

Health Literacy and Affecting Factors in Individuals with Stroke: A Cross-Sectional Study

İnme Geçiren Bireylerde Sağlık Okuryazarlığı ve Etkileyen Faktörler: Kesitsel Çalışma

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ABSTRACT

Objective: This study aimed to examine the factors affecting the health literacy of individuals with stroke.

Methods: In this analytical and cross-sectional study, "Sociodemographic Characteristics Form" and "the Health Literacy Scale" were administered to 223 individuals with stroke who were hospitalized in the neurology clinic of a university hospital in western Turkey. The research data were analyzed in the "Statistical Package for the Social Sciences 22" program. Kolmogorov-Smirnov test, Pearson Correlation, Mann Whitney U, "Kruskal Wallis", and "Post Hoc/Games-Howell" tests were used.

Results: The total mean scale score in our study was 88.67±22.36. The mean rank values of the individuals, who were aged below 50, who had a high education level, and who did not have a chronic disease other than stroke, on the scale and all its subscales were significantly higher. The mean rank of the scale increased as the economic status raised from low to high. The mean rank value of those who received training from health professionals on the "access to information subscale" was significantly higher.

Conclusion: Age, marital status, education level, income level, general health status, presence of another chronic disease, and status of receiving training from a health professional were determined as factors affecting health literacy in individuals with stroke. It is thought that determining the health literacy levels of inpatients with stroke is an important step in determining the stroke literacy levels of individuals and thus their awareness of stroke.

Keywords: Stroke, health literacy, nursing

ÖZ

Amaç: Bu çalışmada inme geçiren bireylerin sağlık okuryazarlığını etkileyen faktörlerin incelenmesi amaçlandı.

Yöntemler: Analitik ve kesitsel olan bu çalışmada, Türkiye'nin batısındaki bir üniversite hastanesinin nöroloji kliniğinde yatan 223 inme geçirmiş bireye "Sosyodemografik Özellikler Formu" ve "Sağlık Okuryazarlığı Ölçeği" uygulandı. Araştırma verileri "Statistical Package for the Social Sciences 22" programı ile analiz edildi. Kolmogorov-Smirnov testi, Pearson Korelasyonu, Mann Whitney U, "Kruskal Wallis" ve "Post Hoc/Games-Howell" testleri kullanıldı.

Bulgular: Çalışmamızda ölçeğin toplam puan ortalaması 88,67±22,36 idi. 50 yaş altında olan, eğitim düzeyi yüksek olan ve inme dışında bir kronik hastalığı bulunmayan bireylerin ölçek ve tüm alt boyutlardan aldıkları sıra değeri ortalamaları anlamlı şekilde daha yüksek bulundu. Ekonomik durum düşükten yükseğe gittikçe ölçeğin toplam sıra değeri ortalaması arttı. Sağlık çalışanlarından eğitim alanların "bilgiye erişim alt boyutu" sıra değeri ortalaması anlamlı olarak daha yüksekti.

Sonuç: Yaş, medeni durum, eğitim düzeyi, gelir düzeyi, genel sağlık durumu, başka bir kronik hastalık mevcudiyeti ve sağlık çalışanından eğitim almış olma durumu inme geçiren bireylerde sağlık okuryazarlığı etkileyen faktörler olarak saptandı. Yatarak tedavi gören inme geçirmiş bireylerin sağlık okuryazarlık düzeylerinin tespit edilmesinin, inme okuryazarlık düzeylerinin, dolayısıyla inme konusundaki farkındalıklarının belirlenmesinde önemli bir adım olduğu düşünülmektedir.

Anahtar Kelimeler: İnme, sağlık okuryazarlığı, hemşirelik

INTRODUCTION

Stroke is one of the leading causes of death and disability worldwide and is highly preventable.¹ It is emphasized that age is one of the most important risk factors for stroke, and an estimated 75% of strokes occur in people 65 years old and above.² It was reported that there were 7.44 million deaths due to stroke worldwide in 2021.³ According to the data from the Global Burden of Disease Study, in 2019, the incidence of stroke for Turkey was estimated as 125,345 (154 per hundred thousand), the prevalence was 1,080,380 (1.3%), the death rate due to stroke was 48,947 and the number of life years lost due to stroke-related death/disability was estimated to be 993,082 years.⁴

Stroke burden largely depends on modifiable risk factors and may be influenced by modifiable factors such as the risk of recurrent stroke, smoking, and patient compliance with oral antihypertensives and antithrombotics.⁵ Many of these risk factors can be affected by the patient's ability to understand, implement, and maintain recommendations of health professionals.⁶ Therefore, stroke is one of the chronic diseases in which the concept of health literacy, which is defined as the ability of individuals to acquire, understand, and cope with the necessary health information to improve their health, gains importance.⁵ Poor health literacy can be a major barrier to the ability of people with stroke to reduce their risk of recurrent stroke.⁶

Health literacy is an understanding that interfaces with technological and social environments and involves multiple cognitive and social domains.⁷ An inadequate level of health literacy can cause difficulties in patients' understanding of health-related information and messages, less utilization of preventive health services, problems in accessing health services, delayed time of diagnosis, increased use of emergency services, lack of understanding of medical instructions, difficulties in complying with recommended treatments, and low self-management.^{6,8,9} Low health literacy may also increase the incidence of chronic diseases, the frequency of hospitalizations, disease-related direct costs, and mortality.^{5,8,10} Low health literacy levels are common in Turkey, and 9 out of 10 elderly individuals aged 65 and over have been reported to have inadequate or limited health literacy.¹¹ This suggests that stroke-related health literacy may also be low.

In the literature, the knowledge of stroke symptoms and risk factors is defined with the term "stroke literacy".¹² The literature highlights the need to improve stroke literacy.¹³ People with stroke and their relatives often have unmet needs for training on all aspects of stroke care, including the causes of stroke, the prevention of stroke, and post-

stroke recovery.¹⁴ It is considered important for individuals to receive training on individual stroke risk factors, stroke alarm symptoms, activation of emergency medical systems, need for follow-up after discharge, prescription medications and treatments, especially before being discharged after an acute stroke.¹³ However, in a study evaluating the effect of health literacy on continuing education of individuals who had a stroke, it was noted that more than half of the individuals had inadequate health literacy.⁶

Effective maintenance of post-stroke self-management majorly depends on patients' health literacy.¹⁰ Advanced stroke literacy is inadequate on its own; however, is considered an important component in an approach to reducing the risk of recurrent stroke.^{5,6,15} In the literature, there are studies focusing on health literacy of stroke survivors.^{6,16-19} In these studies, medication literacy in stroke survivors, mental health literacy in stroke survivors, the relationship of stroke health literacy with stroke risk factors and post-stroke depression, the knowledge status of individuals about stroke at the time of discharge in acute stroke, and the effect of health literacy on the continuation of education in stroke survivors were examined. However, no study has been conducted on this subject in Turkey.

AIM

This study aimed to examine the factors affecting the health literacy of stroke individuals receiving inpatient treatment at a university hospital in Turkey.

Research questions are as follows:

- What is the level of health literacy of individuals with stroke?
- What are the factors affecting health literacy in individuals with stroke?

METHODS

Study Design

This study had an analytical and cross-sectional design and was presented in adherence to the Strobe Checklist.

Study Population

The data were collected in the 14-bed neurology clinic of a university hospital in Turkey between December 2021 and October 2022. The number of individuals treated in the neurology department of the hospital in 2020 was 1465. The sample size was calculated as 223 based on an incidence of 18.4% with a confidence interval of 95% and an accuracy of 5%, using the sample calculation method for an incidence of an event with a known population.²⁰ Inclusion criteria were (1) being aged over 18, (2) having a score of "0,1,2" on the Modified Rankin Scale (mRS), (3)

being conscious without any cognitive impairment and memory loss, (4) volunteering to participate in the study, (5) being literate, and (6) having no communication barriers.

Of the 248 individuals evaluated for eligibility, 223 individuals who were confirmed eligible were included in the study. Since 9 individuals with stroke refused to participate in the study and 16 individuals scored 3,4,5 on the mRS, 25 individuals were excluded. The remaining 223 individuals were included in the final analysis.

Instruments

The data of the study were collected using a "Sociodemographic Characteristics Form" and the "Health Literacy Scale".

Sociodemographic Characteristics Form: This form was prepared by the researchers based on the literature.^{21,22} The form includes questions regarding the socio-demographic characteristics of individuals (age, gender, education level, marital status, occupation, social security, income status, and place of longest residence) as well as questions about health status (height, weight, body mass index, smoking-alcohol use, presence of another chronic disease, type of stroke, recurrent stroke status, duration of stroke diagnosis, the status of receiving training on stroke, regular medication status, blood pressure measurement, compliance with dietary recommendations, adoption of an active lifestyle, following appointments, evaluation of general health status). This form consists of 27 items in total.

The Health Literacy Scale: It consists of 25 items and four subscales. The Turkish validity and reliability study of the scale were established by Aras and Bayik Temel.²² All items on the scale have a positive structure and there is no reverse item. The scale is scored between 1-5 points. A minimum of 25 and a maximum of 125 points are obtainable from the scale. Low scores indicate that the level of health literacy is inadequate, problematic, and weak and high scores indicate that the level is adequate. The higher the score, the higher the level of health literacy. The scale has four subscales. The "Access to information" subscale includes five items; a minimum score of 5 and a maximum score of 25 can be taken from this subscale. The "Understanding information" includes seven items; a minimum score of 7 and a maximum score of 35 can be taken from this subscale. The "Appraisal" subscale consists of 8 items and a minimum score of 8 and a maximum score of 40 can be taken from this subscale. The "Application" subscale includes 5 items and a minimum score of 5 and a maximum score of 25 can be taken from this subscale. The Cronbach Alpha value was found to be 0.92 for the overall

scale and between 0.62 and 0.79 for the subscales. In this study, the Cronbach Alpha value of the Health Literacy Scale was found to be 0.96.

The Modified Rankin Scale (mRS): This scale is used to measure the degree of disability in patients who have had a stroke. The scale is graded on a score of 0 to 6. For outcome prediction in clinical trials, the mRS is usually dichotomized where good functional outcome is a score 0-2 and poor functional outcome 3-6.²³

Data Collection

The questionnaire forms were applied by the researchers in face-to-face interviews in the patient rooms of the neurology clinic for an average of 20 minutes. To collect the research data, the individuals with stroke in the neurology clinic were visited 3 days a week (on weekdays, on days when assistant researchers were available) between 08:00-17:00. The questionnaire was filled out using the self-report method. However, the researchers guided individuals who requested help while filling in the questionnaires (for example, the individuals did not have glasses with him although he needed reading glasses or asked for help from the researcher due to fatigue). During the study, the care and treatment process of the participants and the routine workflow of the clinic were not interrupted.

Statistical Analysis

The research data were analyzed in the Statistical Package for the Social Sciences 22 (IBM SPSS Corp., Armonk, NY, USA) program. Descriptive statistics were presented as numbers, percentage distributions, and mean (mean)±standard deviation (SD) values. Kolmogorov-Smirnov or Shapiro-Wilk tests were used to evaluate whether the data showed a normal distribution. Numerical values with normal distribution were compared with the "Pearson Correlation" analysis and categorical variables and dependent variables were compared using the "Mann Whitney U", "Kruskal Wallis", and "Post Hoc/Games-Howell" tests. The strength of the correlation coefficient; very weak (0.00-0.25), weak (0.26-0.49), moderate (0.50-0.69), high (0.70-0.89), very high (0.90-1.00) was evaluated.²⁴ Results are presented at a confidence interval of 95% and a significance level of $P<.05$.

Ethical Aspect of Research

The study was conducted in accordance with the Declaration of Helsinki. The protocol of the present study was approved by Aydın Adnan Menderes University Faculty of Nursing Non-Interventional Clinical Research Ethics Committee (Date: 08.11.2021, Protocol No: 2021/272). Written informed consent was obtained from the individuals with stroke who met the inclusion criteria.

Participants were informed that they could withdraw from the study at any time for any reason with no negative consequences.

RESULTS

Sample characteristics

The majority of the individuals with stroke were aged 50 and over (89.2%) and married (91.5%). More than half of the participants (55.6%) were male. Most of the participants had a low level of education (74%), 41.3% were living in the city center, and more than half had a moderate economic status (64.6%) (Table 1).

Table 1. Distribution of the Participants According to Sociodemographic Characteristics (n = 223)

Patient characteristics	n	%
Age Mean $\pm$ SD: 67.67 $\pm$ 14.37 years		
Age Group		
<50 years	24	10.8
$\geq$ 50 years	199	89.2
Gender		
Female	99	44.4
Male	124	55.6
Marital Status		
Married	204	91.5
Single	19	8.5
Education Level		
Literate	82	36.8
Primary school	83	37.2
Middle school	19	8.5
High school	26	11.7
University	13	5.8
Working Status		
Working	29	13.0
Not working	194	87.0
Economic Status		
Low	73	32.7
Middle	144	64.6
High	6	2.7
Place of residence		
Rural	58	26.0
Urban	165	74.0
Body Mass Index		
Underweight	3	1.3
Normal weight	69	30.9
Pre-obesity	104	46.6
Obesity class I /II	42	18.8
Obesity class III	5	2.2
Smoking		
No	168	75.8
Smoking 1–10 cigarettes per day	15	6.7
Smoking 11–20 cigarettes per day	20	13.0
Smoking more than a pack per day	10	4.5

Table 1. Distribution of the Participants According to Sociodemographic Characteristics (n= 223) (Continued)

	n	%
Alcohol consumption		
No	209	93.7
Yes	14	6.3
Other Chronic Diseases		
Yes	181	81.2
No	42	18.8
Disease Duration		
Less than 1 month	139	62.3
1-3 months	16	7.2
4-11 months	16	7.2
1-3 years	24	10.8
More than 3 years	28	12.5
Education About Stroke		
Received training on stroke from a health professional	74	33.2
Received training on stroke from other sources	14	6.3
The number of recurrence stroke		
None	159	71.3
1 time	26	11.7
2 times	30	13.5
$\geq$ 3 times	8	3.5
Regular Medication		
Yes	203	91.0
No	20	9.0
Blood Pressure Measurement		
Twice per day	14	6.3
Once or several times a week	59	26.5
Once or several times a month	39	17.5
None	111	49.7
Following Dietary Recommendations		
Yes	39	17.5
Partially	118	52.9
No	66	29.6
Weight Control		
Yes	44	19.7
Partially	113	50.7
No	66	29.6
Regular Physical Activity		
Yes	52	23.3
Partially	95	42.6
No	76	34.1
Adherence to Medical Appointments		
Yes	174	78.0
Partially	23	10.3
No	26	11.7
Functional Health Status		
Very good	9	4.0
Good	75	33.6
Moderate	110	49.3
Poor	27	12.1
Very poor	2	1.0

Note: For continuous variables, n; number (%) ; mean (SD) is presented.

About half of the participants were overweight (46.6%). The most frequent comorbidities were hypertension (60.5%) and diabetes mellitus (39%). The majority of the participants were using their medications regularly (91.0%) and went to hospital appointments (78%), but half of them did not undergo blood pressure measurements regularly (49.8%). They partially complied with dietary recommendations (52.9%) and partially achieved weight control (50.7%). In terms of the duration of diagnosis, 62.3% of the participants had a stroke diagnosis for less than a month. 33.2% of the participants obtained information about their disease from health professionals and 71.3% did not develop recurrent stroke. Additional characteristics of the individuals are presented in Table 1.

Health literacy and affecting factors

The mean total score of the Health Literacy Scale was 88.67 ± 22.36 . Individuals with stroke had the highest mean score (27.91 ± 8.06) in the “appraisal” subscale, followed by understanding information (24.33 ± 7.15), application (20.92 ± 4.23), and access to information (15.60 ± 6.43), respectively (Table 2).

Table 2. Mean Scores of the Health Literacy Scale and its Subscales in Individuals with Stroke

	Mean	SD
Access	15.60	6.43
Understanding	24.33	7.15
Appraisal	27.91	8.06
Application	20.92	4.23
Total score	88.67	22.36

Note: Data presented as Mean (SD; Standart deviation)

There was a significant, negative and very weak correlation between age and “application” subscale score ($P < .001$, $r = -.240$). There was a significant, negative and weak correlation between age and other subscales scores (access, understanding, appraisal - total score) of the participants ($P < .001$, $r = -.445$; $P < .001$, $r = -.434$; $P < .001$, $r = -.373$; $P < .001$, $r = -.454$, respectively). The mean rank value of the scale and the mean rank values of the all subscales (access, understanding, appraisal, application) were higher in those aged below 50 compared to those aged 50 and over ($P < .001$; $P < .001$; $P < .001$; $P < .001$; $P = .005$, respectively) (Table 3).

The mean rank values of the single participants from all subscales were higher than that of the married participants. There was a statistically significant difference between them in “access”, “understanding”, and “appraisal” subscales whereas there was no significant difference between the two groups in terms of the “application” subscale ($P < .001$; $P = .004$; $P = .010$; $P = .681$, respectively) (Table 3).

The mean rank scores of those who were high school and university graduates on the overall scale and all subscales (access, understanding, appraisal, application) were statistically significantly higher than that of those who were literate, primary, and middle school graduates ($P < .001$; $P < .001$; $P < .001$; $P = .004$, respectively) (Table 3).

The mean rank values on the overall scale and all subscales increased as the economic status increased from low to high. The mean scale rank of the participants with low income was significantly lower than that of those with middle and high income ($P = .002$) (Table 3).

The mean rank values of those without chronic disease on the overall scale and all subscales (access, understanding, appraisal, application) were significantly higher ($P < .001$; $P = .005$; $P = .003$; $P = .002$; $P = .019$, respectively) (Table 3). The mean rank values of those who expressed their general health status as “poor” on the overall scale and all subscales were the lowest.

There was no significant difference between the mean rank values of the groups on the overall scale and all subscales in terms of health literacy, sex, disease duration, body mass index, and recurrent stroke status ($P > .05$) (Table 3).

DISCUSSION

Health literacy levels of the individuals with stroke

According to our study results, the mean health literacy score of individuals with stroke was 88.67 ± 22.36 . The level of health literacy increased as the scale score increased. Therefore, it can be said that the mean health literacy score of the participants was moderate in the studies conducted with individuals with stroke, similar to our study findings.^{16,17} In a study conducted on stroke health literacy, the level of stroke knowledge of inpatients was found to be low.²⁵ Other studies have reported inadequate stroke health literacy/knowledge both in the general population²⁶⁻²⁹ and in populations at high risk of stroke and individuals with stroke.^{19,26} To reduce the risk of recurrent stroke in people with stroke, it may be important to improve not only health literacy but also stroke literacy. Stroke literacy could not be addressed in our study due to the lack of an appropriate measurement tool. However, we observed that stroke awareness is insufficient in individuals with stroke. It is thought that stroke literacy should be examined more, especially in developing countries.

Health literacy and sociodemographic characteristics of individuals

In our study, the mean age of the individuals was 67.67 ± 14.37 . In similar studies carried out with people with stroke, the mean ages of individuals were 56.84 ± 10.22 and 51.80 ± 8.62 .^{16,17} The mean age obtained in one study was

Table 3. Health Literacy and the Affecting Factors

	Access	Understanding	Appraisal	Application	Total score
Age Mean	$r = -.445$	$r = -.434$	$r = -.373$	$r = -.240$	$r = -.454$
67.67±14.37	$P<.001^*$	$P<.001^*$	$P<.001^*$	$P<.001^*$	$P<.001^*$
Age Group					
<50 years	22.292 ±3.617 (MR:183,38)	30.250 ±5.69 (MR:168,17)	34.542 ±7.512 (MR:171,00)	22.833 ±3.144 (MR:146,54)	110.292±19.034 (MR:179,25)
≥50 years	14.794 ±6.233 (MR:103,39)	23.623 ±6.990 (MR:105,23)	27.121 ±7.776 (MR:104,88)	20.694 ±4.295 (MR:107,83)	86.070 ±21.337 (MR:103,89)
Test and P-value	MWU=675 <.001	MWU=1040 <.001	MWU=972 <.001	MWU=1559 .005	MWU=774 <.001
Gender					
Female	14.959 ±6.647 (MR:105.50)	23.505 ±6.739 (MR:102.90)	28.626 ±7.273 (MR:115.77)	21.273 ±4.004 (MR:117.86)	88.343 ±21.069 (MR:109.32)
Male	16.113 ±6.243 (MR:117.19)	25.000 ±7.428 (MR:119,26)	27.355 ±8.638 (MR:108.99)	20.645 ±4.402 (MR:107.32)	88.944 ±23.429 (MR:114.14)
Test and P -value	MWU=5494.50 .177	MWU=5237.50 .060	MWU=5764.50 .435	MWU=5558 .221	MWU=5873 .580
Marital Status					
Married	15.137 ±6.374 (MR:107.22)	23.922 ±7.106 (MR:108.23)	27.500 ± 8.067 (MR:108.60)	20.853 ± 4.342 (MR:111.46)	87.265 ±22.168 (MR:107.80)
Single	20.579 ±4.914 (MR:163.32)	28.789 ±6.223 (MR:152.53)	32.421 ±6.752 (MR:148.55)	21.684 ±2.769 (MR:117.76)	103.842±19.012 (MR:157.11)
Test and P -value	MWU=963 <.001	MWU=1168 .004	MWU=1243.50 .010	MWU=1828.50 .681	MWU=1081 <.001
Education Level					
Literate	13.012 ± 5.781 (MR:84.23)	20.537 ±6.009 (MR:76.29)	24.781 ±7.575 (MR:85.32)	19.707 ±4.539 (MR:92.73)	77.793 ±20.131 (MR:78.93)
Primary school	15.458 ±6.314 (MR:110.42)	25.181 ±6.775 (MR:119.25)	28.181 ±7.781 (MR:113.89)	21.386 ±4.111 (MR:118.54)	90.108 ±20.704 (MR:115.46)
Middle school	15.632 ±6.817 (MR:115.24)	25.211 ±7.292 (MR:122.47)	28.737 ±7.957 (MR:118.74)	21.211 ±3.735 (MR:112.58)	90.790 ±22.162 (MR:118.66)
High school	21.077 ±3.654 (MR:168.85)	29.423 ±5.686 (MR:160.27)	32.808 ±7.082 (MR:154.37)	22.192 ±3.499 (MR:134.58)	105.423±17.109 (MR:164.58)
University	21.846 ±4.219 (MR:178.85)	31.462 ±5.125 (MR:179.12)	35.077 ±5.251 (MR:173.65)	22.692 ±3.449 (MR:145.81)	111.615±15.289 (MR:183.62)
Test and P -value	KW = 49.747 <.001	KW = 55.437 <.001	KW = 37.454 <.001	KW = 15.223 .004	KW = 55.289 <.001
Economic Status					
Low	13.288 ±6.147 (MR:87.29)	22.904 ±6.880 (MR:97.55)	25.890 ± 7.109 (MR:92.21)	20.726 ±3.899 (MR:105.30)	82.726 ±19.452 (MR:91.60)
Middle	16.625 ±6.248 (MR:122.79)	24.938 ± 7.223 (MR:118.25)	28.667 ±8.409 (MR:119.71)	20.924 ±4.438 (MR:113.68)	91.035 ± 23.306 (MR:120.37)
High	19.167 ±7.441 (MR:153.75)	27.333 ± 6.861 (MR:137.75)	34.667 ±3.011 (MR:167.67)	23.333 ±2.422 (MR:153.08)	104.500 ± 15.719 (MR:159.25)
Test and P -value	KW = 17.358 <.001	KW = 5.987 .050	KW = 13.415 <.001	KW = 3.384 .184	KW = 12.943 .002
Other Chronic Diseases					
Yes	15.083 ± 6.311 (MR:106.14)	23.713 ±7.073 (MR:105.90)	27.182 ±7.959 (MR:105.43)	20.613 ±4.399 (MR:107.18)	86.419±21.896 (MR:104.87)
No	17.833±6.570 (MR:137,25)	27.024 ±6.951 (MR:138.29)	31.095 ± 7.849 (MR:140,30)	22.262 ± 3.132 (MR:132.79)	98.405 ±21.997 (MR:142.74)
Test and P -value	MWU=2740.50 .005	MWU = 2697 .003	MWU=2612.50 .002	MWU = 2928 .019	MWU = 2510 <.001

Table 3. Health Literacy and the Affecting Factors (Continued)

	Access	Understanding	Appraisal	Application	Total score
Disease Duration					
Less than 1 month	16.432 ±5.969 (MR:119.33)	24,712 ±7,152 (MR:115.78)	28,698 ±7,882 (MR:118.29)	21,043 ±4,039 (MR:113.62)	90,777 ±21,872 (MR:118.13)
1-3 months	15.438 ±5.738 (MR:106.34)	23,875 ±5,071 (MR:103.31)	28,125 ±5,427 (MR:108.47)	21,688 ±3,156 (MR:120.56)	89,125 ±12,590 (MR:107.81)
4-11 months	13.563 ±7.118 (MR:93.84)	21.938 ±9.313 (MR:93.50)	24.000 ±10.354 (MR:87.44)	19.688 ±5.885 (MR:105.09)	79.188 ±30.020 (MR:92.66)
1-3 years	13.333 ±6.888 (MR:89.88)	24.125 ±6.713 (MR:109.02)	26.708 ±8.493 (MR:102.25)	19.667 ±4.517 (MR:93.35)	83.917 ±22.236 (MR:95.92)
More than 3 years	14.679 ±7.761 (MR:108.16)	24.286 ±7.358 (MR:111.34)	27.214 ±8.139 (MR:105.16)	21.679 ±4.295 (MR:118.98)	87.500 ±23.664 (MR:108.80)
Test and P -value	KW=6.147 .188	KW = 2.142 .710	KW = 4.561 .335	KW = 2.943 .567	KW = 4.322 .364
Received training on stroke from a health professional					
Yes	17.324 ±5.276 (MR:128.01)	22.824 ±6.845 (MR:98.18)	27.595 ± 8.254 (MR:109.5)	20.770 ± 4.109 (MR:105.38)	88.243 ±22.738 (MR:110.80)
No	14.745 ±6.796 (MR:104.05)	25.087 ±7.206 (MR:118.86)	28.081 ±7.997 (MR:113.22)	21.000 ±4.304 (MR:115.29)	88.893 ±22.251 (MR:112.59)
Test and P -value	MWU= 4328 .009	MWU=4490.50 .024	MWU = 5331 .688	MWU = 5023 .275	MWU=5424.50 .845
Received training on stroke from other sources					
Yes	18.214 ±5.820 (MR:137.11)	26.929 ±7.966 (MR:136.96)	30.929 ±7.509 (MR:136.21)	19.500 ±6.0352 (MR:106.04)	95.857 ±24.491 (MR:133.39)
No	15.426 ±6.451 (MR:110.32)	24.162 ±7.083 (MR:110.33)	27.718 ±8.081 (MR:110.38)	21.019 ±4.087 (MR:112.40)	88.196 ±22.196 (MR:110.57)
Test and P -value	MWU=1111.50 .131	MWU=1113.50 .134	MWU = 1124 .147	MWU=1379.50 .718	MWU=1163.50 .200
Recurrent Stroke					
Yes	14.385 ±6.948 (MR:101.60)	23.385 ±7.514 (MR:103.47)	26.554 ±8.906 (MR:102.65)	20.446 ±4.812 (MR:105.23)	84.646 ± 24.505 (MR:101.68)
No	16.101 ±6.168 (MR:116.28)	24.728 ±6.986 (MR:115.51)	28.481 ±7.656 (MR:115.85)	21.120 ±3.970 (MR:114.78)	90.3354±21.283 (MR:116.25)
Test and P -value	MWU=4459 .121	MWU=4580 .205	MWU=4527 .165	MWU=4695 .310	MWU=4464 .125
Body Mass Index					
Underweight	12.667 ±6.658 (MR:76.17)	22.667 ±2.082 (MR:91.00)	24.667 ±8.145 (MR:78.50)	21.667 ±4.1633 (MR:123.83)	82.333 ±4.619 (MR:80.33)
Normal weight	16.449±6.676 (MR:121.93)	24.841±6.670 (MR:116.13)	28.652±8.339 (MR:118.97)	21.058±4.280 (MR:115.80)	91.0580±23.234 (MR:119.80)
Pre-obesity	15.471 ± 6.063 (MR:109.38)	24.048 ±7.081 (MR:108.92)	27.981 ±7.843 (MR:112.06)	21.183±4.289 (MR:116.25)	88.567 ±21.944 (MR:111.06)
Obesity class I /II	15.191 ± 6.872 (MR:108.92)	24.833 ±8.387 (MR:118.94)	26.809 ±8.497 (MR:103.46)	20.071 ±4.233 (MR:97.15)	86.500 ±23.149 (MR:107.11)
Obesity class III	11.800 ±7.049 (MR:76.90)	20.200 ±6.058 (MR:73.40)	27.800 ±6.535 (MR:106.30)	20.400 ±2.509 (MR:88.70)	80.200 ±20.315 (MR:84.00)
Test and P -value	KW = 4.337 .362	KW = 3.122 .538	KW = 2.393 .664	KW = 3.741 .442	KW = 2.939 .568
Functional Health Status					
Very good	14.333 ±7.649 (MR:99.94)	28.222 ±5.932 (MR:147.06)	29.111 ±6.092 (MR:118.78)	21.333 ±2.062 (MR:105.50)	93.000±16.008 (MR:121.17)
Good	17.520 ±6.650 (MR:133.98)	27.840 ±6.236 (MR:144.53)	31.493 ±7.645 (MR:142.53)	22.480 ±3.685 (MR:141.99)	99.333 ±21.248 (MR:145.46)
Moderate	16.064 ±5.027 (MR:113.03)	22.755 ±6.258 (MR:95.92)	27.036 ±6.837 (MR:101.99)	20.600±3.914 (MR:101.53)	86.236±18.626 (MR:101.85)
Poor	8.593±6.338 (MR:48.94)	19.704 ±8.743 (MR:75.31)	21.370 ±9.699 (MR:67.67)	18.111 ±5.409 (MR:77.26)	67.778 ±25.206 (MR:58.56)
Very poor	18.500 ±.707 (MR:136.50)	25.000 ±5.657 (MR:113.75)	25.500 ±7.778 (MR:85.50)	16.500 ± 7.778 (MR:61.50)	86.000 ±9.899 (MR:96.00)
Test and P -value	KW = 35.348 <.001	KW = 37.384 <.001	KW = 32.690 <.001	KW = 28.813 <.001	KW = 41.741 <.001

Note: Data presented as number (%), *P<.05, MWU; Mann Whitney U test, KW; Kruskal Wallis test; MR: Mean Rank, r; correlation coefficient

similar to the mean age found in our study.³⁰ According to our study results, there was a weak negative correlation between health literacy and age. Yalcinoz Baysal and Yıldız³¹ reached similar results in their study with older adults. Access to and appraisal of information decreases as age increases and it becomes difficult to understand information and use it in practice. Our study results showed that high school and university graduates had higher levels of health literacy. In the literature, it has been found that the level of health literacy is related to general literacy.^{7,32} In addition, it has been reported that the level of literacy decreases with age and low level of health literacy is more common among older adults and less educated individuals.^{33,34} In a study examining the drug literacy of stroke patients, it was found that the drug literacy levels of patients in the younger age group were higher.¹⁶ Younger individuals may have higher levels of health literacy due to fewer health problems, higher levels of literacy, and a more active mind.¹⁶ In the study conducted by Rheault et al.³⁴, being younger than 55 was found to be strongly associated with higher levels of health literacy. Young adults have more opportunities for further education. Given that most of the individuals who participated in our study were aged over 50 and had a low education level (literate/primary school), it can be suggested that low education level is a factor that affects health literacy, especially in advanced ages. A higher level of education can contribute to a better understanding of treatment, more attention to the treatment process, and better compliance with health professionals' referrals.¹⁶ Patients may have limited health literacy due to many reasons. For instance, those with low education levels have difficulty understanding and using complex health information and elderly patients have decreased cognitive and physical function due to aging.³³ It can be suggested that the level of health literacy is influenced by age and differs according to education levels and that the level of health literacy increases as the general education level increases.

In our study, no significant difference was determined between sex and health literacy. The lack of standardization in education and historical disadvantages in educational environments may have impacted individuals over a certain age.⁷ Therefore, regardless of sex, the general literacy levels of these individuals may remain low both in the early period and throughout life due to the limited educational opportunities of their generation. The fact that the mean age of the participants in our study was over 65 and most of them were aged over 50 can explain this situation. It is thought that the principle of lifelong learning should be included in the national education policy to improve the level of health literacy.

We found that single individuals had higher levels of health literacy than married participants. Similar results were obtained in a study examining health literacy in elderly individuals.³¹ In a study conducted with stroke individuals, no significant difference was reported between single and married stroke individuals in terms of health literacy.¹⁶ It is thought that the single individuals in our study had more opportunities to spare more time on health literacy activities than the married ones. However, different results in previous studies suggest that individual characteristics and current opportunities, as well as marital status, may also be effective in health literacy.

In our study, the levels of health literacy of those with poor economic status were lower compared to those with middle and high economic status. It has been stated in the literature that there is a strong correlation between health literacy and socioeconomic status.^{7,32} In the study conducted by Chang et al.¹⁶, it was reported that stroke individuals with high-income levels had better levels of health literacy levels. High-income individuals with stroke may find the opportunity to pay more attention to their quality of life after the disease compared to those with low income and therefore can attach more importance to issues within the scope of health literacy.¹⁶ It has been emphasized that low-income levels may negatively affect older adults in terms of the deprivation of education rights.⁷ Considering the mean age of the participants in our study, it can be suggested that health literacy may be associated with the social determinants of health. It is thought that those with high-income levels have more opportunities to access and use technology than those with low income, therefore their health literacy is better. It can be said that high-income level is a factor that positively affects health literacy.

Health literacy and health-related characteristics of individuals with stroke

In our study, it was determined that the level of health literacy of those who did not have any chronic disease other than stroke was higher than that of those who had a chronic disease other than stroke. In the literature, it has been stated that age and the number of chronic diseases contribute significantly to health literacy skills.³⁴ In the study conducted by Clairmont, Frey, and Adcock¹⁸, the level of health literacy of individuals with three or more stroke risk factors was found to be significantly higher than that of individuals with two or fewer stroke risk factors. In a study in which health literacy and modifiable risk factors for ischemic stroke were examined, it was determined that more than half of the participants had adequate health literacy, but a large proportion of the population had limited health literacy in areas such as good lifestyle,

smoking, alcohol use, and physical activity.³⁵ To increase individuals' awareness of the modifiable risk factors of stroke, the warning signs of stroke, and things to do in an emergency, it is important to first determine the general literacy, health literacy, and stroke literacy of patients, and then develop health policies that will include them in education programs according to the specified levels.

In our study, the levels of health literacy of those who expressed their general health status as good/moderate were found to be higher. In a study conducted with individuals with stroke, higher health literacy was associated with better general health.³⁶ According to our study results, the duration of stroke is not a factor that affects health literacy. In a similar study, it was found that 62% of individuals with stroke had adequate health literacy 12 months after discharge.³⁰ This difference may be because most of the individuals included in our study were newly diagnosed patients. Health literacy can be improved through social networks and interaction with health professionals. Individuals with stroke may have more opportunities to engage in interactions that improve their ability to acquire, understand, process, and practice health information.³⁰ However, more than half of the individuals in our study did not receive health training from any source and it was observed that those who received training on stroke from a health professional had higher scores regarding accessing and understanding information. For this reason, it is considered important that all individuals in the post-stroke period benefit from health services and can strengthen their health literacy, regardless of their education level. The majority of the individuals in our study did not have recurrent strokes. There was no difference in the levels of health literacy of individuals with and without recurrent stroke. This can be explained by the fact that patients do not have enough awareness of stroke even in the post-stroke period, do not demand health training, and post-discharge training has not yet been extended in hospitals in our country.

Study Limitations

There were some limitations of this study. The first limitation of the current study was that it was conducted in a single institution. The other one was the absence of a valid and reliable scale on stroke health literacy in our country.

It can be said that the general health literacy level of individuals with stroke is moderate. Age, marital status, education level, income level, general health status, presence of another chronic disease, and status of receiving training from a health professional are determined as factors affecting health literacy in

individuals with stroke. Although there is no relationship between recurrent stroke and disease duration and health literacy, there is a need for further studies with longer duration and larger samples to determine this relationship.

Determination of health literacy levels of individuals with stroke is an important step in determining their stroke literacy levels and therefore their awareness about stroke. Thus, patient-specific stroke education plans can be made. Nurses/health professionals working in the field of neurology must carry out stroke awareness training according to the age and education level of individuals with stroke. Our study results and clinical observations suggest that the stroke health literacy level of individuals with stroke, including knowledge of stroke symptoms, may be inadequate. Low health literacy may make individuals with stroke vulnerable to preventable health problems after stroke and risk of recurrent stroke. Therefore, it is important to develop valid and reliable measurement tools that can assess stroke literacy in stroke or healthy individuals and to determine the stroke literacy levels of individuals by health professionals with these tools. Integrating institutional policies into the healthcare system that will enable the determination of stroke literacy levels is a priority requirement.

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