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## **Examination of Health Literacy Levels of Pre-Service Teachers**

**Didem Kilic<sup>1</sup>, Guntay Tasci<sup>2</sup>, Bahattin Deniz Altunoglu<sup>3</sup>**

<sup>1</sup>Aksaray University

<sup>2</sup>Erzincan Binali Yildirim University

<sup>3</sup>Kastamonu University

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### Abstract

Low level of health literacy causes a decrease in quality of life and social inequalities. Adequate health literacy levels of pre-service teachers will not only reduce the risk of disease, but also will contribute to development of a healthy lifestyle for societies. In the study, it is aimed to determine the health literacy levels of pre-service teachers, and to reveal how it changes in terms of various socio-demographic characteristics. The study group of the research consists of 482 pre-service teachers studying at the education faculties of state universities. The 'Turkey Health Literacy Scale-32' was used to determine the health literacy levels of the participants. In the analysis of the data parametric tests were used, since there were no outliers, and the normality assumptions were met. The results show that two-thirds (68%) of the research group have inadequate and limited health literacy. When health literacy index scores examined in terms of the variables discussed in the study, it is understood that the level of health literacy remains at a limited level. It is thought that making arrangements to improve health literacy in the curriculum of teacher training programs will directly contribute to a healthier life for both individuals and societies

### Introduction

Along with the current pandemic, which affects the whole world, diseases and health protection issues have taken their place at the forefront as an important agenda item for all individuals. Epidemics related to infectious diseases, which have been experienced many times throughout the world's history, have resulted in significant loss of life, however, many chronic diseases such as cancers, cardiovascular diseases, diabetes, chronic obstructive pulmonary disease, and high blood pressure have become common in the recent past. Within this period, understanding and applying health-related information has become an inevitable necessity for the health of both individuals and societies. Individuals can lead a healthy life only if they can access, understand, and apply basic information about health (Nutbeam, 2000), in other words, if they are health literate. The World Health Organization has defined the concept of health literacy as "the ability of an individual to access, understand and use health information for the protection and maintenance of health" (World Health Organization [WHO], 1998). Health literacy is accepted as an indicator of health status, quality of life and community well-being (Suwono et al, 2023), and a low level of health literacy causes a decrease in quality of life and social inequalities. The World Health Organization reports that improving health literacy is an important tool in reducing health inequalities.

Health literacy has critical importance in developing the capacity of individuals to reach health-related information and to use this information effectively (Nutbeam, 2000). Achieving the desired level of awareness about health literacy leads to positive changes both individually and socially. On the other hand, an inadequate level of health literacy creates some risks and causes limitations in evaluating health-related information. Studies reveal that the evidence for the negative effects of inadequate health literacy is increasing (Yılmazel & Çetinkaya, 2016). These; inadequacy in understanding the individual's health status, inability to adhere to medical recommendations, the inadequacy of self-care, increased health care costs and increased mortality rates (Freedman et al., 2009). There are many studies showing that there is a positive relationship between health literacy and healthy lifestyle behaviors, and the results show that the level of health literacy has significant effects on healthy lifestyles. Again, many studies have proven the relationship between limited health literacy and being unhealthy (U.S. Department of Health and Human Services, 2010). Interventions to improve the level of health literacy due to its primary role in improving health and preventing diseases have an important place in both individual and social areas.

Health literacy, which contributes to the development of skills related to health protection, is seen as a competence that can be gained through educational practices (Paakkari & Okan, 2019). Stating that the main way to develop health literacy is formally organized and structured health education, Nutbeam (2019)

emphasizes the necessity of cooperation between the health and education sectors for the goal of improving health literacy (Nutbeam, 2000). It is recommended by the World Health Organization that health literacy education should be started in early childhood and the concept of health promotion in school education should be emphasized to improve health literacy awareness (Yılmazel & Çetinkaya, 2016).

In the report published as a result of the "First International Conference on Health Promotion" held in Ottawa in 1986, it is stated that it is not possible to achieve health promotion studies only with the efforts of the health sector, and other sectors should also take responsibility in this regard (Bilir, 2014; Dost & Üner, 2020). At this point, education workers are one of the occupational groups that can play an important role in improving the health literacy of individuals. It is stated that health literacy functions as a bridge between the fields of education and health (Paakkari & Okan, 2019) and education workers have a unifying role. Improving health literacy among school-age children from diverse backgrounds can prevent the emergence of health inequalities (Paakkari & Paakkari, 2012). Inadequate health literacy leads to problems related to risky behaviors in children and adolescents; these behaviors exacerbate problems such as stress, depression, anxiety, and poor self-perception with the effect of social-environmental conditions, and children and adolescents face serious health problems. Schools have difficulties in meeting these needs of students with insufficient health literacy and important health needs. For this reason, not only health professionals but also teachers should be prepared for the health problems that students experience (Peterson et al., 2001). Teachers need to consider the physical, mental, social, and emotional health of children as well as their academic development (Yager, 2011). At this point, along with the preparation of teachers for their professional responsibilities, it is seen as an important requirement that they have sufficient knowledge and skills on health issues, which have social, developmental, and biological dimensions, in the pre-service period.

Health literacy has been the subject of many large-scale research projects and policy agendas of countries due to its individual and social importance. Empirical findings from research highlight the importance of health literacy for coping with more common health problems recently. In this direction, it is seen that the number of scientific research on health literacy has increased exponentially. Great interest in health literacy at the national and international level has been reflected in the policy strategies of countries and has resulted in promoting health literacy in their health-related goals. Health literacy has been included in strategic plans among the action plans developed and implemented in various countries. In some countries, health literacy has become a part of education policies and the teaching of health literacy has been included in school curricula starting from early life.

### **Rationale of the Research**

Despite the efforts of people to reach scientific information in the health problems faced due to the current Covid-19 pandemic, it has been seen that they often do not question the accuracy of the information and cannot make an effective evaluation. The health problems experienced for these reasons have revealed the importance of health literacy in a striking way. The need to improve individuals' ability to access, understand, use, and evaluate health information has become much more visible within this process. At this point, it should be considered as an important requirement that students be educated as health-literate individuals and that teachers have sufficient knowledge about health issues. It is stated that there is a need for pre-service and in-service professional teacher training that can help teachers understand the principles of primary prevention, key concepts for the implementation of effective primary health care and health promotion programs (Peterson et al, 2001). In the pre-vocational education period, determining the health literacy levels of pre-service teachers and the affecting factors can provide important data to eliminate the deficiencies in this subject.

Health literacy is considered a tool to be used in reducing the inequality faced by society in health (Bakan & Yıldız, 2019). It is expected that teachers, who are thought to be effective in the dissemination of health literacy in society, should be well-equipped in this regard. It can be stated that teachers are at the forefront in acquiring students' basic health knowledge and self-care skills that are effective in protecting health. Studies have shown that children who have frequent health problems encounter situations such as absenteeism, grade repetition, problematic behaviors in the classroom, attention problems, and low success in standard tests (Martin & Chen, 2014: 346). For this reason, health literate teachers will also alleviate inequalities in the field of education with their contributions to their students in this regard.

For these reasons, pre-service teachers were chosen as the study group in the study. Supporting the personal development as well as academic and professional development of pre-service teachers during the pre-service education period is one of the requirements of not only individual but also social progress. Adequate health

literacy levels of pre-service teachers will not only reduce the risk of disease for themselves and the individuals they will raise in the future, but also will contribute to their development of a healthy lifestyle (Baker, 2006). A low level of health literacy will cause them to experience limitations in protecting and maintaining health (Çopurlar & Kartal, 2016). It is obvious that research on health literacy is mostly carried out by researchers in the field of health, but due to the social value and multidimensional nature of the subject (Marimwe & Dowse, 2017), it should be handled by different field researchers. In this direction, it is aimed that the results of the research will make new contributions to the relevant literature from different perspectives.

### Purpose of the Research

Examining the health literacy levels of pre-service teachers underpin this research. In this direction, it is aimed to determine the health literacy levels of pre-service teachers, and to reveal how it changes in terms of various socio-demographic characteristics. Within the scope of this purpose, general health literacy levels of pre-service teachers were also investigated in terms of 'health care', 'disease prevention and health promotion', and their levels of accessing, understanding, evaluating, and using health-related information. The research questions addressed in this direction are as follows:

1. What is the health literacy level of pre-service teachers?
2. What is the health literacy distribution of pre-service teachers according to their department and grade level?
3. Do pre-service teachers' scores on health literacy components differ according to gender?
4. Do pre-service teachers' scores on health literacy components differ depending on whether they have a chronic illness in themselves or the family?

### Method

#### Research Model

This research was carried out in the survey model, since it aims to reveal the existing situation by examining the health literacy levels of pre-service teachers studying at the university. Since survey studies are concerned with describing the characteristics of a large population and how it is distributed among the individuals in the sample (Fraenkel & Wallen, 2006), the distribution of health literacy levels of pre-service teachers was investigated with a survey model in this study.

#### Study Group

The study group of the research consists of pre-service teachers studying at education faculties of state universities. Convenience sampling approach was adopted in the determination of the study group. In this way, the data of a total of 482 participants who voluntarily consented to participate in the research were used. The distribution of the study group in terms of the variables discussed in the study is shown in Table 1.

Table 1. Distribution of descriptive characteristics of the study group

	N	%		N	%
<i>Gender</i>			<i>Department</i>		
Male	109	23	German Education	4	1
Female	373	77	Computer and Instruc. Tech Edu.	2	<1
<i>Presence of chronic disease</i>			Philosophy Education	1	<1
Exit	41	9	Science Education	57	12
Non-exit	441	91	English Education	5	1
<i>Presence of chronic disease in Family</i>			Mathematics Education	38	8
Exist	197	41	Music Education	2	<1
Non-exist	285	59	Preschool Education	126	26
<i>Grade</i>			Special Education	21	4
1. year	171	35	Guidance and Psychological Counselling	33	7
2. year	133	28	Art Education	5	1
3. yeas	108	22	Classroom Education	135	28
4. year	70	15	Social Studies Education	26	5
Total	482	100	Turkish Education	27	6

When Table 1 is examined, it is seen that the study group of the research consists of 77% female students. The ages of the participants in the study group ranged from 18 to 42, with an average age of 21. Participants aged between 18 and 25 make up 96% of the entire group. The participants consisted of pre-service teachers studying in 14 different departments of Education Faculties in different state universities, and participants from all grade levels took part in the research. The presence of chronic diseases in the families of the pre-service teachers in the study group is distributed in close ratio. The rate of those with chronic diseases in the family was determined as 41%. The rate of having a chronic disease among the participants is 9%.

## Data Collection

In the study, 'Turkey Health Literacy Scale-32 (THLS-32)' was used to determine the health literacy levels of pre-service teachers. In addition, the personal information form created by the researchers was used to examine the demographic characteristics of the students. The "Turkey Health Literacy Scale-32" was developed in 2016 by a research team consisting of the Ministry of Health, (General Directorate of Health Promotion, Department of Health Promotion) and Adnan Menderes University, Faculty of Medicine, Department of Public Health (Okuyay & Abacıgil, 2016). While developing THLS-32, the conceptual framework developed for the European Health Literacy Survey was taken as reference, and it was revised by adapting Turkey's social characteristics, the health level of the society and the structure of the health system (Sağlık Bakanlığı (Ministry of Health), 2018). THLS-32 consists of a 2x4-matrix structure with 32 statements and is a 5-point Likert type scale. Accordingly, the matrix consists of eight components: two dimensions (health care; disease prevention and health promotion) and four processes (accessing health-related information; understanding health-related information; evaluating health-related information; using/application of health-related information). In the evaluation of the scale, indices were standardized to be between 0 and 50, with a score of (0-25): inadequate health literacy; (>25-33) score: problematic – limited health literacy; (>33-42) score: adequate health literacy, (>42-50) score: excellent health literacy. The reliability of the scale was examined with internal consistency (Cronbach's Alpha) and the general internal consistency coefficient; It has been reported as 0.927 (Okuyay & Abacıgil, 2016). In this study, the findings related to the reliability of the THLS-32 scale are presented in Table 2.

Table 2. THLS-32 reliability results

Estimate	McDonald's $\omega$	Cronbach's $\alpha$	N	Mean	Std. Dev.	Min.	Max
Point estimate	0.914	0.913	482	89.892	14.827	39.000	128.000
95% CI lowerbound	0.900	0.901					
95% CI upperbound	0.925	0.923					

It was determined that the THLS-32 scale used in the study had sufficient internal consistency and structural reliability for the research sample (Revelle & Zinbarg, 2009; Yurdugül, 2006). Research data were collected online in a single session using MS Office Forms. The study was carried out with the consent of the Aksaray University Human Research Ethics Committee and voluntary consent of the participants, and institutional or personal information was not collected.

## Data Analysis

The data obtained to seek answers to the research questions were prepared for analysis. First, outlier analysis was performed on the data set. In this context, boxplot graphics were examined with the SPSS 22.0 program, the determined outliers were also examined from the forms, and it was decided to use 482 participant data by removing 26 of 508 data. The normality assumption was examined with kurtosis and skewness values and examined with Kolmogorov-Smirnov test before each analysis. In addition, normality assumptions were tested by examining the histogram and Q-Q plots. Parametric tests were used in the analysis of the research questions since there were no outliers and the normality assumptions were met ( $p > 0.05$ ). In the analysis of the data, firstly, percentage and frequency values were used to determine the distributions according to demographic information and health literacy levels. The significance of the differences between the health literacy scores according to the factors within the scope of the research questions was tested by analysis of variance.

## Results

### Descriptive Results on Health Literacy Levels of Pre-service Teachers

Distribution and descriptive statistics of pre-service teachers' scores obtained with the THLS-32 scale according to health literacy indices were determined. In Table 3, the number, and percentages of participants according to four different levels of health literacy indices calculated for the matrix components of the THLS-32 scale are presented.

Table 3. Distribution of pre-service teachers' health literacy levels

	Health Literacy Level							
	Excellent		Adequate		Limited		Inadequate	
	n	%	n	%	n	%	n	%
General	34	7	120	25	211	44	117	24
Health Care	42	9	159	33	166	34	115	24
Accessing Health-Related Information	76	16	257	53	67	14	82	17
Understanding Health-Related Information	51	11	248	51	58	12	125	26
Evaluating Health-Related Information	16	3	124	26	79	16	263	55
Using Health-Related Information	89	18	250	52	66	14	77	16
Disease Prevention and Health Promotion	34	7	124	26	170	35	154	32
Accessing Health-Related Information	47	10	229	48	79	16	127	26
Understanding Health-Related Information	52	11	217	45	102	21	111	23
Evaluating Health-Related Information	31	6	163	34	72	15	216	45
Using Health-Related Information	25	5	132	27	67	14	258	54

According to the health literacy indices calculated within the framework of THLS-32 general scores, it is seen that pre-service teachers have limited levels of health literacy at a rate of 44% and inadequate levels of health literacy at a rate of 24%. The rate of those whose health literacy levels are adequate and excellent is 32%. It is observed that these rates are similar for the sub-dimensions of 'health care' and 'disease prevention and health promotion'. Based on the THLS-32 scores of the pre-service teachers in the research group, the highest rate of inadequate health literacy is 55%, with the process of 'evaluating health-related information' in the 'health care' dimension.

The 'using health-related information' process in the dimension of 'disease prevention and health promotion' with a rate of 54% follows this. In the same dimension, the 'evaluating health-related information' component is 45%. These findings show the prominent dimensions of health literacy that pre-service teachers are inadequate. The proportion of pre-service teachers who are inadequate in the remaining dimensions of THLS-32 is below 32%. The mean and standard deviation scores of the pre-service teachers for the THLS-32 matrix components are given in Table 4.

Table 4. Descriptive statistics of pre-service teachers' health literacy scores

	Mean	Standard Deviation	N	Health Literacy Level
General	30,15	7,72	482	Limited
Health Care	29,64	12,17	482	Limited
Accessing Health-Related Information	34,40	9,01	482	Adequate
Understanding Health-Related Information	32,06	9,51	482	Limited
Evaluating Health-Related Information	24,79	10,78	482	Inadequate
Using Health-Related Information	34,98	9,25	482	Adequate
Disease Prevention and Health Promotion	28,75	9,31	482	Limited
Accessing Health-Related Information	30,74	11,01	482	Limited
Understanding Health-Related Information	31,36	10,10	482	Limited
Evaluating Health-Related Information	27,24	11,24	482	Limited
Using Health-Related Information	25,65	11,28	482	Limited

When Table 4 is examined, it is seen that the average scores vary between 24.79 and 34.98. It is seen that the index mean scores for the health literacy matrix components are rather limited. While the level of health literacy is inadequate in the 'health care' dimension in the 'evaluating of health-related information' process, it is seen that it is adequate in the 'accessing health-related information' and 'using health-related information' processes. It is seen that the mean of the 'disease prevention and health promotion' dimension and its sub-components vary between 25.65 and 31.36, that is, the pre-service teachers have a limited level of health literacy for this dimension.

**Examining the Health Literacy Levels of Pre-service Teachers According to Various Variables**

*Health Literacy of Pre-service Teachers by Department*

The general health literacy levels of the pre-service teachers in the study were examined according to the department they studied, and their distribution is presented in Table 5.

Table 5. Distribution of health literacy of pre-service teachers according to the department

Department	Mean	Standard Deviation	N	Health Literacy Level
Science Education	29,22	7,82	57	Limited
Mathematics Education	27,25	7,16	38	Limited
Preschool Education	30,32	6,44	126	Limited
Special Education	26,54	8,84	21	Limited
Guidance and Psychological Counselling	32,56	7,11	33	Limited
Classroom Education	30,48	7,68	135	Limited
Social Studies Education	32,09	10,25	26	Limited
Turkish Education	30,96	6,56	27	Limited
others	31,36	11,45	19	Limited
Total	30,15	7,72	482	Limited

In Table 5, it is seen that the general health literacy mean scores of the pre-service teachers vary between 26.54 and 32.56 according to the departments they study. These results show that pre-service teachers have a limited level of health literacy, regardless of the department they study. When the difference between the health literacy scores of the pre-service teachers according to the departments was analyzed by one-way analysis of variance, it was seen that the difference was statistically significant ( $F_{(8;473)}=2.484; p=0.012$ ). The post hoc test regarding the source of these differences was made with Tukey and Tamhane tests according to the results of the Levene test, and there were differences in favor of some departments in various sub-dimensions and processes. For example, in the 'health care' sub-dimension, there was a significant difference between mathematics teaching and preschool and classroom teaching departments in favor of preschool and classroom teaching departments ( $p<0.05$ ). However, when the effect size values of the differences are examined, it is understood that they do not have a significant effect. As a result, it has been determined that general health literacy is at a limited level in all departments.

*Health Literacy of Pre-service Teachers by Grade Level*

General health literacy levels of pre-service teachers were examined according to their grade level and their distribution is presented in Table 6.

Table 6. Distribution of general health literacy of pre-service teachers by grade level

Grade	Mean	Standard Deviation	N	Health Literacy Level
1	29,37	5,75	171	Limited
2	30,85	7,86	133	Limited
3	30,98	9,23	108	Limited
4	29,46	8,95	70	Limited
Total	30,15	7,72	482	Limited

As can be seen in Table 6, the average health literacy scores of pre-service teachers according to their grade levels vary between 29.37 and 30.98. These results show that pre-service teachers at all grade levels have limited health literacy. When the difference between the health literacy scores of pre-service teachers according to grade levels was analyzed with one-way analysis of variance, it was seen that the difference was not statistically significant ( $F_{(3;478)}=1.556; p=0.199$ ).

*Health Literacy of Pre-service Teachers by Gender*

General health literacy levels of pre-service teachers were examined according to gender, and the results are presented in Table 7.

Table 7. General health literacy levels of pre-service teachers by gender

Gender	Mean	Standard Deviation	N	Health Literacy Level
Female	30,34	7,71	373	Limited
Male	29,50	7,78	109	Limited
Total	30,15	7,72	482	Limited

When the values related to general health literacy by gender are examined, it is seen in Table 7 that female students have a higher mean score than male students. When the statistical significance of the difference between the mean general health literacy scores of female and male students was examined by one-way analysis of variance, it was seen that the difference was not significant ( $F_{(1,481)}=1.016$ ;  $p=0.314$ ). In addition to this result, it was determined that the health literacy levels of both female and male students were limited.

#### Health Literacy of Pre-service Teachers by Chronic Disease Status

The index scores of all the components of health literacy of the pre-service teachers were calculated according to whether they had any chronic disease, and the statistical significance of the differences between them was examined. The results are shown in Table 8.

When the values in Table 8 are examined, it is seen that pre-service teachers with chronic diseases have a higher mean score than pre-service teachers without chronic disease in all processes. When the differences were examined whether they were statistically significant or not, it was seen that the difference was significant in favor of pre-service teachers with chronic diseases in the process of 'evaluating of health-related information' in the 'health care' dimension ( $F_{(1,480)}=3,864$   $p=0.050$ ).

Table 8. Health literacy levels of pre-service teachers according to their chronic disease

	Exist			Non-exist		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation
<i>General</i>	31,95	41	8,23	29,99	441	7,66
<i>Health Care</i>	29,70	41	12,78	29,63	441	12,12
Accessing Health-Related Information	35,98	41	9,44	34,25	441	8,97
Understanding Health-Related Information	34,04	41	9,12	31,88	441	9,54
Evaluating Health-Related Information*	27,95	41	10,91	24,50	441	10,73
Using Health-Related Information	36,08	41	9,62	34,87	441	9,22
<i>Disease Prevention and Health Promotion</i>	30,39	41	9,91	28,60	441	9,25
Accessing Health-Related Information	32,42	41	12,52	30,58	441	10,87
Understanding Health-Related Information	32,72	41	10,02	31,24	441	10,11
Evaluating Health-Related Information	29,57	41	11,37	27,02	441	11,21
Using Health-Related Information	26,83	41	11,34	25,54	441	11,28

\*:  $p < 0.050$

Table 9. Health literacy levels of pre-service teachers according to their family history of chronic disease

	Exist			Non-exist		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation
<i>General</i>	30,86	197	8,05	29,66	285	7,46
<i>Health Care</i>	29,47	197	11,88	29,75	285	12,38
Accessing Health-Related Information	34,88	197	9,54	34,06	285	8,63
Understanding Health-Related Information	32,93	197	9,93	31,46	285	9,19
Evaluating Health-Related Information	25,06	197	11,17	24,61	285	10,51
Using Health-Related Information	35,68	197	10,05	34,49	285	8,65
<i>Disease Prevention and Health Promotion</i>	29,58	197	9,11	28,17	285	9,42
Accessing Health-Related Information*	32,09	197	10,02	29,81	285	11,58
Understanding Health-Related Information*	32,72	197	9,67	30,42	285	10,30
Evaluating Health-Related Information	27,75	197	11,13	26,89	285	11,32
Using Health-Related Information	25,78	197	11,25	25,56	285	11,31

\*:  $p < 0.050$



*Health Literacy of Pre-service Teachers According to the Status of Chronic Disease in the Family*

The index scores were calculated according to the THLS-32 general and sub-dimensions of health literacy according to the presence of chronic disease in the family of the pre-service teachers and the statistical significance of the differences between them were examined. The results are presented in Table 9. When the health literacy scores of the pre-service teachers were examined according to the presence of chronic disease in their families, in the dimension of 'disease prevention and health promotion', 'accessing health-related information' ( $F_{(1; 480)}=5.013, p=0.026$ ) and 'understanding health-related information' ( $F_{(1; 480)}=6.083, p=0.014$ ), the differences were found to be significant in favor of those with a family history of chronic disease.

**Conclusion, Discussion and Recommendations**

In the study examining the health literacy levels of pre-service teachers, 482 pre-service teachers studying in 14 different departments of education faculties took part and it was determined that the general health literacy of pre-service teachers was mostly at a limited level (44%). While only 7% of pre-service teachers have an excellent level of health literacy, 25% have an adequate level of health literacy, and 24% have an inadequate level of health literacy. These results show that only one third (32%) of the research group has adequate and excellent health literacy, while two thirds (68%) have inadequate and limited health literacy. Similarly, the values obtained from the 'Health Literacy Survey in Turkey' conducted with the adult group over the age of 18 in 2014; inadequate health literacy 24.5%; limited health literacy 40.1%; adequate health literacy 27.8%; excellent health literacy was reported as 7.6% (Durusu Tanrıöver et al., 2014). In the report titled "Investigation of Health Literacy and Related Factors in Turkey" published by the Ministry of Health in 2018, individuals with limited and inadequate general health literacy levels were found to be 69%, and individuals with adequate and excellent levels were found to be quite similar at 31% (Sağlık Bakanlığı (Ministry of Health), 2018). As a result of the 'European Health Literacy Project' carried out in 8 member countries of the European Union, the rate of excellent health literacy was 17%, adequate level 36%, limited level 35%, and inadequate level 12% (HLS-EU Consortium, 2012). As a result of a study measuring the health literacy of American adults, the health literacy levels of individuals in the 19-24 age group were: 11% adequate; 58% moderate; 21% basic; It is stated as 10% subbase (Kutner et al., 2006). The proportion of individuals with sufficient health literacy levels in Australia is 40%, and 28% in China (ACSQHC, 2015; Shi et al., 2020). Accordingly, it is understood that the results obtained in the study are in parallel with the results of large-scale health literacy research conducted in Turkey, and the distribution according to health literacy levels differs from European countries, Australia, and America. It is thought that these differences arise from the differences between the development levels of the countries, the health policies they follow, the health services they offer and the education programs they conduct. However, health literacy is not at the desired level in the USA, Australia, and European countries, and accordingly, countries are looking for solutions to improve health literacy and they have created national action plans (ACSQHC, 2015; US Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2010).

When evaluated health literacy in terms of index scores, the average of the general index scores in this study was determined as 30.15. According to this result, it is possible to state that the health literacy levels of pre-service teachers are limited (Okuy & Abacıgil, 2016, p.36). As a result of the "Turkey Health Literacy Survey", Turkey's general health literacy index was found to be 30.4 (Durusu Tanrıöver et al., 2014). In the 'Reliability and Validity Study of Turkish Health Literacy Scales', another report published by the Ministry of Health in 2016, the general index score average of individuals aged 15-24 was 32.0; The average of individuals with a university or higher education level is stated as 32.6 (Okuy & Abacıgil, 2016). In the 'European Health Literacy Project' report, the average general health literacy index scores were reported as 33.8 (HLS-EU Consortium, 2012). According to these values, the results obtained in the research show that the health literacy of pre-service teachers reflects the average of Turkey but is below the average of European countries.

When the pre-service teachers' index scores of the health literacy sub-dimensions and processes were evaluated, the mean scores of the pre-service teachers in the processes of 'accessing health-related information' and 'using health-related information' in the 'health care' sub-dimension were 34.40; 34.98 (>33) was determined. Accordingly, it is understood that pre-service teachers have a sufficient level of health literacy in these two processes. In the same dimension, since the index score average is 24.79 (<25) in the 'evaluating health-related information' process, it can be stated that the pre-service teachers are inadequate in this process. In all other processes related to health literacy, pre-service teachers were found to have a limited level of health literacy. Similarly, it has been reported by the Ministry of Health in 2016, the highest scores in the 'health care' dimension in the 'accessing health-related information' (31.1) and 'using health-related information' (33.5)

processes, the lowest scores in the 'evaluating health-related information' (26.2) processes (Okyay & Abacıgil, 2016, p.56). As a result of a study conducted in the Netherlands, it was reported that the highest average score among health literacy dimensions was observed during the process of understanding health-related information, and the lowest average score was observed in the applying health-related information (van der Heide et al., 2013). As a result of another study examining the health literacy of teacher candidates, it was seen that higher scores were obtained in the dimensions of accessing health information and understanding health information, while the lowest average scores were reported in the dimensions of evaluating health information and applying health information (Ahmadi & Montazeri, 2019). In this research the process of 'accessing health-related information' in the 'health care' dimension, in which pre-service teachers have adequate health literacy, includes skills such as searching and finding information about disease symptoms and treatment which three different categories defined by Nutbeam (2000) correspond to functional health literacy, which is the basic level of health literacy. The process of 'using health-related information' of 'health care' dimension, in which pre-service teachers' health literacy is at an adequate level; It requires behaviors such as making an appointment with a health institution by phone or the internet, calling an ambulance when necessary, using medications as recommended by health professionals, and it also overlaps with basic/functional health literacy in Nutbeam's classification. The process in which pre-service teachers' health literacy levels were found to be inadequate was 'evaluating health-related information' in the 'health care' dimension. The skills required in this process are high-level and have been defined as a level that Nutbeam classifies as critical health literacy and requires critical analysis of information by using advanced cognitive and social skills together (Nutbeam, 2000; 2015). As a result, it can be concluded that pre-service teachers have limited health literacy in most of the processes, the health literacy processes that they are adequate include basic level knowledge and skills, and the process in which they are inadequate includes high-level skills. These results show that pre-service teachers have basic knowledge and skills, though limited, about health literacy, they have deficiencies in advanced high-level cognitive and social skills, and they need to be strengthened in these subjects.

When the health literacy levels of the pre-service teachers were examined according to their departments and grade levels, it was seen that they were at a limited level in all departments and all grade levels. In the comparisons made based on department and grade level, it was understood that there were no significant differences, and this result was significant when the health-related courses in the teaching programs were considered. When the curricula of the teaching programs are examined, only the pre-school teaching department has 'child health and first aid', which is a compulsory course at the 1st grade level. Health-related topics in the content of this course are within the framework of child health, physical development of children, pediatric diseases and vaccines and are not related to the necessary acquisitions related to health literacy. When the teacher training programs in our country are examined, it is seen that 'nutrition and health' course is included as a general culture elective course in their curriculum, and the subject of healthy life is included in the content of this course (YÖK (Council of Higher Education), 2018). This course can be chosen at the 2nd, 3rd, or 4th grade levels. However, the subject content of the course does not cover the knowledge and skills related to health literacy. As a natural consequence of the lack of teaching about accessing, understanding, and using health-related information in teacher-training programs, the health literacy of pre-service teachers is limited regardless of department and grade level. As a result of another study on the health literacy of pre-service teachers, it was determined that there was no difference between health literacy levels according to the branch (Demirtaş, 2019). Considering the health literacy levels of pre-service teachers by gender, a limited level of health literacy was observed in both female and male students. It was understood that female students had a higher mean score than male students, however, there was no statistically significant difference between their health literacy levels. As a result of a study examining the health literacy of nursing students, no statistically significant difference was found between male and female students (Uysal & Yıldız, 2021). In a specialization thesis study involving medical faculty students, it was determined that the health literacy levels of female and male students were mostly at an adequate and excellent level, however, there was no significant difference when health literacy was compared according to gender (Tatar, 2020). Similarly, as a result of a study conducted throughout Turkey, no difference was found in terms of gender (Okyay & Abacıgil, 2016, p. 58). In the Turkey Health Survey report published in 2014, health literacy levels were also found to be limited without changing according to gender (Durusu Tanrıöver et al., 2014). In the 2018 report, it was stated that the difference in health literacy levels between women and men was found to be significant in favor of men (Sağlık Bakanlığı (Ministry of Health), 2018). As a result of the European Health Literacy Survey, a weak effect of gender on general health literacy was mentioned and it was stated that this effect originated from the Netherlands and Ireland. It was also shown that the correlation between gender and general health literacy was insignificant for Austria, Bulgaria, Greece, and Spain (HLS-EU Consortium, 2012). As a result of a study in which 85 studies conducted in the USA were systematically reviewed, it was reported that the level of health literacy was not related to gender (Paasche-Orlow et al., 2005). Although different levels of health literacy findings were reached depending on the characteristics of the study groups in the related studies, it was determined that health literacy did not change

depending on gender as a general result. Gender is a variable that is affected by social, cultural and geographical features and can be an effective variable depending on the scope and purpose of the research. However, due to the content and dimensions of health literacy, gender only has a biological meaning in this study and is not expected to have any effect in this sense.

In the study, an answer was sought to the question of whether the health literacy levels of pre-service teachers change depending on the presence of chronic disease in themselves or their families. If there is a chronic disease, it has been observed that there is a difference in health literacy. A similar result was also revealed in the study conducted by Bakan and Yıldız (2019). The authors determined that the mean THLS-32 score of individuals with relatives with poor health status was statistically significantly higher. However, there are also studies in which there is no difference in the health literacy of having a chronic disease or having a chronic disease in a relative (Muslu et al, 2017; Okuyan, 2019). As a result of this research, the health literacy of pre-service teachers who stated that they have a chronic disease was found to be higher in all processes related to health literacy than those who do not have a chronic disease. However, the process for which statistical significance was determined is the 'evaluating health-related information' process in the 'health care' dimension. The processes in which the difference was determined in favor of pre-service teachers with chronic diseases in their families are 'accessing health-related information' and 'understanding health-related information' in the 'disease prevention and health promotion' dimension. In a master's thesis study (Güven, 2017), in which the factors affecting health literacy are investigated, it is stated that there is a difference in health literacy in the presence of people with chronic diseases in themselves or the household. As a result of a study conducted in China, it has been reported that having one or more chronic diseases is associated with better knowledge of diseases, and that the health literacy of individuals improves after chronic illness (Liu et al., 2020). The results show that exposure to a health problem has an impact on the health literacy of individuals. As the reason for this situation, it is considered as a factor that people who are faced with a health problem have encountered situations that require the use of skills such as accessing, understanding, using, and evaluating health-related information.

When the results of the research are evaluated in general; the health literacy of pre-service teachers is not affected by their demographic characteristics and educational status, but it changes depending on whether they have a health-related problem. Here is an inference that can be reached; subjective experiences related to the health problem are effective on the level of health literacy. However, the goal of improving health literacy includes not only reducing the negative consequences of health problems but also preventing health-related problems. For this reason, it is expected that the level of health literacy will be high without experiencing any health problems.

Health literacy levels are found to be relatively high in studies conducted with people from health fields such as medicine and nursing, and it is seen that they are adequate. However, it is concluded that the level of health literacy is limited or inadequate in survey research targeting the general population. This shows that the high level of health literacy of individuals working or studying in the field of health is not sufficient to achieve the expected level in the social field. The necessity of the support of the education sector, which is the most important field in reaching all levels of society, comes to the fore at this point. The education system has been recognized as a central arena for improving children's health literacy (Paakkari & Paakkari, 2019). In addition, Nutbeam (2000) states that health literacy can be developed and improved with a well-organized health education. The necessity of health literacy education in schools is frequently emphasized by researchers, and in this direction, it is necessary to train teachers as professionals with a high level of health literacy. It is thought that making arrangements to improve health literacy in the curriculum of teacher training programs will directly contribute to a healthier life for both individuals and societies.

### **Scientific Ethics Declaration**

The authors declare that the scientific ethical and legal responsibility of this article published in JESEH journal belongs to the authors.

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### Authors Information

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**Didem Kilic**

Aksaray University  
 Faculty of Education, Department of Mathematics and  
 Science Education, Aksaray/Turkey  
 Contact e-mail: [didem\\_kilic@yahoo.com](mailto:didem_kilic@yahoo.com)  
 ORCID iD: 0000-0002-2250-8580

**Guntay Tasci**

Erzincan Binali Yıldırım University  
 Faculty of Education, Department of Primary Education,  
 Erzincan/Turkey  
 ORCID iD: 0000-0002-2141-2616

**Bahattin Deniz Altunoglu**

Kastamonu University  
 Faculty of Education, Department of Primary Education,  
 Kastamonu/Turkey  
 ORCID iD: 0000-0001-7609-1883

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