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# Determining the Relationship Between e-Health Literacy and Health-Improving and Protective Behaviors in Nursing Students *

## Hemşirelik Öğrencilerinde e-Sağlık Okuryazarlığı ile Sağlığı Geliştirici ve Koruyucu Davranışları Arasındaki İlişkinin Belirlenmesi

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**Abstract**

**Objective:** The research was conducted to determine relationship between e-Health literacy level and health promoting and protective behaviors in nursing students.

**Methods:** The sample consists of 279 nursing students studying at a state university and agreeing to participate in the research. Data were collected using personal information form, e-Health Literacy Scale and Health Promotion and Protective Behaviors Scale.

**Results**: Nearly half of students are 22 years old and over (47.7%), 69.2% of them are women. A statistically significant difference was determined between age and place of residence of the students and Health Promotion and Protective Behaviors Scale mean score ($p<.05$). The mean score of e-Health Literacy Scale is 28.97±6,324. The mean score of Health Promotion and Protective Behaviors Scale is 76.34±10.02. There was a positive and very weak ($r=0.196$, $p=0.001$) correlation coefficient between variables and was statistically significant ($p <.05$).

**Conclusion:** The e-health literacy level and health promoting, and protective behaviors of nursing students are moderate. As the level of e-health literacy increases, health promoting, and protective behaviors increase. It is recommended to add a course about e-Health literacy to curriculum of nursing students and to organize training programs on health promoting and protective behaviors.

**Keywords**: e-Health literacy, health promotion, nursing students

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**Öz**

**Amaç:** Bu çalışma ile hemşirelik öğrencilerinde e-Sağlık okuryazarlığı düzeyi ile sağlığı geliştirici ve koruyucu davranışları arasındaki ilişkinin belirlenmesi amaçlanmaktadır.

**Yöntem:** Bu çalışmanın örneklemini bir devlet üniversitesinde öğrenim gören toplam 279 hemşirelik öğrencisi oluşturmaktadır. Araştırmada veriler araştırmacılar tarafından hazırlanan kişisel tanıtım formu, e-Sağlık Okuryazarlığı Ölçeği ile Sağlığı Geliştirici ve Koruyucu Davranışlar Ölçeği kullanılarak toplanmıştır.

**Bulgular:** Öğrencilerin yaklaşık yarısı 22 yaş ve üzerinde, %69.2'si kadındır. Öğrencilerin yaş ve yaşadıkları yer ile Sağlığı Geliştirici ve Koruyucu Davranışlar Ölçeği toplam puanı arasında istatistiksel açıdan anlamlı bir fark bulunmuştur ($p<.05$). e-Sağlık Okuryazarlığı Ölçeği toplam puan ortalamasının 28.97±6.324, Sağlığı Geliştirici ve Koruyucu Davranışlar Ölçeği toplam puan ortalamasının 76.34±10.02, olduğu belirlenmiştir. Değişkenler arasında pozitif yönlü çok zayıf düzeyde anlamlı bir ilişki saptanmıştır.

**Sonuç:** Hemşirelik öğrencilerinin e-sağlık okuryazarlığı ile sağlığı geliştirici ve koruyucu davranışları orta düzeydedir. E-sağlık okuryazarlığı düzeyi arttıkça sağlığı geliştirici ve koruyucu davranışlar artmaktadır. Hemşirelik öğrencilerinin müfredatına e-Sağlık okuryazarlığı ile ilgili bir dersin eklenmesi ve sağlığı geliştirici ve koruyucu davranışlar konusunda eğitim programlarının düzenlenmesi önerilmektedir.

**Anahtar kelimeler:** e-Sağlık okuryazarlığı, hemşirelik öğrencileri, sağlığı geliştirme

## INTRODUCTION

Developments in information and internet technology have led to changes in the production, presentation and use of health services. These technologies have allowed better control and faster access to health services (Chan et al., 2009). The health system, which has been modernized with science and technology, also expects individuals to take an active role in the use of health services, protection and development of health (Brown & Dickson, 2010). This is possible with adequate health literacy, which is a key factor in protecting and improving the health of individuals, enabling them to make appropriate decisions about health (Park et al., 2017).

Health literacy refers to the ability to acquire, understand and use health information in order to have a high quality of life throughout life, to improve health and to prevent diseases. (Başgöl, 2016). Studies have shown that the level of health literacy in the world and in our country is insufficient (Sørensen et al., 2016). According to the health literacy research conducted in eight European Union Countries, it has been determined that individuals have health literacy varying between 2% and 27%, while the average of health literacy in Turkey is 30.4% (Tanrıöver et al., 2014). As a result of widespread access to the Internet and mobile devices, the concept of e-Health literacy has emerged (Norman, 2012; Park, 2019).

e-Health literacy has been defined as the awareness of obtaining relevant health information from electronic sources and the ability to use this information to solve a health-related problem (Sharma et al., 2019). The increase in health-related applications and the use of electronic devices and the internet by individuals to obtain health information have revealed the importance of e-Health literacy (Monkman & Kushniruk, 2015; Şengül et al., 2017). The internet has been an important factor in individuals' access to health-related information resources. Studies have found that 90-97% of young people access the internet, and 35.5% use the internet as a source of information and to solve health problems (Çelen et al., 2011; Muslu & Bolışık, 2009). It is possible with sufficient e-Health literacy that people who use the internet to find answers to health-related questions can grasp the accuracy of the information and use this information to develop positive health behaviors (Kılıç, 2017; Yalçıntürk Akkurt, 2018). Studies have revealed that individuals with high e-Health literacy have more efficiency in finding health information and using health applications, and indirectly they develop more health-promoting and protective behaviors (Cho et al., 2014; Park et al., 2014; Tennant et al., 2015). A health-promoting lifestyle can help individuals achieve positive health outcomes (Chiou et al., 2016). In a study conducted with 525 university students in Taiwan, e-Health literacy was found to mediate the relationship between individual factors and health behaviors (Hsu et al., 2014). In another study conducted on 422 university students in the USA, it was determined that e-Health literacy is associated with general health, exercise, sleep, vaccination, sexual health preventive behaviors and balanced diet (Britt et al., 2017). Yang et al. (2017), in their study with university students, critical e-Health literacy was expressed as the most important indicator of health promotion behaviors (Yang et al., 2017).

It is thought that the competencies of the future health care service providers and nursing students, who will provide education to the society at the point of health promotion, to obtain, understand and evaluate the right health information from the internet are important both in terms of protecting and improving their health and directing the society correctly. Therefore, this study was planned to determine the relationship between e-Health literacy and health promoting and protective behaviors of nursing students.

## METHODS

**Study Design:** In the descriptive study, a web-based questionnaire was created to minimize face-to-face interaction due to the pandemic.

**Research Questions:**

1. What is the e-Health literacy level of nursing students?
2. Is there a relationship between the e-Health literacy level of nursing students and their health promoting and protective behaviors?

**Variables of the Study:** The independent variables were the sociodemographic characteristics of the nursing students. The dependent variable were the e-Health Literacy Scale and Health Promotion and Protective Behaviors Scale scores.

**Settings of the Study:** The web-based survey form was shared on social media platforms (such as whatsapp, instagram, twitter) and the respondents were asked to share it with other people. At the beginning of the web-based questionnaire sent to the participants, it is stated that the purpose of the study and participation in the research is on a voluntary basis.

**Population of the Study:** The population of the research consists of 384 nursing students studying at a state university. G* Power program was used for Power analysis for sample size. The sample size was determined as at least 193 people with a 95% confidence interval. The number of participants consists of 279 nursing students who agreed to participate in the research by collecting online communication with students through social media. Inclusion criteria; Being over 18 years old and a nursing student, being able to use social media, volunteering to participate in the research.

**Data Collection:** The data of the study were collected between 01.04.2021 and 01.05.2021 by communicating to the students online via social media.

**Data Collection Tools**

Personal Introduction Form, e-Health Literacy Scale and Health Promotion and Protective Behaviors Scale were used in the study.

***Personal Introduction Form:*** The Personal Information Form was developed by researchers in line with the literature review (Seyret, 2019; Ergün et al., 2019; Yılmaz et al., 2020). This form consists of 17 questions aiming to obtain information about students' sociodemographic characteristics, internet usage habits, health promoting and protective behaviors.

***e-Health Literacy Scale (e-HEALS):*** It was developed by Norman and Skinner in 2006 to determine traditional literacy, health-related literacy, information retrieval, scientific research, media literacy and computer literacy (Norman & Skinner, 2006). This scale consists of 8 items that determine the perception of internet use in health-related issues. Before starting the Likert test there are 2 open-ended questıons. It was arranged as "1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree" with 5-point Likert-type scaling method. The lowest 8 points and the highest 40 points are taken from the scale. A high score from the scale indicates a high level of e-Health literacy. The Cronbach Alpha value of the scale was found to be 0.88. The Turkish validity and reliability study of the e-Health Literacy Scale was conducted by Tamer in 2017 and the cronbach alpha value was found to be 0.86 (Tamer Gencer, 2017). In this study, the cronbach's alpha value of the scale was determined as 0.94.

***Health Promotion and Protective Behaviors Scale (HPPBS):*** The Health Promotion and Protective Behaviors Scale was developed by Bostan et al. in order to develop a valid and reliable tool for detecting health promotion and protection behaviors. The scale of health promoting and protective behaviors consists of three sub-dimensions as physical, psychosocial and protection and 24 items. The Cronbach's alpha coefficient was found to be between 0.61-0.76 for the sub-dimensions and 0.83 for the overall Scale (Bostan et al., 2016). In this study, the cronbach's alpha value of the scale was determined as 0.79.

**Ethical Committee Approval:** Ethics committee approval (Ethics Committee No: 2021/08-04) was obtained to conduct the study. The purpose of the research was written on the form prepared digitally, and volunteerism was taken as basis. The consent was obtained from the individuals participating in the research after reading the information about the research purpose, the principles of confidentiality and privacy, and that they could withdraw from the study at any time. This study was conducted in accordance with the Principles of the Declaration of Helsinki.

**Data Analysis:** Data was evaluated in Version 22.0 (Statistical Package for the Social Sciences) package program. Descriptive tests for demographic data, mean in calculating scale scores, and number, percentage and total score average of the scale were calculated when comparing scale mean scores with some variables.

## RESULTS

Nearly half of the students are 22 years old and over (47.7%), 69.2% were women, 49.4% were in the 4th grade, 63.8% were living in the province, 67.7% had income equal to their expenses. 46.2% of mothers and 47.3% of fathers are primary school graduates. The study 93.2% of them had a father's education at primary school level, 96.4% of them had their own computer-mobile phone, 36.2% of them used the internet for an average of 1-3 hours and 3-5 hours a day, 94.3% of them did not have a chronic disease. 33.7% of the students get their health information from health institutions. There was a statistically significant difference between the students' class, father's education status, average daily internet usage time, and the source from which health information was obtained, and the total score of the e-Health Literacy Scale ($p<.05$). There is a statistically significant difference between the age and place of residence of the students and the e-HEALS total score ($p<.05$) (Table 1).

**Table 1.** Comparison of the socio-demographic characteristics of the students with the e-Health Literacy Scale and HPPBS mean scores (n=279)

| | | | e-HEALS | | HPPBS | |
|---|---|---|---|---|---|---|
| | | **n (%)** | **Mean ± SD** | **Significant** | **Mean ± SD** | **Significant** |
| Age | 18-19 age | 28(10.0) | 26.21±5.858 | KW=5.565 p=.062 | 76.46±10.47 | KW=9.795 p=.007 |
| | 20-21 age | 118 (42.3) | 29.17±6.685 | | 78.27±8.912 | |
| | ≥ 22 age | 133(47.7) | 29.37±5.981 | | 74.60±10.59 | |
| Gender | Male | 86 (30.8) | 28.56±6.774 | Z=0.637 p=.524 | 75.18±10.84 | Z=1.606 p=.108 |
| | Female | 193 (69.2) | 29.15±6.122 | | 76.85±9.619 | |
| Class | 1. class | 42 (15.1) | 26.47±6.511 | KW=9.102 p=.028 | 75.52±10.72 | KW=2.507 p=.474 |
| | 2. class | 38 (13.6) | 29.05±5.402 | | 77.78±9.314 | |
| | 3. class | 61 (21.9) | 29.40±6.288 | | 77.42±9.048 | |
| | 4. class | 138(49.4) | 29.52±6.400 | | 75.71±10.41 | |
| Place | Country | 178(63.8) | 29.39±6.361 | KW=2.729 p=.256 | 77.83±8.943 | KW=10.08 p=.006 |
| | Town | 56(20.1) | 28.32±6.500 | | 74.32±11.75 | |
| | Village | 45(16.1) | 28.11±5.920 | | 72.95±10.69 | |
| Income-expenditure status | Income less than expenses | 73(26.2) | 29.05±6.582 | KW=0.712 p=.701 | 74.89±11.63 | KW=1.838 p=.399 |
| | Income equals expense | 189(67.7) | 29.05±6.184 | | 76.73±9.104 | |
| | Income more than expenses | 17(6.1) | 27.76±9.995 | | 78.23±12.12 | |
| Mother's educational status | Illiterate | 76(27.2) | 28.81±6.378 | KW=7.331 p=.119 | 75.14±10.49 | KW=7.333 p=.119 |
| | Primary education | 129(46.2) | 28.56±6.140 | | 76.35±9.326 | |
| | Middle School | 42(15.1) | 28.64±6.238 | | 79.90±8.553 | |
| | High school | 26(9.3) | 30.92±7.149 | | 75.07±10.34 | |
| | University | 6(2.2) | 33.66±4.676 | | 71.66±20.25 | |
| Father's educational status | Illiterate | 13(4.7) | 27.38±5.560 | KW=14.73 p=.012 | 73.61±8.39 | KW=5.162 p=.396 |
| | Primary education | 132(47.3) | 28.03±5.572 | | 76.10±9.857 | |
| | Middle School | 54(19.4) | 31.37±6.038 | | 76.00±9.273 | |
| | High school | 48 (17.2) | 29.35±7.259 | | 76.60±11.00 | |
| | University | 28 (10.0) | 28.50±7.918 | | 79.92±8.082 | |
| | Postgraduate/Doctoral | 4 (1.4) | 31.75±4.924 | | 69.25±23.54 | |
| Own your own computer-phone | Yes | 269(96.4) | 28.86±6.337 | Z=1.788 p=.074 | 76.55±9.712 | Z=0.965 p=.335 |
| | No | 10(3.6) | 31.90±5.445 | | 70.50±15.96 | |
| Computer - phone - Internet status | Yes | 260(93.2) | 28.86±6.300 | Z=0.612 p=.540 | 76.66±9.839 | Z=1.950 p=.051 |
| | No | 19(6.8) | 30.47±6.636 | | 71.89±11.67 | |
| Average Internet Time | 0-1 hour | 13(4.7) | 28.84±8.773 | KW=12.30 p=.006 | 75.92±12.53 | KW=0.779 p=.854 |
| | 1-3 hour | 101(36.2) | 28.49±5.679 | | 76.19±9.234 | |
| | 3-5 hour | 101(36.2) | 28.10±5.839 | | 76.13±10.54 | |
| | ≥5 hour | 64(22.9) | 31.12±7.087 | | 76.96±10.05 | |
| Chronic disease Status | Yes | 16(5.7) | 27.18±7.538 | Z=1.024 p=.306 | 73.00±15.07 | Z=0.736 p=.462 |
| | No | 263(94.3) | 29.08±6.243 | | 76.54±9.636 | |
| Health information | Family | 7(2.5) | 25.28±6.897 | KW=12.43 p=.029 | 73.57±9.289 | KW=7.109 p=.213 |
| | Medical institution | 94(33.7) | 28.00±6.343 | | 77.65±9.303 | |
| | Scientific resources | 77(27.6) | 30.20±6.177 | | 76.49±11.01 | |
| | Tv-newspaper | 12(4.3) | 26.83±6.393 | | 77.25±12.01 | |
| | Friend | 4(1.4) | 29.75±12.31 | | 61.00±20.99 | |
| | Internet | 85(30.5) | 29.50±5.878 | | 75.56±8.453 | |
| | Total | 279(100.0) | | | | |

e-HEALS: e-Health Literacy Scale, HPPBS: Health Promotion and Protective Behaviors Scale, SD: Standard deviation, Z=Mann Whitney U. KW=Kruskal Wallis H, p<.05.

The students 52% of think that the internet is useful in making decisions about their health, and 62.7% think that accessing health resources on the internet is important (Table 2).

**Table 2.** Distribution of open-ended questions regarding the e-health literacy scale

| **Open-End Questions** | **n** | **%** |
|---|---|---|
| How useful do you think the internet has been in helping you make decisions about your health? | | |
| Not beneficial at all | 4 | 1.4 |
| Not beneficial | 20 | 7.2 |
| Indecisive | 91 | 32.6 |
| Beneficial | 145 | 52.0 |
| Very beneficial | 19 | 6.8 |
| Total | 279 | 100.0 |
| How important is it to you to have access to health resources on the Internet? | | |
| Not matter at all | 2 | 0.7 |
| Not matter | 47 | 16.8 |
| Indecisive | 55 | 19.7 |
| Important | 175 | 62.8 |
| **Total** | 279 | 100.0 |

It was determined that the students' e-Health Literacy Scale total score average was 28.97±6.324. It was found that the total mean score of HPPBS was 76.34±10.02, the mean scores of sub-dimensions were Physical 28.81±4.534, Psychosocial 19.53±3.476, Protection 27.98±4.341 (Table 3).

**Table 3.** The mean scores of the e-HEALS, HPPBS and its sub-dimensions, and the distribution of the minimum-maximum values

| | **Mean** | **SD** | **Min.-Max.** |
|---|---|---|---|
| **e-HEALS Total** | 28.97 | 6.324 | 8-40 |
| **HPPBS Total** | 76.34 | 10.02 | 34-101 |
| **Physically** | 28.81 | 4.534 | 14-43 |
| **Psychosocial** | 19.53 | 3.476 | 9-30 |
| **Protection** | 27.98 | 4.341 | 11-38 |

**e-HEALS:** e-Health Literacy Scale, **HPPBS:** Health Promotion and Protective Behaviors Scale, **SD:** Standard deviation

A positive and very weak significant correlation was found between the e-Health Literacy levels of the students and their Health Promotion and Protective Behaviors (r=0.196, p=0.001). As the level of e-Health Literacy increases, health promoting, and protective behaviors increase. It has been determined that there is a weak positive and very weak relationship between all sub-dimensions of the scale of health promoting and protective behaviors and e-Health Literacy (Table 4).

**Table 4.** The relationship between e-HEALS mean score and HPPBS and sub-dimension mean score

| | | | **e-HEALS Total** | **HPPBS Total** |
|---|---|---|---|---|
| **HPPBS Sub-Dimensions** | Physically | r | 0.072 | 0.766 |
| | | p | .232 | **.000** |
| | Psychosocial | r | 0.133 | 0.771 |
| | | p | **.026** | **.000** |
| | Protection | r | 0.276 | 0.748 |
| | | p | **.000** | **.000** |
| **e-HEALS Total** | | r | - | 0.196 |
| | | p | - | **.001** |

**e-HEALS:** e-Health Literacy Scale, **HPPBS:** Health Promotion and Protective Behaviors Scale

## DISCUSSION

Nursing students, who will be among the team that will ensure that the society and individuals have the right knowledge and guidance about healthy behaviors, should be able to apply the knowledge, attitudes and behaviors they have acquired after graduation, both in their own lives and share them with the society. In this study, a statistically significant difference was found between the age and place of residence of the students and the total score of HPPBS. In a study conducted with adolescents, the mean e-Health literacy score was similar according to age, gender, class and having a chronic disease, but no statistically significant difference was found. It has been determined that the average e-Health literacy score is high in those whose parents are university graduates and those with a sufficient monthly income (Ergün et al., 2019). In a study conducted on students in the faculty of health sciences, it was determined that the e-Health literacy levels of the students did not make a significant difference in terms of age, gender, year of computer use, and frequency of internet use (Yılmaz et al., 2020). In a study conducted on students studying in the health services department, it was determined that while there was no significant difference in age between the health promotion and protective scale scores of the students, there was a significant difference in gender and women scored higher than men (Kuloğlu et al., 2022). Our study is similar to the findings of the studies in the literature.

In this study, it was determined that almost half of the nursing students thought that the internet was useful in making decisions about their health, and that the majority of them thought that it was important to access health resources on the internet. In a study conducted on nursing students, it was stated that the majority of students thought it was important to access health-related resources (Sharma et al., 2010). In another study, nearly half of the participants stated that the internet is important/very important in accessing health resources (Ergün et al., 2019). Our study is similar to the findings of the studies in the literature, and it is thought that the internet has become an important factor in reaching health information, especially among young people.

In this study, it was determined that the total score average of the e-Health Literacy Scale and HPPBS of the nursing students was moderate, and that they got the highest score in the physical sub-dimension in the mean scores of the HPPBS sub-dimensions. In a study conducted with health science students, e-Health literacy scale scores were found to be moderate (Yılmaz et al., 2020). In a study conducted with health care students, it was determined that the mean score of HPPBS was moderate (Bostan et al., 2016). Our study is similar to the study findings in the literature, and it is thought that the reasons for the highest

score in the physical sub-dimension are due to the education life and lifestyle of nursing students.

In this study, a positive and very weak relationship was found between the e-Health Literacy levels of nursing students and their Health Promotion and Protective Behaviors. As the level of e-Health Literacy increases, health promoting, and protective behaviors increase. It has been determined that there is a weak positive and very weak relationship between all sub-dimensions of the scale of health promoting and protective behaviors and e-Health Literacy. In a study conducted with adolescents, a positive and significant relationship was found between e-Health literacy and healthy lifestyle Behavior (Eyimaya et al., 2021). In another study conducted with university students, a significant positive correlation was found between COVID-19-related prevention cognition, e-Health literacy, self-efficacy, and healthy lifestyle behaviors (Bao et al., 2021). In the literature, no study has been found on nursing students in this direction. It is thought that the reason why there is a weak and very weak positive relationship between all sub-dimensions of the scale of health promoting and protective behaviors and e-Health Literacy is due to the sample difference.

**Limitations of the Study:** Research findings are limited to nursing students studying at a state university for a certain period of time.

## CONCLUSION

In line with the findings in the study, the e-health literacy and health promoting, and protective behaviors of nursing students are moderate. As the level of e-health literacy increases, health promoting, and protective behaviors increase. In this direction, it is recommended that nursing students should include health literacy education in the pre-graduate education program on e-Health literacy, which is thought to be effective on almost the whole society in the future, and training programs on health-promoting behaviors should be carried out regularly.

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***Author Contributions:***

Research idea: EÖÇ, SSI, ZC

Design of the study: EÖÇ, SSI, ZC

Acquisition of data for the study: EÖÇ, SSI, ZC

Analysis of data for the study: EÖÇ, SSI

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Drafting the manuscript: EÖÇ, SSI, ZC

Revising it critically for important intellectual content: EÖÇ, SSI, ZC

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