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# Relationship between health literacy and knowledge among patients with hypertension in Isfahan province, Iran

Fateme Chajaee[1], Asiyeh Pirzadeh[2], Akbar Hasanzadeh[3], Firoozeh Mostafavi[4]

[1] M.Sc. Student of Health Education and Promotion, Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran
[2] Ph.D. of Health Education and Promotion, Assistant Professor, Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran
[3] M.Sc. of Mathematics, Instructor, Department of Mathematics and Epidemiology, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran
[4] Ph.D. of Community Health, Associate Professor, Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

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**Abstract**

**Background:** Hypertension is usually symptomless, and is not seriously attended until it causes some chronic complications. Individuals' skills in understanding and applying information about health subjects may have a substantial impact on patients' behavior and health.

**Objective:** to determine the relationship between health literacy and knowledge among patients with hypertension in Isfahan province, Iran.

**Methods:** This cross-sectional study was conducted on 700 patients with hypertension selected according to multistage random and quota types in Isfahan province (Iran). Data collection tools included Health Literacy for Iranian Adults (HELIA) and Hypertension Knowledge Level Scale (HK-LS), which were completed by patients. Data were analyzed by SPSS version 23 using Pearson's correlation, one way ANOVA, and Independent-samples t-test. The significance level was set at 0.05.

**Results:** The mean (SD) of participants' age was 60.58±11.14 years. Results showed that the relationship between age and health literacy ($r=-0.354$, $p<0.001$) and knowledge ($r=-0.129$, $p<0.001$) was statistically significant. More than three quarters of participants (75.5%) are inadequate and partially adequate of health literacy. There was a significant correlation between the blood pressure knowledge and the mean score of health literacy ($r=0.0407$, $p<0.001$).

**Conclusion:** The present study confirmed that the majority of the patients with hypertension had inadequate health literacy and there was a significant correlation between the blood pressure knowledge and the mean score of health literacy. Therefore, adequate education should be provided in health centers to increase the health literacy and knowledge about hypertension in hypertensive people. So it is suggested that future studies will be conducted on the use of various educational media in hypertensive people.

**Keywords:** Health Literacy, Knowledge, Hypertension, Health Center, Iran

## 1. Introduction

Hypertension is considered as one of the most significant health problems which is quickly prevailing around the world, and in developing countries in particular (1). Globally, there are more than one billion individuals with hypertension. In addition, four million patients die annually from direct consequences of hypertension (2). Also, the

**Corresponding author:**
Associate Professor Dr. Firoozeh Mostafavi, Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.
Tel: +98.3137923344, Fax: +98.3136682509, Email: f_mostafavi@yahoo.com
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prevalence of hypertension was observed to be 26.21% among healthy men and women in urban areas of five major cities (Tehran, Tabriz, Mashhad, Shiraz, and Bushehr) in Iran (3). A study conducted in 2011 revealed that 42.5% of people in a sample population of Yazd city (range of age 20-74 years) were diagnosed as hypertensive (4). Prevalence of hypertension in Isfahan was overall, 18.0% (16.8% males and 19.4% females) who had systemic hypertension (5). According to a systematic review (1980-2012), hypertension is one of the most common health problems in Iran (6). Hypertension is usually symptomless and is not seriously attended until it causes some chronic complications (4). If hypertension is not controlled appropriately, some complications such as heart attacks, heart failures, brain strokes, chronic kidney diseases, vision loss, and vascular diseases are quite likely to occur (7, 8). Lack of knowledge regarding hypertension is one of the most important reasons for ignoring high blood pressure (9). Therefore, expanding patients' knowledge about hypertension and related advantages of a healthy lifestyle is the key to controlling the disease (10). Adjustment of lifestyle required to lower blood pressure such as healthy diet, weight-loss and physical activity is needed to manage self-care behaviors. One factor that may contribute to self-management of hypertension is an individual's level of health literacy. Furthermore, individuals' skills in understanding and applying information about health subjects may have a substantial impact on patients' behavior and health (11). These skills have recently been conceptualized as health literacy. Health literacy is defined as the extent to which an individual is able to obtain, interpret, and understand basic health information and use health services. This concept contains a collection of reading, listening, analyzing, decision-making skills and the ability to use such skills in situations affecting health status (12). Health literacy also determines the effectiveness of health information in accepting or rejecting healthy measures; all of the above-mentioned are vital for the decision-making process within the health field. Health literacy affects the participation of individuals in promoting health behaviors such as self-care behaviors (13). Patients with insufficient health literacy are less likely to understand and act upon verbal and written information given by physicians, and more likely to pay higher expenses for healthcare services; i.e. they suffer from weak wellness, use hospitalization and emergency services more and care less about prevention measures (14). The body of evidence demonstrates that compared to individuals with adequate health literacy skills, those with limited health literacy are more likely to misunderstand health information or face the difficulties which follow medical instructions (15, 16). For example, patients with insufficient health literacy take wrong medications more and are not aware of the side effects of the medications they are taking. For those with insufficient health literacy, the majority of health tips and messages about disease prevention and screening is not easy to process (17, 18). Some studies involving blood pressure control have suggested that patients with lower health literacy are less knowledgeable about disease (19, 20) and that hypertension knowledge is related to blood pressure control (21, 22). Shibuya et al. conducted a study among Japanese elderlies. The study discovered that there was a significant relationship between reading skill in the practical health literacy field and blood pressure. It also demonstrated that there was a significant relationship between systolic blood pressure, blood-pressure-related health literacy and blood type (23). In Iran also, Darvishpour et al. conducted a study on patients with hypertension, in which results showed that only 44.1% of the sample population in Gilan province (Iran) had enough health literacy (24). There was a significant correlation between the knowledge of blood pressure and the health literacy (24). Molakhalili et al. conducted a study on the level of health literacy of patients at the hospitals of Isfahan University of Medical Sciences and found that only 33.9% of the patients possessed adequate health literacy (25). Among studies conducted with individuals with chronic disease, several reported no association between health literacy and adherence to self-care activities (26). According to investigation by researchers, studies that examine health literacy and its relationship with knowledge of hypertension in patients with hypertension are very limited. So, the present study was conducted to determine the relationship between the health literacy and the knowledge among the patients with hypertension in Isfahan province, Iran.

## 2. Material and Methods

### *2.1. Research design and sampling*

This was a cross-sectional study which was conducted on 700 hypertensive patients who visited healthcare centers in Isfahan province, Iran, in February and March 2015. Sampling methods were multistage random selection and quota types. Different districts in Isfahan province were divided into six clusters containing cases which were similar in geographical and climatic conditions. Form each cluster, a district was randomly selected; from each district, one urban and one rural healthcare center was then selected. Participants in sample population were selected randomly from the patients who had visited urban and rural centers. Sample size was set according to the distribution ratio of urban (78%) and rural populations (22%) of the related clusters.

### *2.2. Selection criteria*
Inclusion criteria comprised of having an active health record for hypertension in a health center and satisfaction to participate in the study, and exclusion criteria included failure to fulfill the questionnaire correctly and completely.

### *2.3. Instrument*
Totally, three questionnaires were presented to the participants. The first questionnaires asked for demographic information such as: age, sex, education level, job, marital status, and residence address. The second questionnaire was the Health Literacy for Iranian Adults (HELIA) questionnaire with alpha coefficient correlation score ranging from 0.72 to 0.89 which contained 33 questions (in the fields of accessibility, reading, understanding, evaluating and behavior intention) whose design, validity and reliability had been confirmed in a study by Ali Montazeri et al. (27). Each item was rated on a 5-point scale such as it is quite easy, it is easy, not easy not hard, it is hard, and it is quite hard, respectively. Based on the data from the questionnaires, participants were divided into 4 different categories: well (84.1 to 100), adequate (66.1 to 84), partially adequate (50.1 to 66) and inadequate (less than 50). The third questionnaire was Hypertension Knowledge Level Scale (HK-LS) which contained 22 items and was prepared by Erkoc et al. (25) and the reliability in this study was confirmed ($\alpha=0.82$). Zinat Motlagh et al. translated this questionnaire to Persian, after that, to assess the content validity of the scale, an expert panel's opinion was gathered and two items were excluded from the scale. All items were evaluated in terms of clarity and expression by considering the experts' opinions, and relevant changes were made for the following categories: Definition (1 item), Medical Treatment (4 items), Drug Compliance (4 items), Lifestyle (4 items), Diet (2 items), and Complications (5 items). CVI for self-care behaviors was 0.86 and Cronbach's alpha was more than 0.82 for each item. Its validity and reliability were confirmed by Zinat Motlagh et al. (29). Also, participants' blood pressure was measured and documented three times by health care experts using a calibrated blood pressure device. The questionnaires were filled through face-to-face interviews. Interviewers explained the purpose, as well as the confidentiality of the survey. Participants were asked to provide oral consent, and were then invited to participate in the study.

### *2.4. Ethical approval*
A comprehensive verbal description of the nature and purpose of the study was given to the participants. Written informed consent was obtained from patients. Ethical committees of Isfahan University of Medical Sciences reviewed and approved study protocols.

### *2.5. Statistical analysis*
After gathering data, SPSS v.23 was used for analyzing the data. The Pearson correlation coefficient, one-way ANOVA, and independent T-test and linear regression were used. Two-tailed hypotheses with p-values lower than 0.05 were considered statistically significant.

## 3. Results
The mean value of age was 60.58 ±11.14. The Pearson test showed that the relation between age and health literacy ($r=-0.354$, $p<0.001$) and knowledge ($r=-0.129$, $p=0.001$) was statistically significant. The overall demographics specifications in the participants and their relationship to health literacy and knowledge is presented in Table 1. The mean (SD) of health literacy was 53.4±19.8. The mean (SD) of health literacy categories for accessing, reading, understanding, appraisal and behavioral intention were 51.58 (27.03), 26.53 (33.7), 51.65 (26.8), 36.3 (26.7) and 70.12 (19) respectively. The level of health literacy can be observed in Table 2. The mean score of "knowledge about hypertension" for the participants was 80±14.95. Independent-samples t-test showed there was no significant difference between knowledge and sex and residence (Table 3). Also, One-way ANOVA test showed there was significant difference between knowledge, education level and job categories ($p<0.001$). There was a significant correlation between the blood pressure knowledge and the mean score of health literacy ($r=0.407$, $p<0.001$). Also, the Pearson test showed significant correlation between the blood pressure knowledge and categories of health literacy such as accessing ($r=0.261$, $p<0.001$), reading ($r=0.223$, $p<0.001$), understanding ($r=0.341$, $p<0.001$), appraisal ($r=0.327$), $p<0.001$) and behavioral intention ($r=0.416$, $p<0.001$). The results of the linear regression indicated that knowledge about predicting blood pressure was significantly associated with systolic blood pressure but health literacy was not significantly associated with systolic blood pressure by adjusting the different variables (Table 4). Meanwhile, by adjusting the rest of the variables, regression analysis showed that residence is a significant predictor of blood pressure and the blood pressure of the residents of the villages is significantly lower than that of urban residents (Table 4).

**Table 1.** Demographic information and their relationship to health literacy and knowledge

| Variables | | n | % | p-value | |
|---|---|---|---|---|---|
| | | | | Health literacy | Knowledge |
| Gender | Man | 218 | 32 | <0.001* | 0.07 |
| | Woman | 464 | 68 | | |
| Marital Status | Single | 95 | 14 | <0.001* | <0.001* |
| | Married | 578 | 86 | | |
| Residence | Rural | 151 | 22 | 0.002** | 0.62 |
| | Urban | 531 | 78 | | |
| Education Level | Illiterate | 371 | 54.5 | <0.001**, (r=202) | <0.001*** |
| | Elementary | 211 | 31 | | |
| | Secondary | 44 | 6.5 | | |
| | High school | 34 | 5 | | |
| | Academic | 20 | 3 | | |
| Job | Employer | 17 | 2.5 | <0.001*** | <0.001*** |
| | Worker | 30 | 4.4 | | |
| | Retired | 117 | 17.2 | | |
| | Housekeeper | 448 | 65.7 | | |
| | Self-employed | 60 | 8.8 | | |
| | Unemployed | 10 | 1.5 | | |

* Independent-samples t-test; ** Pearson's correlation; *** One –way ANOVA

**Table 2.** Frequency distribution of health literacy in the participants

| Level of health literacy | n | % |
|---|---|---|
| Well | 57 | 8.4 |
| Adequate | 108 | 15.9 |
| Partially adequate | 181 | 26.7 |
| Inadequate | 332 | 49 |
| Total | 678 | 100 |

**Table 3.** Frequency and percent of correct answer to knowledge question about hypertension in participants

| Hypertension knowledge item | Correct Answer | |
|---|---|---|
| | n | % |
| High diastolic or systolic blood pressure indicates increased blood pressure. | 246 | 36.1 |
| Blood pressure 140 over 90 indicates high blood pressure | 487 | 71.4 |
| Drugs for increased blood pressure must be taken every day. | 626 | 91.8 |
| Individuals with increased blood pressure must take their medication only when they feel ill. | 473 | 69.4 |
| Individuals with increased blood pressure must take their medication throughout their life. | 558 | 81.8 |
| Increased blood pressure is the result of aging, so treatment is unnecessary. | 429 | 62.9 |
| If individuals with increased blood pressure change their lifestyles, there is no need for treatment. | 349 | 51.02 |
| Individuals with increased blood pressure can eat salty foods as long as they take their drugs regularly. | 534 | 78.3 |
| Individuals with increased blood pressure must not smoke. | 605 | 88.7 |
| Individuals with increased blood pressure must eat fruits and vegetables frequently. | 661 | 96.9 |
| For individuals with increased blood pressure, the best cooking method is frying. | 557 | 81.7 |
| For individuals with increased blood pressure, the best cooking method is boiling or grilling. | 655 | 96 |
| The best type of meat for individuals with increased blood pressure is white meat. | 657 | 96.3 |
| The best type of meat for individuals with increased blood pressure is red meat. | 564 | 82.7 |
| Increased blood pressure can cause premature death if left untreated. | 646 | 94.7 |
| Increased blood pressure can cause heart diseases, such as heart attack, if left untreated. | 634 | 93 |
| Increased blood pressure can cause strokes, if left untreated. | 630 | 92.4 |
| Increased blood pressure can cause kidney failure, if left untreated. | 517 | 75.8 |
| Increased blood pressure can cause visual disturbances, if left untreated. | 539 | 79 |

**Table 4.** Linear regression model to assess health literacy and knowledge on systolic blood pressure by adjusting the different variables

| Variable | Row coefficient (β) | Standard Error | Standard Beta | t | p-value |
|---|---|---|---|---|---|
| Knowledge | -0.099 | 0.04 | -0.099 | 2.37 | 0.018 |
| Health literacy | -0.054 | 0.039 | -0.07 | 1.39 | 0.16 |
| Residence | -6.49 | 1.38 | -0.18 | 4.72 | <0.001 |
| Age | -0.012 | 0.06 | -0.009 | 0.202 | 0.84 |
| Sex | -2.36 | 1.37 | -0.074 | 1.72 | 0.086 |
| Education level | -0.465 | 0.62 | -0.038 | 0.75 | 0.45 |

## 4. Discussion

The present study was conducted to examine the relationship between blood pressure knowledge and health literacy in patients with hypertension in Isfahan province, Iran. The results revealed that more than three quarters of the participants (75.5%) were categorized as inadequate or partially adequate with relation to health literacy. In this study, 24.3% of participants had well and adequate health literacy. These results were consistent with those of the study by Hutchison et al. who reported that 29.1% of participants had desirable health literacy (30). In Singapore, 28.4% of the respondents had adequate health literacy (31). Tehrani Bani Hashemi et al. conducted a study in 5 different provinces in Iran and reported that 28.1% of participants had adequate health literacy (32). These results were consistent with the present study. But in the study by Darvishpour et al., 41.6 % of participants had adequate health literacy which was not consistent with the present study (24). The inconsistency in the results might have been related to the participants of the studies; in Darvishpour et al. participants were selected from rural health centers (24). But in our study, the mean of health literacy was higher in urban than in rural areas. Another reason is using a different questionnaire, in the Darvishpour et al. study S –TOFHLA, and in the present study HELIA were used. In the present study, the mean value of health literacy was adequate for accessing and understanding and behavioral intention categories, and the lowest mean value was observed in the reading and appraisal categories. In a Montazer et al. study on Iranian adults, it was found that the lowest score for health literacy was for the appraisal category (27). Considering the similarity of measurement tools in these two studies, it seems that Iranian society needs to improve health literacy, especially in the appraisal category. There was a significant correlation between hypertension knowledge and the mean score of health literacy in all categories. In other words, the participants with high health literacy had more knowledge of their disease. As it can be seen in Table 2, most of the participants had knowledge about taking medications, healthy food and the side effect of hypertension. On the other hand, there were no significant differences between knowledge in urban and rural groups, so these results might be related to the education about these subjects in health centers by health care experts or physicians. Because in this study, people stated that health care experts or physicians are the most important source of information regarding their health. Studies by Shibuya et al., Ko et al., Darvishpour et al. and Williams, confirmed the results of this study (20, 23, 24, 31). So, it is presumed that effective training should be based on the patients' health literacy level to improve their attitudes and control hypertension. Using multimedia-based methods such as adapting related pictures, videos and computer applications have been proven effective. These conclusions were confirmed by the study of Tol et al. (33). There was a positive correlation between education level and the mean score of health literacy. Studies by Molakhalili et al., and Montazeri et al. showed that the health literacy level rose as the education level increased (25, 27). In this study, men's mean score of health literacy was significantly higher than women's. This result was consistent with that of Javadzadeh et al., but opposed Afshari et al. and Montazeri et al. results in which women had more health literacy (13, 27, 34). Since in the present study, men's education level was higher than women's, it can be considered as one the causes of men's higher health literacy scores. In this study, it was shown the there was a negative correlation between age and health literacy. The results are consistent with the studies of Tol et al., Molakhalili et al., and Levinthal. On the other hand, the knowledge about hypertension also decreased as age increased (25, 34, 35). One of the possible causes for this result could be the degraded ability of older people in reading and appraising health subjects. Although linear regression showed health literacy could predict systolic blood pressures in patients in present study, some studies have reported that patients with hypertension did not have statistically significant differences between health literacy and blood pressure control (20, 36). Veghari et al., concluded that knowledge in illiterate people was high, but the rate of hypertension control was low in this group. This is not consistent with our study (37).

## 5. Study limitations

With regard to the interviews with patients, the impact of participants' responses may be affected due to the lengthy questionnaires, furthermore, the physical and mental condition of participants may also have affected their responses to the questionnaires. So, for future study, we propose that a short questionnaire would be more suitable for people with hypertension. In addition, our study was conducted on participants with hypertension who referred to health centers, therefore may not be generalized to an entire community.

## 6. Conclusions

The present study confirmed that the majority of the patients with hypertension had inadequate health literacy and there was a significant correlation between the knowledge about blood pressure and the mean score of health literacy. Therefore, adequate education should be provided in health centers, to increase the health literacy and knowledge about hypertension in hypertensive people. So, it is suggested that future studies will be conducted on the use of various educational media in hypertensive people.

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**Conflict of Interest:**
There is no conflict of interest to be declared.

**Authors' contributions:**
All authors contributed to this project and article equally. All authors read and approved the final manuscript.

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