



Socioeconomic Inequality in Health Literacy, Self-Rated Health, and General Health in Arak, Iran: a Population-Based Cross-Sectional Study

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ABSTRACT

Aims Socioeconomic inequalities are major problems for public health in the communities. This study aimed to determine the socioeconomic inequality of health literacy (HL), self-rated health (SRH), and general health.

Instrument & Methods This cross-sectional study was performed in Arak city, Iran, in 2019. The Wealth index was created using the principal component analysis (PCA) based on participants' assets. HL was evaluated using a validated questionnaire in Iran. The general health was evaluated using the WHO general health questionnaire. The relative concentration index (RCI) was used to assess HL's inequality, SRH, and general health. The simple random sampling method was used. The results were reported at a 95% CI. Stata software 14.2 was used for data analysis.

Findings Overall, 750 adults with a mean±SD age of 34.76±9.82 participated in this study. The prevalence of poor SRH was 2.93 (95% CI: 1.94, 4.42). In general health domains, the highest poor prevalence was related to the feelings of sadness or depression in the 30 past days with 10.80% (95% CI: 8.77, 13.24). The total prevalence of poor health literacy was 25.60% (95% CI: 22.60, 28.85). In domains of poor general health, mobility, cognition, individual activities, and sleep disorders were significantly concentrated among disadvantaged participants. Also poor health literacy was concentrated among disadvantaged participants in term of wealth index and education, RCI=-0.21; 95% CI: -0.27, -0.14 and RCI= -0.25; 95% CI: -0.32, -0.19, respectively.

Conclusion Poor health domains such as mobility, cognition, individual activities, sleep, and poor health literacy were significantly concentrated among disadvantaged participants based on the wealth index and education.

Keywords Self-Rated Health; General Health; Health Literacy; Inequality

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Introduction

Health inequalities are systematic disparities in people's health status and are associated with people's socioeconomic status (SES). Socioeconomic inequalities are very important problems for public health in the communities. These inequalities lead to high costs for individuals and communities. People with poorer SES more suffer from a low level of health [1, 2]. Many health outcomes such as maternal mortality, infant mortality, life expectancy, and premature deaths are key indicators of health inequality in societies and result from socioeconomic inequalities [3, 4]. Many of the health indices improved in the world, but health inequality not only removed it increased in some domains of health. Besides, with progress in health technologies and advanced interventions for treatment and health improvement, the inequality in access to these health services is increasing [5]. Based on the world health organization (WHO), the measurement of socioeconomic health inequality is one of the most parts for evaluating the health systems' performance in the communities [6]. Nowadays, health literacy (HL) is one of the most health determinants in communities [7]. HL is associated with people's social, economic, and cultural growth in the communities [8]. Many unpleasant health consequences are due to insufficient HL [9]. It has been shown that the prevalence of inadequate HL among patients with diabetes and hypertension is high [9]; this prevalence among American adults is about 26% [10]. HL is associated with general health. Based on the WHO, health is a multidimensional concept [11], so to evaluate individuals' health status, it should evaluate in terms of its dimensions. WHO developed a questionnaire that can evaluate general health in eight aspects: mobility, self-care, interpersonal activities, vision, cognition, sleep, pain, and affect [12]. Besides, self-rated health (SRH) is an important and practical index, cost-effective in health research for evaluating health [13]. SRH, as a probable predictor of health outcome, is an indicator used in health inequality research [14, 15]. Several studies have investigated the socioeconomic inequality of different health outcomes in Iran [15-18]. The existing evidence regarding the simultaneous socioeconomic inequality in the HL, general health, and SRH in Iran is insufficient. Therefore, this study aimed to determine HL's socioeconomic inequality, SRH, and general health based on its domains in Arak city, Iran.

Instrument & Methods

This population-based cross-sectional study was performed in Arak City (about 531,000 residents), Iran, in 2019. The study population was 18 to 65 years old literate adults with the ability to read and write. There are 14 Health Centers in Arak City, so the city is divided into 14 areas based on the area covered

by each Health Center. The simple random sampling method was used in each area. The number of participants in each area was determined based on its population. The participants were selected randomly from a list of the household numbers in the Health Centers. In the next step, a trained interviewer invited only one person from each household for the interview. Overall, 810 households were contacted to participate.

The socioeconomic status (SES) of participants was evaluated using a researcher-designed questionnaire. This questionnaire was based on household assets. The assets include personal care (Not to earn money), smartphone, personal computer/ laptop, internet use, freezer, microwave, washing machine, dishwasher, vacuum cleaner, and LCD/LED TV. The Wealth index was created using the principal component analysis (PCA) based on the mentioned assets. PCA is a dimension reduction technique that reduces many variables to small components that contain the highest of information in the variables. The first component explains the highest volume of the total variance among the model variables; therefore, this component is considered the wealth index [19]. According to the PCA results, participants were classified into five groups from the lowest (quintile 1) to the highest (quintile 5) SES level. HL was evaluated using a questionnaire validated by Montazeri *et al.* in Iran [20]. This questionnaire assesses the HL in five parts: reading, availability, understanding, evaluating, decision-making, and behavior. The range of scores for each part was as follows: reading 4 to 20; availability 6 to 30; understanding 7 to 35; evaluating 4 to 20; decision-making and behavior 12 to 60. The range of the total HL score was between 33 and 165. The score for each part was standardized using this formula:

$$\text{Standardized score} = \frac{(\text{achieved score} - \text{minimum score})}{(\text{maximum score} - \text{minimum score})} \times 100$$

The total HL score was a summation of five standardized scores in the mentioned parts divided by five. The range of the total standardized score was between 0 and 100. The total HL score grouped into four categories includes inadequate (0-55), not enough (55.1-66), enough (66.1-84), and excellent (84.1, 100) [20]. Finally, the HL of participants categorized into poor (inadequate and not enough groups) and good (enough and excellent groups). The general health was evaluated using the WHO general health questionnaire validated by Khalili *et al.* in Iran [21]. This tool includes ten questions in eight domains: mobility, self-care, cognition and perception, interpersonal relationships, vision status, sleep status, pain, and mental status [21]. The participants were asked to rate their health problems in each domain on a Likert scale as follows: none, mild, moderate, severe, and extreme/cannot do. Overall, the general health categorized into good health (if a participant selected either none, mild or moderate

options) and poor health (if he/she selected severe or extreme/cannot do). In addition, self-rated health (SRH) was evaluated using ask of "In general, how do you evaluate your current health status?" The answer to this question was on a Likert scale: very good, good, intermediate, bad, and very bad. The individual's SRH was categorized into a good health group (those rated their health as intermediate, good, and very good) and a poor health group (those rated their health as bad and very bad) [15, 16]. The Cronbach's alpha for domains of the HL literacy questionnaire was between 0.72-0.89. The Cronbach's alpha for the general health questionnaire was 0.76, and comprehensiveness, relevancy, and clarity of this questionnaire were 0.90, 0.94, and 0.91 respectively.

The Ethical Permission obtained from Hamadan University of Medical Sciences. Written informed consent was obtained from all participants. The face-to-face interview was conducted with the respondents at the Health Centers.

The relative concentration index (RCI), which ranged between -1 and +1, was used to assess the inequality of the poor prevalence of SRH, general health, and health literacy across participants' SES. If there is no inequality, it takes zero. The negative value of the RCI means that the health indicator concentrated among the disadvantaged, while the positive values indicated the health indicator concentrated among advantaged people [22, 23]. The results were reported at a 95% CI, and Stata 14.2 software (StataCorp, TX, USA) was used for data analysis.

Findings

Overall, 750 households (participants) accepted our invitation for an interview (response rate=92.6%). Therefore, 750 adult people, including 299 men (39.87%) and 451 women (60.13), participated in the study. The mean±SD age of participants was 34.76±9.82. In terms of SES, 20.27% of participants were at the lowest SES level (Table 1).

The overall prevalence of poor SRH was 2.93 (95% CI: 1.94, 4.42). The highest poor prevalence of SRH was related to people in the first quintile of the wealth index (5.92%; 95% CI: 3.10, 11.02). Overall,

the prevalence of poor SRH in the first quintile of the wealth index was more than other quintiles. The highest poor prevalence was related to the feelings of sadness or depression in the 30 past days with 10.80% (95% CI: 8.77, 13.24) and sleep disorders with 9.20% (95% CI: 7.32, 11.49) respectively. The prevalence of feelings of sadness or depression among unmarried people was more than married (Table 2).

Poor SRH is concentrated among people with a lower level of SES. In the poor health domains, mobility was significantly concentrated among disadvantaged participants. In addition, problems in cognition, individual activities, and sleep domains were significantly concentrated among disadvantaged participants. However, the vision problems are concentrated among people with a high SES level (Table 3).

The concentration curve shows that poor health literacy is concentrated among people with a low SES level (Diagram 1).

Table 1) Characteristics of participants in the study

Variables	Number	Percent
Gender		
Male	299	39.87
Female	451	60.13
Educational level		
Elementary	57	7.60
Intermediate	101	13.47
Diploma	267	35.60
Associate degree	95	12.67
Bachelor	195	26.00
Masters	35	4.67
Job		
Employed	289	38.53
Unemployed	27	3.60
Housekeeper	336	44.80
Retired	31	4.13
Student	44	5.87
Other	23	3.07
Marital status		
Single	105	14.00
Married	645	86.00
Socioeconomic status		
Quintile 1	152	20.27
Quintile 2	149	19.87
Quintile 3	203	27.07
Quintile 4	125	16.67
Quintile 5	121	16.13

Table 2) Prevalence of poor self-rated health, general health domains, and poor health literacy among adult people in Arak (95% CI)

Variables	Poor self-rated health	Poor health domains								Poor Health literacy
		Mobility	Self-care	Vision	Pain	Cognition	Personal activity	Sleep	Feelings of sadness or depression	
Gender										
Male	3.68 (2.04, 6.53)	5.69 (3.56, 8.97)	2.01 (0.90, 4.40)	1.34 (0.50, 3.52)	3.34 (1.81, 6.11)	5.69 (3.56, 8.97)	4.68 (2.28, 7.08)	9.03 (5.77, 12.29)	10.03 (6.62, 13.45)	29.10 (24.21, 34.52)
Female	2.44 (1.35, 4.36)	4.66 (3.05, 7.04)	1.56 (0.74, 3.23)	1.33 (0.60, 2.94)	5.10 (3.41, 7.57)	3.99 (2.53, 6.25)	3.77 (2.01, 5.53)	9.31 (6.62, 12.00)	11.31 (8.38, 14.24)	23.28 (19.60, 27.42)
Marital status										
Unmarried	2.86 (0.91, 8.54)	7.62 (3.84, 14.56)	2.86 (0.92, 8.54)	5.71 (2.58, 12.20)	3.81 (1.43, 9.77)	6.67 (3.20, 13.39)	6.67 (1.86, 11.47)	15.24 (8.32, 22.16)	18.10 (10.68, 25.51)	26.67 (19.05, 35.99)
Married	2.94 (1.88, 4.58)	4.65 (3.27, 6.58)	1.55 (0.83, 2.86)	0.62 (0.23, 1.64)	4.50 (3.14, 6.40)	4.34 (3.01, 6.22)	3.72 (2.25, 5.19)	8.21 (6.09, 10.34)	9.61 (7.33, 11.89)	25.43 (22.21, 28.94)

Continue of Table 2) Prevalence of poor self-rated health, general health domains, and poor health literacy among adult people in Arak

Variables	Poor self-rated health (95% CI)	Poor health domains (95% CI)								Poor Health literacy (95% CI)
		Mobility	Self-care	Vision	Pain	Cognition	Personal activity	Sleep	Feelings of sadness or depression	
Wealth index										
Quintile 1	5.92 (3.10, 11.02)	13.82 (9.17, 20.30)	2.63 (0.99, 6.83)	NO	9.87 (6.02, 15.76)	8.55 (5.02, 14.21)	7.24 (4.04, 12.63)	13.82 (9.17, 20.3)	17.76 (12.45, 24.7)	42.76 (35.1, 50.78)
Quintile 2	1.34 (0.33, 5.24)	6.04 (3.16, 11.23)	0.67 (0.09, 4.65)	NO	2.01 (0.65, 6.09)	4.7 (2.25, 9.56)	6.71 (3.64, 12.06)	10.07 (6.15, 16.06)	6.71 (3.64, 12.06)	31.54 (24.56, 39.47)
Quintile 3	2.46 (1.03, 5.80)	1.48 (0.48, 4.50)	1.97 (0.74, 5.15)	2.46 (1.03, 5.80)	3.45 (1.65, 7.08)	2.96 (1.33, 6.44)	2.46 (1.03, 5.80)	8.37 (5.26, 13.08)	11.82 (8.04, 17.06)	18.72 (13.91, 24.71)
Quintile 4	1.6 (0.4, 6.22)	0.00 (0.00, 0.00)	0.80 (0.11, 5.51)	0.80 (0.11, 5.51)	2.40 (0.77, 7.22)	4.00 (1.67, 9.29)	2.40 (0.77, 7.22)	7.20 (3.77, 13.30)	7.20 (3.77, 13.30)	20.80 (14.54, 28.85)
Quintile 5	3.31 (1.24, 8.52)	4.13 (1.72, 9.59)	2.48 (0.80, 7.45)	3.31 (1.24, 8.52)	4.13 (1.72, 9.59)	3.31 (1.24, 8.52)	1.65 (0.41, 6.41)	5.79 (2.77, 11.68)	9.09 (5.09, 15.72)	13.22 (8.24, 20.55)
Education										
Elementary	5.26 (1.69, 15.24)	10.53 (4.77, 21.67)	5.26 (1.69, 15.24)	NO	8.77 (3.66, 19.55)	8.77 (3.66, 19.55)	8.77 (3.66, 19.55)	14.04 (7.13, 25.79)	14.04 (7.13, 25.79)	54.39 (41.32, 66.88)
Intermediate	2.97 (0.95, 8.87)	7.92 (3.99, 15.11)	0.99 (0.14, 6.77)	0.99 (0.14, 6.77)	5.94 (2.68, 12.66)	8.91 (4.68, 16.31)	7.92 (3.99, 15.11)	10.89 (6.11, 18.67)	13.86 (8.36, 22.12)	40.59 (31.42, 50.47)
Diploma	3.75 (2.02, 6.83)	5.62 (3.41, 9.12)	1.87 (0.78, 4.43)	1.12 (0.36, 3.44)	3.37 (1.76, 6.36)	5.62 (3.41, 9.12)	3.75 (2.02, 6.83)	9.36 (6.4, 13.51)	10.86 (7.64, 15.21)	26.22 (21.28, 31.84)
Associate degree	1.05 (0.15, 7.18)	3.16 (1.01, 9.4)	2.11 (0.52, 8.10)	2.11 (0.52, 8.1)	6.32 (2.85, 13.42)	2.11 (0.52, 8.10)	3.16 (1.01, 9.4)	10.53 (5.73, 18.54)	13.68 (8.08, 22.22)	21.05 (13.96, 30.47)
Bachelor	2.56 (1.07, 6.03)	2.56 (1.07, 6.03)	1.03 (0.26, 4.03)	2.05 (0.77, 5.36)	3.59 (1.72, 7.36)	1.03 (0.26, 4.03)	1.54 (0.49, 4.68)	5.64 (3.14, 9.92)	7.18 (4.29, 11.78)	14.36 (10.09, 20.04)
Masters	NO (0.39, 18.16)	2.86 (0.39, 18.16)	NO	NO	NO	5.71 (1.4, 20.54)	5.71 (1.4, 20.54)	11.43 (4.29, 27.10)	8.57 (2.74, 23.79)	5.71 (1.4, 20.54)
Total	2.93 (1.94, 4.42)	5.01 (3.71, 6.89)	1.73 (1.00, 2.97)	1.33 (0.71, 2.45)	4.40 (3.14, 6.13)	4.67 (3.37, 6.43)	4.13 (2.91, 5.82)	9.20 (7.32, 11.49)	10.80 (8.77, 13.24)	25.60 (22.60, 28.85)

Table 3) Relative concentration index (RCI) for poor health literacy, self-rated health, and health domains based on wealth index and education levels

Variable	Wealth index			Education		
	RCI	SE	95% CI	RCI	SE	95% CI
Poor self-rated health	-0.16	0.13	-0.42, 0.10	-0.18	0.11	-0.41, 0.04
Poor health domains						
Mobility	-0.43	0.09	-0.60, -0.25	-0.27	0.09	-0.44, -0.10
Self-care	-0.03	0.17	-0.38, 0.31	-0.23	0.14	-0.51, 0.05
Vision	0.41	0.12	0.19, 0.64	0.16	0.16	-0.16, 0.48
Pain	-0.19	0.11	-0.40, 0.02	-0.12	0.10	-0.31, 0.08
Cognition	-0.21	0.10	-0.40, -0.02	-0.32	0.09	-0.49, -0.15
Individual activities	-0.29	0.09	-0.47, -0.11	-0.26	0.10	-0.47, -0.05
Sleep	-0.16	0.07	-0.29, -0.03	-0.10	0.07	-0.23, 0.04
Feelings of sadness or depression	-0.12	0.06	-0.24, 0.00	-0.10	0.06	-0.22, 0.01
Poor health literacy	-0.21	0.03	-0.27, -0.14	-0.25	0.03	-0.32, -0.19

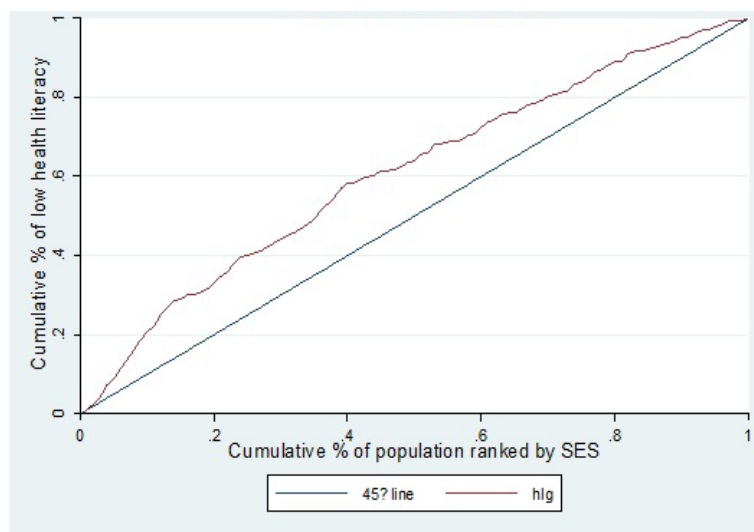


Diagram 1) The concentration curve for poor health literacy

Discussion

This study estimated the prevalence of poor SRH, general health domains, and health literacy simultaneously. Besides, the SES inequality of these outcomes was assessed. Based on the results of our study, the overall prevalence of poor SRH was low. The prevalence of poor SRH in the first quintile of the wealth index was more than other quintiles. In general health domains, the highest poor prevalence was related to the feelings of sadness or depression in the '30 past days' and 'sleep disorders', respectively. The prevalence of poor health literacy among participants was considerable. Results of inequality analysis showed that poor SRH concentrated among people with a low SES level; nevertheless, this finding is not significant. Problems with mobility, cognition, individual activities, sleep disorders, and poor health literacy were significantly concentrated among disadvantaged participants in terms of wealth index and education. The vision problems were significantly concentrated among advantaged participants.

Our study results showed that the prevalence of poor SRH and other health domains in Arak city was lower than a population-based study in Tehran¹⁵ and a world health survey^[24]. A reason for the lower prevalence in Arak than Tehran may be due to the difference in participants' mean age. Our study's mean age was lower than the mentioned study (34.76 versus 41.8 yr). The prevalence of poor SRH and poor health domains includes mobility, pain, and feelings of sadness or depression, decreased from the first to fourth quintile of wealth index but slightly increased in quintile five. In other health domains, including cognition, personal activity, and sleep disorders, the poor prevalence decreased with an increased level of wealth index from the first to the fifth quintile, which is in the line of other studies^[15, 24]. In other words, these outcomes significantly concentrated among people with lower levels of wealth index and education. Overall, regarding the relationship between SES and education with SRH and domains of general health, our findings are consistent with the results of other studies in Iran^[15, 16, 25] and studies conducted in other countries^[22].

The prevalence of vision problems is more concentrated among people with a higher level of wealth index. A reason may be more detection of eye disorders among people with a higher level of SES. However, this finding was not in the line of conducted study in Tehran^[15]. Another reason may be due to the low prevalence of vision problems in our study (1.33%) and lack of observation for this outcome in the first and second quintiles of the wealth index.

Another outcome of this study was poor health literacy. The prevalence of poor health literacy was considerable and concentrated among people with a low wealth index and education level. This finding is

in line with another study in Iran, indicating that higher health literacy is concentrated among people with a higher level of economic status^[26]. A low level of health literacy is associated with many health outcomes, such as poor SRH and general health domains^[27]. On the other hand, a low level of health literacy is concentrated among people with a low level of SES, and SES affects the health status via mediating the behavioral and lifestyle factors^[28]. People with a lower SES level have lower access to health-related sources such as health information and health care^[29]. Therefore, people with a low level of SES suffer from low health literacy and consequently poor health.

This study's strength point was to evaluate three health outcomes, SRH, general health, and health literacy, in a relatively large population-based study. A limitation of this study measured SRH and general health via self-declared of participants, increasing the risk of information bias.

Based on the WHO recommendation measuring health inequalities displays the difference in health, which can be used to assess and enhance the health equities in the communities^[30]. Therefore, this study and other studies conducted in Iran^[15, 16, 18, 26], as population-based studies, can be used to identify health inequalities. Researchers recommend Iranian health policymakers to use these studies' results for evidence-based decision-making and designing interventions to reduce health inequalities. In addition, researchers are advised to assess inequalities in other aspects of healthcare use in Iran.

Conclusion

Based on the results of this study, the prevalence of poor self-rated health, poor health domains such as mobility, self-care, vision, pain, cognition, and personal activity was low, but the prevalence of sleep disorders, feelings of sadness or depression, and poor health literacy were considerable. There is significant inequality based on the wealth index and education for poor health domains such as mobility, cognition, individual activities, sleep, and poor health literacy.

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Ethical Permissions: The Ethics Committee of the Hamadan University of Medical Sciences approved this study (IR.UMSHA.REC.1397.832). Written informed consent was obtained from all participants.

Conflict of Interests: This study was a part of the MSc thesis in Epidemiology.

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