Observational Study

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E-health literacy of nursing students and investigation of factors affecting e-health literacy during COVID-19 pandemic process

A cross-sectional study

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Abstract

The lack of knowledge on health literacy affects all segments of society, particularly health workers.

The objectives were to identify nursing students' means of accessing information during the coronavirus disease 2019 pandemic, their level of health literacy, and the factors that affect it.

This cross-sectional study was conducted in Turkey among 398 nursing students of Çukurova University and Van Yüzüncü Yıl University between June 1 and June 30, 2020. As a data collection tool, E-Health Literacy Scale was used, with students' characteristics and personal information form related to Internet use. These forms were converted to the online format. The survey link was sent to the students' smartphones and/or e-mails to ask them to participate.

Majority of participants were Van Yüzüncü Yıl University nursing students (63.8%). E-SYO score average of all students was found to be 29.42 ± 4.39 (min = 14, max = 40); it was is found be at a good level. They used the Internet as the first source of information about coronavirus disease 2019 (65.1%).Among the participants, 65.8% stated that it was important to access the health resource on the Internet and 19.1% of the participants thought that it was very important. It was found that Internet use was being used for >3 times a day (72.9%). The age, class, gender, family type, income level, high school from which they graduated from, and their working status significantly were statistically affecting their health literacy ($P < .05$). The health literacy scale scores were significant and higher than those who did not know the concept of health literacy, and those who perceived Internet skills well and very well than those who perceived them poorly ($P < .05$).

Nursing students were found to have good average health literacy averages. Improving the health literacy is important for making individuals healthier.

Abbreviations: COVID-19 = coronavirus disease 2019, WHO = World Health Organization.

Keywords: COVID-19, health literacy, nursing, nursing students

1. Introduction

As the new coronavirus disease 2019 (COVID-19) affects people worldwide, improving health is significant. Improving health is important for people to maintain control over their health. Health promotion includes a wide range of social and economic interventions designed not only to focus on treatment and medicine, but also to identify the root causes of the disease, to focus attention on ways to stay healthy, and to benefit and protect people's health. To improve health, 3 elements are needed: good health supervision, health literacy, and healthy cities. Good supervision of health and healthy cities, together with states and state-affiliated institutions (municipalities, etc) emphasizes that health needs to be brought to the best level by producing policies. In health literacy, people need knowledge, experience, and guidance to make healthy choices, for example, specifying healthy and reliable foods, counseling/guidance for getting health care, and so on.[1] Health equality in populations that improve health literacy indicates that governments' health improvement policies work well, the actions of society for health are successfully carried out, and citizens are sensitive to improving their own health.[2]

The concept of health literacy can be explained as the ability to comprehend, read, and use essential information related to

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval was granted by the Çukurova University Ethics Committee.

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health that people need to make appropriate health decisions. Health literacy includes the ability to understand the doses and procedures of recommended drugs, medical training documents, physicians' explanations, and informed consent forms, and to overcome complex health systems. Critical health literacy, on the other hand, is the most advanced literacy skill that can be applied to health-related situations, information about a wide range of health determinants, to use this information to gain more control in daily life, and to critically analyze information from a wide variety of sources.[3] Digital health literacy has become more common and essential for improving the health and wellbeing of patients. This concept focuses on the ability to acquire, understand, and evaluate health information from electronic sources to apply the acquired information to address or solve a health problem.[4] It is stated that adequate level of health literacy benefits the control and treatment of chronic diseases. It is also stated that health literacy has a positive impact on the cost of health care.[5]

Pew Research Center's Internet and American Life Project (Pew Internet) (Fox 2013) shows that approximately 72% of adult Internet users in the United States are seeking health information and more than a third of them are searching the Internet for self-diagnosis.[4] Improving health literacy has a positive impact on people's taking an active role in promoting their own health, doing their part successfully in community activities for health, and doing governments at the highest level in the field of health. Health literacy provides a benefit in addressing the health needs of even the most disadvantaged and marginalized communities. World Health Organization (WHO) 2030 emphasizes that efforts to increase health literacy are important in ensuring that the social, economic, and environmental goals of the sustainable development agenda are fully met.[6]

COVID-19 is a viral disease that spreads very rapidly from person to person and there is not enough information about it. Therefore, new information is transferred to the literature as a result of experiences and research. This outbreak has called on people to acquire and implement health information. The most valuable information about COVID-19 is handwashing and social isolation. There was also a need for simple and practical solutions, such as where to find the latest warnings and suggestions about this outbreak. Unfortunately, complex and contradictory and false information has also been conveyed to people. In this process, people should acquire, understand, and use information about COVID-19 reliably and ethically, that is, be a health literate.[7]

Health literacy has been the topic of the agenda because of the unpredictable situation created by the pandemic. Both the relevant authorities/persons in the field of health and the mass media have been mobilized to inform people. However, in this process, it is reported that the conflicting information may come to the agenda by the media, the ministry of health/directorate, nurses, doctors, data modelers, epidemiologists, and virologists. At this point, digital and critical health literacy has been a concept that requires urgency from both citizens and politicians in terms of synthesizing and analyzing this process. Health literacy skills allow us to gain good knowledge of risks, resources, and advice and engage in solidarity-based behaviors to achieve ideal community health.[8]

Nguyen et al[9] examined the impact of health literacy on depression and health-related quality of life of participants (n = 3947) who had outpatient access to health institutions in Vietnam (especially those with suspected COVID-19 symptoms (s-COVID-19-S). Those with S-COVID-19-S are more likely to have depression and have a lower health-related quality of life score than those without S-COVID-19-S. Health literacy is credited with having a protective effect on depression and healthy quality of life during the epidemic.

This research was conducted to determine nursing students' means of access to information in the COVID-19 pandemic, their health literacy levels, and the factors that affect it.

2. Methods

The work is of descriptive and cross-sectional type. The population of the research was composed of nursing students who continued their education and training in the Faculty of Health Sciences of Çukurova University and Van Yüzüncü Yıl University during the spring semester of 2019 to 2020. It was aimed to reach all students who continue their education at 2 state universities, who have no gender – age difference, and who have a smart device (phone, computer, tablet) and Internet connection, without sampling. Academics from the 2 universities sent the online survey link to their class leaders and then shared the link with other students via WhatsApp and email. Before completing the questionnaire, the students declared that they agreed to voluntarily participate in the study in the online informed consent form. There were no missing data since all questions were required to be answered. A total of 398 students participated in the survey, with a participation rate of 60.8%. The research was carried out between June 1 and June 30, 2020. When the research was applied, students were given education and training in their own hometown via distance education.

In the research, personal information form, features of students about Internet use and E-Health Literacy Scale were used as data collection tools. These forms were converted to online format and students were asked to participate by sending a questionnaire link to their smartphones and/or their e-mails.

The research was carried out after approval from the Ethics Committee of Çukurova University and official permission for application in related institutions.

2.1. Data collection tools

Characteristics of students and personal information form related to Internet usage: This form, in which students' sociodemographic and Internet usage characteristics are examined, was prepared by the researchers.

E-Health Literacy Scale: This scale was developed in 2006 by Norman and Skinner.[10] In our country, the validity and reliability study were conducted by Zekiye Tamer Gencer in 2017. E-health is an 8-item measure of e-health literacy developed to measure consumers' shared knowledge, comfort and perceived skills in finding, evaluating, and implementing electronic health information related to health problems. It can be scored between 8 and 40 on the scale, meaning that as the score increases, the level of health literacy increases. The Cronbach alpha value of the scale is indicated as 0.915. It can be applied to people in the 18 to 45 age range.[11]

2.2. Research limitations

The limitations of the research were students who did not continue their education in both state universities in the 2019 and 2020 spring term, students who did not have a smart device (phone, computer, tablet) and Internet connection, and nursing students who did not volunteer and did not use the Internet.

2.3. Analysis of the data

Statistical analysis was performed using a package program called SPSS demo package program. Descriptive statistics such as frequency, percentage, arithmetic mean, standard deviation, minimum, and maximum were used in the analysis of the data. The test results were evaluated at .05 significance level ($P < .05$).

Nonparametric methods were used for measurement values that were not suitable for normal distribution. The "Mann–Whitney *U*" test (Z-table value) was used to compare the measurement values of the 2 independent groups according to nonparametric methods. The "Kruskal–Wallis *H*" test (χ^2-table value) method was used to compare the measurement values

of 3 or more independent groups. Bonferroni correction was applied for binary comparisons of variables with significant difference for 3 or more groups.

An Example of Examining Differences: There are expressions such as [1–2,3] in binary comparisons for variables that have significant differences for 3 or more groups. [1–2,3] means that there are significant differences between 1 and 2 and between 1 and 3.

3. Results

The average age of the nursing students involved in the study was found to be "21.15 ± 2.02 years" and 161 of them (40.5%) were in the 20 to 21 age group. Two hundred fifty-four (63.8%) of nursing students attended Van Yüzüncü Yıl University and 129 of them (32.4%) were found to be at the first grade. It was found that 325 (81.7%) of the students were females, 368 (92.5%) were not working, and 319 (80.1%) were Anatolian High School graduates. One hundred eighty-nine (47.4%) of the students were determined that their mother and 143 (35.9%) their father were primary school graduates (Table 1).

The distribution of some findings of nursing students that may affect their Internet use and health literacy is shown in Table 2. Accordingly, it was found that 369 students (92.7%) did not have chronic illness, 245 (61.6%) did not know the concept of health literacy, 285 (71.6%) of them thought that health literacy was necessary, and 240 (60.3%) of the students read books occasionally. The first source of information of 259 (65.1%) of the students on COVID-19 was determined to be from the Internet (Table 2).

It was determined that 290 (72.9%) of the students used the Internet >3 times a day, 156 (39.2%) of the students rarely neglected their home/school/work responsibilities due to the Internet, and 121 (30.4%) of them rarely neglected sleep due to the Internet. At the same time, 177 students (44.5%) expressed that they were sometimes angry/frustrated when they were left without the Internet. One-hundred fifty of the students (37.7%) also stated that they thought the Internet should be used <3 times a day when considering health. It was determined that 182 students (45.7%) perceived their Internet skills well, 238 (59.3%) of the students thought the Internet was useful when deciding about health, and 262 (65.8%) of them thought it was important to have access to health resources on the Internet (Table 2).

The distribution of some of the findings of the students on the sources of information about COVID-19 is seen in Table 3. It was determined that 181 students (45.5%) frequently used the Internet for COVID-19 information, while 158 students (39.7%) received COVID-19 information from family/friends and 145 students (36.4%) received COVID-19 information from health care workers (Table 3).

The health literacy scale was found to be 29.42 ± 4.39 (min = 14, max = 40, median = 30; Table 4).

It was determined that there was no statistically significant difference in terms of Health literacy scale scores of the nursing students participating in the research according to the university, mother/father education level, and where they lived most ($P > .05$; Table 5).

A statistically significant difference was found in terms of health literacy scale scores by age ($\chi^2 = 15.234$; $P = .002$; Table 5). As a result of Bonferroni-corrected bilateral comparisons to determine which group the significant difference originated from, a statistically significant difference was found between those in the age group 19 and 6, those in the age group 20 to 21 and those aged 24 and over. Health literacy scale scores of those aged 24 and over are statistically significantly higher than those of those aged 19 and under and those in the 20 to 21 age group.

Table 1

Distribution of sociodemographic findings of nursing students participating in the study.

Variable (n = 398)	n	%
University		
Çukurova	144	36.2
Van Yüzüncü Yıl	254	63.8
Age range [X ± *S.S.* → 21.15 ± 2.02 (yr)]		
≤19	80	20.1
20–21	161	40.5
22–23	124	31.2
≥24	33	8.2
Grade		
1	129	32.4
2	52	13.1
3	92	23.1
4	125	31.4
Gender		
Female	325	81.7
Male	73	18.3
Working status		
Yes	30	7.5
No	368	92.5
Graduated high school		
High school	29	7.3
Anatolian high school	319	80.1
Vocational high school	29	7.3
Science high school	21	5.3
Mother's education level		
Illiterate	20	5.0
Literate	66	16.6
Primary school	189	47.4
Middle school	54	13.6
High school	50	12.6
University	19	4.8
Father's education level		
Illiterate	4	1.0
Literate	20	5.0
Primary school	143	35.9
Middle school	91	22.9
High school	83	20.9
University	57	14.3
Marital status		
Married	4	1.0
Single	394	99.0
Most inhabited place		
Province	210	52.8
District	111	27.9
Village/town	77	19.3
Family type		
Elementary family	337	84.7
Extended family	61	15.3
Income rate		
Income covers expense	268	67.3
Income does not cover expense	130	32.7

According to the classes, a statistically significant difference was found in terms of health literacy scale scores ($\chi^2 = 16.689$; $P = .001$; Table 5). As a result of Bonferroni-corrected binary comparisons to determine from which group the significant difference originated, a statistically significant difference was found between the 1st and the 4th class ones. Health literacy scale scores of the 4th grade are statistically, significantly higher than that of the 1st grade.

A statistically significant difference was detected in terms of health literacy scale scores by gender ($Z = -2.514$; $P = .012$; Table 5). Men's health literacy scale scores are statistically, significantly higher than women.

A statistically significant difference was found in terms of health literacy scale scores by employment status

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Table 2

Distribution of nursing students' findings that may affect Internet usage and health literacy.

Variable (n = 398)	n	%
Having chronic disease		
Yes	29	7.3
No	369	92.7
Knowing the concept of health literacy		
Yes	153	38.4
No	245	61.6
Health literacy		
Not required	10	2.5
Necessary	285	71.6
Quite necessary	103	25.9
Frequency of reading		
Never	19	4.8
Sometimes	240	60.3
Often	139	34.9
Internet usage frequency		
Sometimes	26	6.5
At least 3 times a day	82	20.6
>3 times a day	290	72.9
Home/school/work liability neglect due to Internet		
Never	84	21.1
Rarely	156	39.2
Sometimes	127	31.9
Often	25	6.3
Always	6	1.5
Being angry, frustrated in the absence of the Internet		
Never	152	38.2
Sometimes	177	44.5
Often	60	15.0
Always	9	2.3
Perception of Internet skills		
Bad	11	2.8
Average	147	36.9
Good	182	45.7
Very good	58	14.6
Internet use for health		
Every other day	81	20.3
<3 times a day	150	37.7
>3 times a day	83	20.8
Once a week	50	12.6
Once a month	34	8.6
The benefit of the Internet when making decisions about health		
Not useful at all	16	4.0
Not useful	32	8.0
No idea	85	21.4
Helpful	238	59.8
Very helpful	27	6.8
The importance of accessing health resources on the Internet		
Does not matter	2	0.5
Not important	18	4.5
No idea	40	10.1
Important	262	65.8
Very important	76	19.1
COVID-19 information sources*		
Internet (first source of information)	259	65.1
Radio/TV (second source of information)	165	41.5
Health employee (third source of information)	82	20.6

COVID-19 = coronavirus disease 2019.

Table 3

Distribution of some findings regarding students' information sources about COVID-19.

Variable (n = 398)	n	%
Internet use for COVID-19 information		
Never	1	0.3
Rarely	17	4.2
Sometimes	71	17.8
Often	181	45.5
Always	128	32.2
Use of newspapers for COVID-19 information		
Never	188	47.2
Rarely	124	31.2
Sometimes	67	16.8
Often	16	4.0
Always	3	0.8
Magazine usage for COVID-19 information		
Never	167	42.0
Rarely	102	25.6
Sometimes	83	20.9
Often	38	9.5
Always	8	2.0
TV/radio usage for COVID-19 information		
Never	29	7.3
Rarely	35	8.8
Sometimes	83	20.9
Often	157	39.4
Always	94	23.6
Use of book/poster/brochure for COVID-19 information		
Never	112	28.1
Rarely	109	27.4
Sometimes	125	31.4
Often	46	11.6
Always	6	1.5
Getting information from family/friends for COVID-19 information		
Never	9	2.3
Rarely	50	12.6
Sometimes	158	39.7
Often	140	35.1
Always	41	10.3
Getting information from the healthcare professional for COVID-19 information		
Never	34	8.6
Rarely	82	20.6
Sometimes	145	36.4
Often	101	25.4
Always	36	9.0

COVID-19 = coronavirus disease 2019.

Table 4

Distribution of findings related to health literacy scale.

	Findings			
Scale	**Average**	**Standard deviation**	**Median**	**Min–max**
Health literacy scale	29.42	4.39	30.0	14.0–40.0

(Z = –3.349; P = .001; Table 5). Health literacy scale scores of employees are statistically significantly higher than those who do not.

According to the high school graduated, a statistically significant difference was detected in terms of health literacy scale scores (χ^2 = 9.781; P = .021; Table 5). As a result of Bonferroni-corrected binary comparisons to determine which group the significant difference originated from, statistically significant differences were determined between vocational high school graduates and Science High School graduates. The health literacy scale scores of vocational high school graduates are statistically significantly higher than those of Science High School graduates.

Statistically significant difference was determined in terms of health literacy scale scores by family type (Z = –2.899; P = .004; Table 6). The health literacy scale scores of those with an elementary family are statistically significantly higher than those with a broad family.

Statistically significant difference was found in health literacy scale scores by income level (Z = –2.313; P = .021; Table 6).

Table 5

Comparison of health literacy scale scores according to students' findings.

Variable (n = 398)	n	Health literacy scale		Statistical analysis* Probability
		X ± S.S.	Median [IQR]	
University				
Çukurova	144	30.97 ± 3.93	31.0 [4,0]	Z = –1.902
Van Yüzüncü yıl	254	29.11 ± 4.61	30.0 [5,3]	*P* = .057
Age range				
≤19 (1)	80	28.70 ± 4.17	30.0 [6,0]	χ^2=15.234
20–21 (2)	161	29.04 ± 4.39	30.0 [5,0]	**P = .002**
22–23 (3)	124	29.69 ± 4.42	31.0 [5,0]	**[1, 2–4]**
≥24 (4)	33	32.09 ± 3.95	32.0 [5,5]	
Grade				
1	129	28.40 ± 4.24	29.0 [6,0]	χ^2=16.689
2	52	29.08 ± 4.71	30.0 [5,0]	**P = .001**
3	92	29.64 ± 4.75	30.0 [4,8]	**[1–4]**
4	125	30.47 ± 3.92	31.0 [3,5]	
Gender				
Female	325	29.22 ± 4.33	30.0 [5,0]	Z = –2.514
Male	73	30.34 ± 4.60	31.0 [4,0]	**P = .012**
Working status				
Yes	30	32.07 ± 5.58	32.5 [7,5]	Z = –3.349
No	368	29.21 ± 4.22	30.0 [5,0]	**P = .001**
Graduated high school				
High school (1)	29	28.45 ± 5.98	29.0 [6,0]	χ^2=9.781
Anatolian high school (2)	319	29.42 ± 4.20	30.0 [5,0]	**P = .021**
Vocational high school (3)	29	31.72 ± 4.33	32.0 [4,0]	**[3–4]**
Science high school (4)	21	27.61 ± 3.67	27.0 [7,5]	
Mother's education level				
Illiterate/literate	86	28.98 ± 4.44	30.0 [6,0]	
Primary school	189	29.23 ± 4.26	30.0 [5,0]	χ^2 = 4.565
Middle school	54	30.20 ± 5.07	31.0 [5,0]	*P* = .335
High school	50	30.04 ± 3.89	30.0 [4,3]	
University	19	29.53 ± 4.67	30.0 [7,0]	
Father's education level				
Illiterate/literate	24	29.46 ± 4.63	30.0 [5,5]	
Primary school	143	28.93 ± 4.36	30.0 [5,0]	χ^2 = 2.926
Middle school	91	29.84 ± 4.34	31.0 [4,0]	*P* = .570
High school	83	29.64 ± 4.20	30.0 [5,0]	
University	57	29.67 ± 4.75	30.0 [5,5]	
Most inhabited place				
Province	210	29.75 ± 4.55	30.0 [4,0]	χ^2 = 3.275
District	111	29.21 ± 4.10	30.0 [6,0]	*P* = .194
Village/town	77	28.84 ± 4.34	30.0 [5,0]	

Bold writing was written that way to draw attention to the meaningful result.

*In the data without normal distribution, "Mann–Whitney *U*" test (Z-table value was used to compare the 2 independent groups with the measured values.); "Kruskal–Wallis *H*" test (χ^2-table value) statistics were used to compare 3 or more independent groups.

The health literacy scale scores of those whose income covers their expenses are statistically significantly higher than those who do not.

There are no statistically significant differences in health literacy scale scores according to chronic disease, frequency of book reading, and frequency of Internet use (*P* > .05; Table 6).

According to the state of knowing the concept of health literacy, a statistically significant difference was found in terms of health literacy scale scores (Z = –5.485; *P* = .000; Table 6). Health literacy scale scores of those who know the concept of health literacy are statistically significantly higher than those who do not.

A statistically significant difference was found in terms of health literacy scale scores according to the necessity of health literacy (χ^2 = 8.598; *P* = .014; Table 6). As a result of Bonferroni-corrected bilateral comparisons to determine which group the meaningful difference originated from, a statistically significant difference was found between those who thought that health literacy was not necessary and those who thought it was very necessary. Health literacy scale scores of those who think it is very necessary are statistically significantly higher than those who think it is not necessary.

A statistically significant difference was detected in terms of health literacy scale scores according to the perception of Internet skills (χ^2 = 48.492; *P* = .000; Table 6). As a result of Bonferroni-corrected binary comparisons to determine which group the significant difference originated from, a statistically significant difference was found between those who perceived Internet skills poorly and who perceived them well and very well. Health literacy scale scores of those who perceive Internet skills well and very well are statistically, significantly higher than those who perceive them poorly. Similarly, a statistically significant difference was found between those who perceived Internet skills on average and those who perceived Internet skills well and very well. Health literacy scale scores of those who perceive Internet skills well and very well are statistically significantly higher than those who perceive Internet skills average.

4. Discussion

It was found that 369 (92.7%) of the students participating in the study did not have a chronic disease (Table 2). In the study of Koç et al[12] on health literacy, the proportion of students

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Table 6

Comparison of health literacy scale scores according to students' findings.

Variable (n = 398)	n	Health literacy scale		Statistical analysis* probability
		X ± S.S.	Median [IQR]	
Family type				
Elementary family	337	29.73 ± 4.30	30.0 [5,0]	Z = –2.899
Extended family	61	27.74 ± 4.55	29.0 [6,5]	***P* = .004**
Income rate				
Income covers expense	268	29.79 ± 4.37	30.0 [5,0]	Z = –2.313
Income does not cover expense	130	28.67 ± 4.35	29.0 [6,0]	***P* = .021**
Chronic illness				
Yes	29	31.10 ± 4.82	31.0 [5,0]	Z = –1.799
No	369	29.29 ± 4.34	30.0 [5,0]	*P* = .072
Knowing health literacy				
Yes	153	30.78 ± 4.07	32.0 [3,0]	Z = –5.485
No	245	28.58 ± 4.38	29.0 [5,0]	***P* = .000**
Health literacy				
Not required	10	27.60 ± 3.86	27.5 [7,5]	χ^2 = 8.598
Necessary	285	29.09 ± 4.42	30.0 [5,0]	***P* = .014**
Quite necessary	103	30.52 ± 4.19	31.0 [4,0]	**[1–3]**
Frequency of reading				
No	19	28.32 ± 4.07	28.0 [6,0]	χ^2 = 4.977
Sometimes	240	29.28 ± 4.04	30.0 [5,0]	*P* = .083
Often	139	29.82 ± 4.97	31.0 [5,0]	
Internet usage frequency				
Sometimes	26	28.96 ± 4.51	29.0 [5,3]	χ^2 = 0.181
At least 3 times a day	82	29.39 ± 4.58	30.0 [4,3]	*P* = .913
>3 times a day	290	29.48 ± 4.35	30.0 [5,0]	
Internet skills				
Bad	11	25.64 ± 6.07	24.0 [6,0]	χ^2 = 48.492
Average	147	28.21 ± 3.90	29.0 [5,0]	***P* = .000**
Good	182	29.65 ± 4.08	31.0 [4,0]	**[1–3,4]**
Very good	58	32.50 ± 4.43	32.0 [6,0]	**[2–3,4]**

Bold writing was written that way to draw attention to the meaningful result.

*In the data without normal distribution, "Mann–Whitney *U*" test (Z-table value) was used to compare the 2 independent groups with the measured values; "Kruskal-Wallis *H*" test (χ^2-table value) statistics were used to compare 3 or more independent groups.

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without chronic disease in Ankara Yıldırım Beyazıt University Faculty of Health Sciences Nursing Department is approximately similar (95.3%). In the study conducted by Ertas et al[13] correlation analysis was conducted between the overall health status scores of individuals and health literacy averages. The analysis found a positive low-level relationship between overall health status and health literacy ($P < .005$).

It is important for nursing students to maintain and improve their own health as they will serve many years in postgraduation healthcare. The importance of this was further understood in the COVID-19 pandemic. We owe the low mortality rates in our country to our health army, which was well educated and self-serving with the understanding of Health for the Society of the Republican period. For the first time, an elective course called "Healthy Life Behaviors" has been proposed to the curriculum so that students of the Department of Nursing, Faculty of Health Sciences of Çukurova University, can improve their health at the desired level and raise awareness about this issue in our country. In the next academic year, this course will be taught by the Department of Child Health and Disease Nursing. This course can be recommended to all university students.

It is possible that health literacy is influenced by individuals' reading behavior. Examining the sources used by students to access health-related information, it was determined that 48% reported the Internet, 29.7% reported health workers, and 16.7% reported family members and friends in the top 3.[14]

Nearly two-fifths (37.7%) of respondents stated that Internet use for health should not exceed 3 times a day (Table 2). In the study of Sharma, Oli, and Thapa [15], this ratio is stated to be 26.3%.

Of the respondents, nearly half (45.7%) of them stated that their Internet skills were good, and the vast majority (59.8%) stated that the Internet was beneficial when making decisions about their health (Table 2). In the 2019 study, Sharma et al[15] found that 48% of students had good Internet skills and 65.1% stated that the Internet was beneficial when deciding on their health. In the study of Tubaishat and Habiballah,[16] it is stated that 36.8% of students have good Internet skills. In the study of Rathnayake and Senevirathna,[17] this rate is reported to be 47%. In a study by Üstün et al,[18] 77.3% of students report that the Internet helps when deciding on health.

In the European Union sample, 59% of people have used the Internet to search for health-related information in the past year. In addition, 10% of them used the Internet once a week or more, 9% of them used the Internet many times a month, 13% of them used the Internet approximately once a month, and 27% of them used the Internet less than once a month to search for health-related information.[4] It is observed that nursing students who participated in the study were similar to those who said Internet use for health once a week (12.6%) and once a month (8.6%; Table 2).

When looking at the data sources that students had access to during the pandemic, 45.5% stated that they used the Internet and 39.4% TV/radio frequently; 31.4% stated that they received information from books/posters/brochures and 36.4% from health workers (Table 3). In their 2020 study, Chesser et al[19] reported that the sources of data that university students gain the most access to during the COVID-19 process are the Internet (39.0%) and social media (39.0%). In the same study, it was stated that 21% of the sources accessed online are TV, 15% are Facebook, and 13% are local/national newspapers' websites.

According to the WHO, health literacy is the level of cognitive-social skills and motivation in accessing, understanding, and using information to protect and improve the health of individuals. Health literacy means more than reading leaflets and

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successfully making appointments. Strengthening health literacy is of paramount importance by improving people's access and capacity to use health information effectively.[20]

By improving health literacy, individuals can be supported to make the right decisions about their own health. During the coronavirus outbreak, information pollution was accompanied by conspiracy theories in traditional and digital media. In this process, the importance of gaining awareness of health literacy was also clearly understood.

Because we live in a digital time, the existence of health information in a digital environment raises the question of whether this information is true or false. Health information is constantly uploaded to the digital media (Internet). New strategies may be needed to manage this accumulation of information. For example, when you type "cancer" into the search engine on Google, >37 million results can come. One out of every 20 searches on Google is quoted as being health-related. This also emphasizes the importance of digital health literacy for individuals.[4]

Health workers act as health educators and consultants of persons within the framework of their professional fields. Their own levels of health literacy need to be good for them to be able to fulfill these roles.[14] It is not enough to know only the basic information so that students studying in the field of health can take an active role in the health system integrated with today's technological developments; health literacy and awareness are expected.[12]

The average score of the students participating in the study on the health literacy scale was 29.42 (Table 4). This average score is considered good. Rathnayake and Senevirathna[17] found this average as 28.02 in their study with nursing students. Üstün et al[18] found this mean as 30.10 in their study with pharmacy students. Yılmaz et al[14] found this score as 29.48 with the students of the Faculty of Health Sciences. In the studies conducted with nursing students during the pandemic process, it is stated that the average score obtained from the E-SYO scale is high.[21,22] In our study, it was found that the health literacy levels of the students were close to similar studies.

Analysis of student findings determined that age, undergraduate school year (class), gender, working status, and type of high school graduated had an impact on health literacy ($P < .05$; Table 5). In their study, Rathnayake and Senevirathna[17] stated that, unlike our study, age, gender, and academic year have no impact on health literacy level. Health literacy is influenced by gender factor. Considering the effects of women's health behaviors on the health of family members, improving women's health literacy will be meaningful in terms of community health promotion strategies.[14]

In the analysis of student findings, it was determined that family type and income level had an impact on health literacy ($P < .05$; Table 6). In the study of Birimoglu and Caglar,[23] it is stated that the Undergraduate Education year, income status, and family type similarly have an impact on health literacy, while gender does not have an impact. The concept of health literacy can be influenced by many factors such as the environment in which individual's live, educational status, cultural characteristics, and age.[12]

Health literacy levels of the students participating in the study were determined to vary depending on the use of Internet skills, the necessity of health literacy, and the state of knowing health literacy ($P < .05$; Table 6). In studies with nursing students, it is stated that there is a significant difference between Internet use skills and health literacy.[15–17] In the study of Ozen et al[24] it is unlikely stated that the state of knowing health literacy does not affect the level of health literacy.

The research limitations of our study to determine the means of access to information, health literacy levels and the factors affecting nursing students in the COVID-19 pandemic were as follows: Some students had Internet problems due to the insufficient digital infrastructure arising from the criteria in the study. Some students did not have smart devices or tablets with Internet connection. Since the participation of the students was not compulsory and voluntary participation was requested, 60.8% of the target population could be reached. Three hundred ninety-eight students participated in the study voluntarily. The concept of health literacy should be titled as service provider and service provider and reflected on the field. Education and counseling, which are given according to the individuals' health literacy levels, play an important role in the protection and development of health. Healthcare professionals need to be able to create healthcare environments that support health literacy.[12]

It is also important to evaluate the health literacy of individuals (healthy/patient) so that nurses can effectively perform their independent role of health education and counseling. It is a fact that the training and consultancy, which will be made according to the level of the individual's health literacy, will contribute to the adoption of health protection and development practices, to increase the compliance of the individual to the treatment and to make chronic disease management more effective. At the same time, this assessment will help identify the best communication channels to meet the individual's needs. Given the factors such as the health status of individuals, health inequality, cost increases, and access to health information, planning and implementation of initiatives to increase health literacy are also important.[25]

It is important to raise awareness about health literacy before graduation. It may be suggested that the health literacy course should be included as an elective course in the curricula of all faculties and that this course should be started at the primary school level in order to raise awareness.[14,26] It has also been argued that health literacy education should be provided at all levels of education.[13] As a result of this study, the Health Literacy course at Çukurova University was added to the faculty curriculum.

The following recommendations are made by the WHO to promote awareness of health literacy:

1. Health literacy education should be conducted from early childhood.
2. The concept of improving health should be developed during school education.
3. In adult education, ways to cope with possible obstacles should be developed.
4. Multifaceted programs should be made in accordance with the characteristics and capacities of individuals.
5. Participatory training methods should be used.
6. New methods should be developed to be healthy and to be in good health.[20]

5. Conclusion

The first source of information for 259 (65.1%) of students on COVID-19 was the Internet. The health literacy scale was found to be 29.42 ± 4.39 (min = 14, max = 40, median = 30). According to the classes, a statistically significant difference was found in terms of health literacy scale scores. The health literacy scale scores of the 4th grade were statistically significantly higher than the 1st grade.

The COVID-19 pandemic process, which emerged suddenly and affected world, made us realize that importance distance education and health literacy was understood for by for departments that provide applied health-related education. During pandemic and quarantine period, technical infrastructure for health literacy and distance education and complete management of the process were very important for both nursing students and academics. It is important to raise awareness of health literacy before graduation. As a result of this, the health literacy course at Çukurova University was added to the faculty curriculum.

During the COVID-19 pandemic, improving the health literacy level of students who will become nurses in the future is important for the health of the individual, family, and community, both for their own health and for their role in education, counseling, and service. The E-SYO levels of the nursing students were found to be good. We recommend that similar studies be conducted with other health care professionals.

Author contributions

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