they should also hold the health practitioners and healthcare providers across the healthcare system accountable for the providers' role in advancing health communication excellence.

In the present study, geographic location played the most critical role in contributing to inequality in FHL. For rural inhabitants, head of household and size of household were contributed to the inequality in FHL, and among urban residents, monthly income and gender were mostly attributable to FHL inequality. In the initial paper derived from the project reporting the urban–rural differences in health literacy and its determinants (25), we concluded that the differences found in FHL by geographic location may originate from the disparities in the number of family members, educational status, monthly income, and history of contact with the health care system between urban and rural areas. Previous research has also demonstrated geographic location as an effective factor on FHL (22). Playing the role of a source for many influential factors on FHL, geographic location seems to be a basic social determinant with great

influence on health literacy. This outstanding determinant perpetuates the disparities in many social determinants of health such as income (7), and the number of family members (45). Although family size is still with lack of evidence to be considered as a proxy for poor socioeconomic status, our results in the present study shed light to the associations between gender, education, family size, SES, and health literacy. Based on the findings, we can assume that parents with poor education status in the MENA region families are not well empowered to take control over their fertility mode, which may result in a higher number of family members. As a result, the SES of the family may be weakened and the provision of opportunities to promote HL become less possible. This presumption may be happened with a more severity in the rural areas located in the remote/agricultural settings- where men mainly work outdoors as either farmers or ranchers with lack of access to both general and health literacy promotion programs. Such assumptions should be focused with more details in the future studies. Despite such remarkable disparities in HL and its determinants, healthcare services to urban-rural populations in many MENA region countries, like Iran, are still delivered with a lack of attention in equity considerations (46). Although some contemporary efforts are made by the Iranian government to promote general literacy within the society, there are still remarkable gender-based disparities in health and wellbeing between the urban and rural inhabitants (47, 48). In order to decrease such disparities, promoting the level of internet use through increasing the level of internet accessibility and internet use skills as well as HL education through social and mass media campaigns are recommended. As local mass media (radio and television) in the most of rural areas in MENA region are with a suitable coverage, and considering that the rural inhabitants are with a positive attitude and inclination toward using such media, implementing HL promotion programs and campaigns with a focus on radio and television may be an effective approach to improve gender-specific disparities in the FHL and its associates among the inhabitants.

**Strengths and limitations:** This study presented a novel analysis of health literacy that indicated the relative contribution of a range of sociodemographic factors to functional health literacy. Moreover, it was the first study to examine gender differences in functional health literacy within a MENA setting. Despite the strengths of our study, the research had some limitations. Considering the cross-sectional design of the study, we are unable to determine causal relationships from the findings. We collected data through face to face interview. So, there is a possible risk for misclassification bias. Moreover, due to the nature of interview, a risk of underreporting by participants is possible. In future studies, we suggest the application of adjusted methods for misclassification (i.e. probability bias analysis) to calculate unbiased estimations. We also could not determine the bias-adjusted ORs due to differential misclassification. Finally, the use of a unidimensional health literacy tool that does not capture the broad range of skills and resources that make up health literacy also limits the study. Further research is required to investigate the broad range of health literacy abilities and resources, such as having good social support and relationships with healthcare providers, to develop interventions to engage groups with inadequate functional health literacy in healthcare and health management.

## Conclusion

Although gender was not the strongest contributing factor for FHL inequalities, poor functional health literacy was mostly concentrated among men. Instead, geographic location (rural/urban) played the most remarkable role in contributing to inequality in FHL. As discussed inside, different factors were attributed to FHL inequality by gender, which should be considered while designing strategies aiming at the provision of skills to promote accessibility and application of health information and communication with the healthcare delivery system. Our findings shed light the critical role of social determinants of health (SDH) in promoting the health literacy of populations, particularly MENA region countries, like Iran. Our findings on the quantified disparities within HL by the determinants seem to be beneficial in informing health policymakers on needs-based resource allocation for reducing HL disparities within the populations. The findings also suggest a reorientation in the delivery of healthcare services with a focus on planning gender-specific and geographical location-based health literacy promotion programs. Also, health policy makers and health promotion specialists should try to alleviate such inequalities in functional health literacy in disadvantaged groups through clear communication of health information via popular mass media like local radio and television channels.

## **Abbreviations**

HL: Health literacy

FHL: functional health literacy

TOFHLA: Test of functional health literacy in adults

HCCs: health care centers

CID: Concentration Index Decomposition

## **Declarations**

### **Ethics Approval and consent to participate**

Ethics approval was obtained from the Committee in the Research Affairs of Islamic Azad University-Sanandaj Branch, Iran (Ethics Code: 92/2311241).

### **Consent for publication**

Not applicable.

### **Availability of data and materials**

Data and materials are available per request.

## Competing Interest

The authors declare that they have no competing interests.

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## Authors' contributions

HN, HM, and SHS have been the leading authors on this study and have participated in all steps and the writing process. RM, SH, and KK conducted data analysis, helped in data collection and drafting and completing the manuscript. AI, FS, SA and PSS have participated in data collection and manipulation and supported the leading authors in all steps of the writing process. All authors read and approved the final manuscript.

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## Tables

**Table 1.** Socio-economic and underlying characteristics of the respondents

ble		n (%) / mean (SD) n=869	Male n (%) / mean (SD) n=369	Female n (%) / mean (SD) n=500	p-value
		33.68 (±13.0)	33.92(±13.3)	33.44(±12.5)	0.60
hold*		4.27 (±2.0)	4.34(±2.0)	4.18(±2.0)	0.29
vel*	No formal education	141(16.2)	64(12.9)	76(20.8)	<b>&lt;0.001</b>
	Elementary	125(14.3)	80(16.2)	45(12.3)	
	High school	97(11.1)	59(11.9)	36(9.8)	
	Pre-university/diploma	210(24.1)	143(28.9)	67(18.3)	
	University degree	292(33.4)	149(30.1)	142(8.8)	
us*	Married	528(62.0)	299(61.3)	229 (63.1)	0.59
	Unmarried	323(38.0)	189(38.7)	134(36.9)	
reshold*	Yes	342(39.6)	305(61.7)	37(10.0)	<b>&lt;0.001</b>
	No	521(60.4)	189(38.3)	332(90.0)	
ospitalization*	Yes	209(24.2)	111(22.4)	98(26.8)	0.14
	No	653(75.8)	385(77.6)	268(73.2)	
: disease*	Yes	72(8.3)	35(7.1)	37(0.3)	0.11
	No	791(91.7)	461(92.9)	330(89.9)	
ocation	Rural	489(56.3)	300(60.0)	189(51.2)	<b>0.010</b>
	Urban	380(43.7)	200(40.0)	180(48.8)	
reshold income*	<300,000	196(26.3)	93(21.3)	103(33.4)	<b>&lt;0.001</b>
	300,000 to 500,000	264(35.5)	147(33.7)	117(38.0)	
	≥500,000	284(38.2)	196(45.0)	88(28.6)	
ore		51.9 (0.43)	50.7 (0.4)	52.23 (0.46)	<b>&lt;0.001</b>

Significant p-values shown in bold, determined by chi-square or t-test as appropriate; \*Indicates missing data

Table 2: Factors associated with TOFHLA score among male and female participants

Variable Name	Female*		Male**	
	β Coefficient (95% Confidence Interval)	P-value	β Coefficient (95% Confidence Interval)	P-value
Age	-0.17 (-0.21- - 0.13)	<0.001	-0.07 (-0.11-0.03)	0.12
Size of household	-	-	-0.93 (-0.99- -0.86)	<0.001
Marital Status	-	-	2.20 (2.03-2.41)	0.10
Head of Household	3.62 (3.44 - 3.89)	0.04	-	-
Previous hospitalization	-	-	1.84 (1.67-1.99)	0.08
≥1 chronic condition	-	-	-3.56 (-3.71- -3.45)	0.04
Geographic location	1.80 (1.67-1.93)	<0.001	2.21 (2.12-2.34)	<0.001
Monthly income	2.11 (1.99-2.23)	<0.001	2.22 (2.13-2.34)	<0.001

\*R-squared: 0.19; \*\*R-squared: 0.20; those that were not reported had P-value > 0.2 and were not included in the final regression model.

Table 3: Decomposing Inequalities in Health literacy among an Iranian Kurd Population

Variable Name	Elasticity	Concentration Index	Contribution	Contribution (%)
	-.21415972	-.0193148	.00413645	11
	.02251563	.17169435	.00386581	10.9
Household	-.18215007	-.02432816	.00443138	12.5
Education level	.06474684	.0306539	.00198474	5.6
Marital Status	.06279967	.00194113	.0001219	.003
Head of Household	.07288442	.08115433	.00591489	16.7
History of Hospitalization	.066603	.00122529	.00008161	.02
With chronic disease	-.24917026	-.00112544	.00028043	.07
Geographic location	.22309934	.08626815	.01924637	54.3
Monthly household income	.2686311	-.01285406	-.003453	-9.7

Table 4: Decomposing Inequalities in Functional Health literacy by gender among an Iranian Kurd Population

Variable Name	Female				Male			
	Elasticity	Concentration Index	Contribution	Contribution (%)	Elasticity	Concentration Index	Contribution	Contribution (%)
Age	-.32365022	-.05985552	.01937225	32.8	-.15835058	-.01549298	.00245332	03.6
Size of household	-.09323548	-.00618405	.00057657	00.97	-.2338878	-.04313318	.01008832	15.1
Education level	.07010873	.09677956	.00678509	11.5	.04968551	.05083235	.00252563	03.7
Marital Status	.00213926	.0359609	.00007693	00.13	.36652046	-.00389641	-.00142812	-02.1
Head of Household	.37896595	.01724928	.00653689	11	-.22164007	-.0049915	.00110632	01.6
History of Hospitalization	.01893105	.0042644	.00008073	00.13	.19502218	.0091931	.00179286	02.6
With chronic disease	-.06145641	.01359243	-.00083534	-01.41	-.4246012	.00092304	-.00039192	-0.005
Geographic location	.20995173	.12307978	.02584081	43.8	.23915177	.12575373	.03007423	45.2
Monthly income	.24672997	.03245904	.00800862	13.5	.29861645	.03680047	.01098923	16.5

Table 5: Decomposing Inequalities in Functional Health literacy by place of residence among an Iranian Kurd Population

Variable Name	Urban				Rural			
	Elasticity	Concentration Index	Contribution	Contribution (%)	Elasticity	Concentration Index	Contribution	Contribution (%)
Age	.14162154	-.02803752	-.00397072	-14.77	-.2780881	-.00575269	.00159975	4.32
Sex	.42768268	.1696193	.07254324	26.98	-.01911816	.17136951	-.00327627	- 8.91
Size of household	-.05429083	.01142551	-.0006203	-02.31	-.20325079	-.03675944	.00747139	20.45
Education level	.2793313	.01345078	.00375722	13.91	.06169862	-.00931566	-.00057476	- 1.51
Marital Status	.34785649	.01373948	.00477937	17.72	.01795015	-.02166294	-.00038885	- 1.06
Head of Household	-.54058015	.08452889	-.04569464	-16.97	.20350718	.07293269	.01484233	40.52
History of Hospitalization	.84622306	.00362503	.00306759	11.46	.04221882	.00041671	.00001759	0.04
With chronic disease	-.07650152	-.00212005	.00016219	00.62	-.36227497	-.00655104	.00237328	6.48
Monthly income	.81703175	-.01376995	-.01125049	-41.81	.27480418	-.0215846	-.00593154	-16.19

## Figures

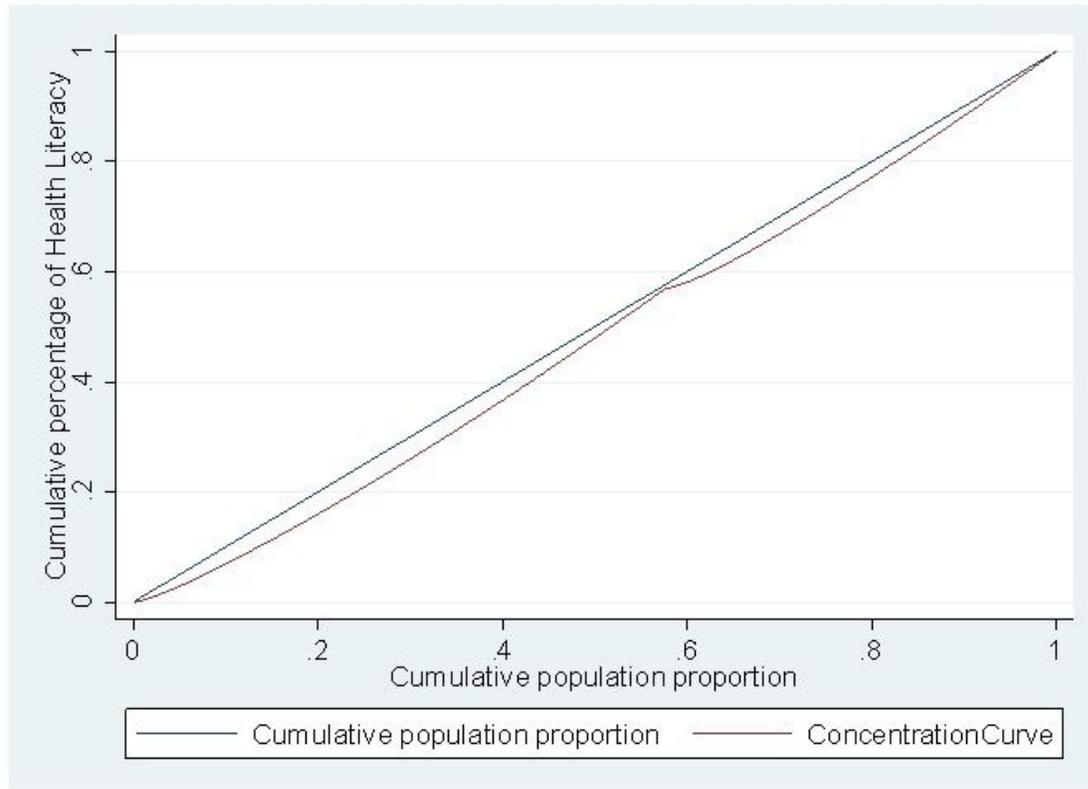
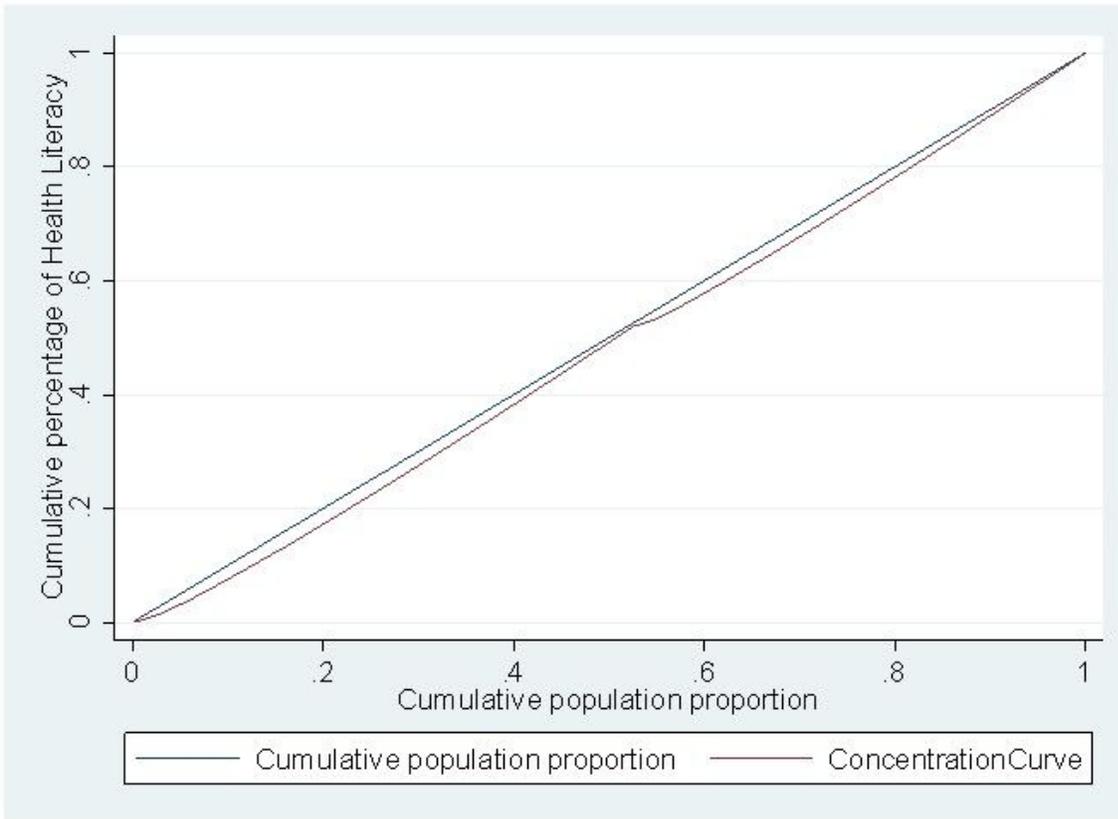


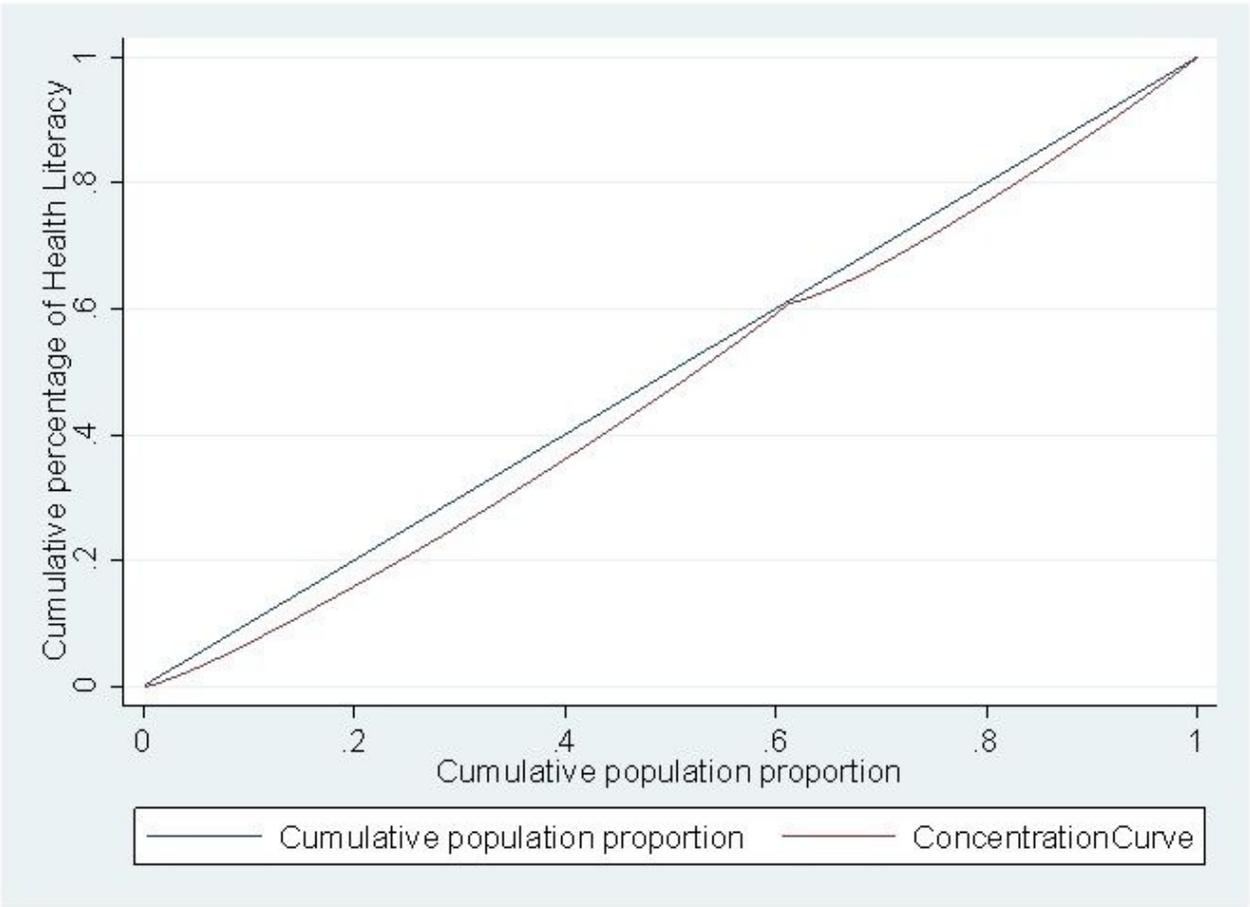
Figure 1

Concentration curves of health literacy (y-axis) and cumulative population proportion (x-axis) in Sanandaj. Concentration index = 0.05 (CI 95%: 0.04, 0.06; p-value = 0.001). The line is exactly 45° show the equity line, and other curves show concentration curves, which means that the higher score for functional health literacy is concentrated among women [CI stands for Concentration Index].



**Figure 2**

Gender inequality among urban participants; Concentration index = 0.04 (CI 95%: 0.03, 0.04; p-value = 0.044). The line is exactly 45° show the equity line, and other curve show concentration curve, which means that, in urban inhabitants, the higher score for functional health literacy is concentrated among women [CI stands for Concentration Index].



**Figure 3**

Gender inequality among rural participants; Concentration index = 0.06 (CI 95%: 0.05, 0.06; p-value = 0.001) The line is exactly 45° show the equity line, and other curve show concentration curve, which means that, in rural inhabitants, the higher score for functional health literacy is concentrated among women [CI stands for Concentration Index].

## Supplementary Files

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