

The Relationship between the Use of Information Technologies and Smartphone Addiction Levels with Digital Healthy Diet Literacy among Nursing Students

ABSTRACT

Background and Objectives: In today's digital era, the increasing integration of technology into daily life has significantly influenced health behaviors and literacy, particularly among university students in health-related fields such as nursing. The aim of this study is to investigate the relationship between the use of information technologies and smartphone addiction levels with digital healthy diet literacy among nursing students.

Materials and Methods: This descriptive study was conducted with 368 nursing students between January and May 2023. Data was collected using the Descriptive Information Form, the Information Technology Use Scale, the Smartphone Addiction Scale, and the Digital Healthy Diet Literacy Scale.

Results: The mean scores of these scales were 56.25 ± 8.85 , 32.14 ± 9.86 and 20.05 ± 10.51 respectively. There was a significant difference in the scores on the Scale of Utilization of Information Technologies by grade level ($p < 0.05$), with a significant difference between second and fourth graders ($p = .025$). A positive, very weak, significant correlation was found between the Scale of Utilization of Information Technologies and the Digital Healthy Diet Literacy Scale ($r = .161$, $p = .002$), and between the Smartphone Addiction Scale and the Digital Healthy Diet Literacy Scale ($r = .153$, $p = .003$). Multiple regression analysis indicated that both information technology use ($\beta = .135$, $p = .010$) and smartphone addiction ($\beta = .126$, $p = .017$) were weak but significant predictors of digital healthy diet literacy, although the overall model accounted for only 3.6% of the variance ($F(2, 365) = 7.81$, $p < .001$).

Conclusion: The study suggests that there are weak but significant relationships between levels of information technology use, smartphone addiction and digital healthy diet literacy that vary by grade level.

Paper Type: Research Article

Keywords: Diet, Digital Health, Information Technologies, Nursing Students, Smartphone Addiction.

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Introduction

Information technologies comprise all systems such as computers, phones, and tablets that are used for processing, storing, and using all kinds of data (1). The use of these technologies is of great importance in terms of everyone's accessibility to information. Information technologies developed with electronic and digital methods have become indispensable in the health field as in many fields today (2). It has been reported that using information technologies increases nurses' possibility of providing safer and more effective care (3). Nursing students thus actively use information technologies to access health information, communicate, record care plans, and support their professional development (4). Although computers are the most widely known technologies, smartphones have replaced computers in recent years due to the developments in operating systems, easy access to the internet, and portability (5). Moreover, smartphones have become tools that create virtual environments with digital identities on various social media networks, allow users to shop and manage their finances, serve as a guide for transportation, and provide access to all kinds of information and content at any time and place (6). Studies have consistently demonstrated a significant rise in both the prevalence and duration of smartphone use (7–9). However, the widespread and continuous use of smartphones poses potential addiction risks. Smartphone addiction is a type of addiction that harms users through excessive and uncontrolled smartphone use (9). According to the results of numerous studies, this addiction causes

physiological and psychological symptoms, deterioration in social relations, sleep problems, anxiety disorders, and many other complaints in individuals (7, 10). Recent studies indicate that 42–50% of nursing students show problematic smartphone use associated with sleep disturbances, decreased academic performance, and unhealthy eating behaviors (7, 9, 10). These consequences highlight the urgent need to understand the digital dietary behaviors of nursing students.

Despite their potential risks and negative impacts, when used consciously, smartphones provide unique conveniences for individuals in accessing health-related information. One significant convenience is digital healthy diet literacy, defined as the ability to access, understand, evaluate, and apply nutrition-related information obtained from digital platforms to support healthy dietary decisions (11, 12). Strengthening this literacy is critical for preventing exposure to misinformation and promoting healthy lifestyle behaviors among young adults. Access to accurate nutrition information has been identified as one of the most influential factors shaping individuals' dietary habits (11, 13). Moreover, smartphone addiction may also influence diet-related behaviors through continuous exposure to food-

Related digital content, increased use of food delivery applications, and reduced awareness of nutritional choices (14). While problematic smartphone use has been linked to unhealthy eating patterns, it may also facilitate access to nutrition information and self-monitoring tools (12). In this context, both information technology use and smartphone dependence may play a dual

role—either enabling or hindering individuals' ability to access, evaluate, and apply digital nutrition resources. Therefore, understanding how these digital behaviors interact with digital healthy diet literacy is essential, particularly for nursing students who are expected to guide individuals in making evidence-based dietary decisions in clinical practice. Taken together, information technology use may influence smartphone addiction patterns, and both behaviors may jointly shape students' digital healthy diet literacy by determining the extent to which they are exposed to, process, and utilize online nutrition information (15).

As future healthcare professionals, nursing students are expected to model healthy behaviors and provide evidence-based guidance to the patients under their care. Their level of digital healthy diet literacy can directly influence clinical decision-making and the quality of patient education. Therefore, understanding their competencies in accessing, interpreting, and critically evaluating online nutrition information is essential not only for their personal well-being but also for supporting their role in public health promotion.

Despite the widespread use of smartphones and information technologies among university students, limited research has examined how these behaviors are associated with digital healthy diet literacy specifically among nursing students (16–21). In Türkiye, this issue remains particularly underexplored, and the potential influence of family-related factors, such as the father's education and employment status, on students' digital competencies has not been clearly identified. This gap in the literature

highlights the need to evaluate both technological behaviors and digital healthy diet literacy within this group together.

Given the increasing digitalization of health information, the ability to access reliable digital nutrition content and use technology consciously may have significant implications for nursing students' professional development and future clinical practice. A better understanding of these relationships can guide the design of targeted educational strategies aimed at strengthening digital competencies and supporting healthier decision-making among nursing students. Therefore, this study aimed to investigate the relationship between the utilization of information technologies and smartphone addiction levels and digital healthy diet literacy among nursing students.

Materials and Methods

Design and Setting

This quantitative, cross-sectional, descriptive study was conducted between January and May 2023 with students of the Nursing Department of the Faculty of Health Sciences of a state university.

Sample

The population of the study consisted of 640 students receiving education in the Nursing Department Faculty of Health Sciences in a state university. A purposive sampling method was employed in the study. The sample consisted of 368 undergraduate nursing students who met the inclusion criteria and voluntarily agreed to participate. To be eligible, students were required to be 18 years of age or older, actively enrolled in the Nursing Department, able to use a smartphone and information technologies

(self-reported), and to have completed all data collection tools fully and accurately.

Data Collection

Data were collected face-to-face in the classroom environment, using a Descriptive Information Form, the Scale of Utilization of Information Technologies, the Smartphone Addiction Scale, and the Digital Healthy Diet Literacy Scale. The questionnaires were self-administered and completed under researcher supervision.

Study Instruments

Descriptive Information Form: The form consisted of 12 questions regarding the sociodemographic characteristics of the participants (8, 14).

Scale of Utilization of Information

Technologies: The scale was developed by Özmusul (2011) and includes 18 questions. The scale is rated on a 4-point Likert scale with responses ranging from never (1) to always (4). The scale consists of five subdimensions: acquiring information, research-examination, communication, game-entertainment, and self-expression. The lowest score obtainable from the scale is 18 and the highest score is 72. The higher the score on the scale, the higher the level of utilization of information technologies. The Cronbach alpha reliability coefficient of the scale was calculated as 0.85 (22). The scale has been widely used in studies conducted with nursing and health sciences students, demonstrating strong psychometric properties in this population. In the present study, the Cronbach alpha coefficient was found to be 0.93, indicating excellent internal consistency for nursing students.

Smartphone Addiction Scale-Short Form (SAS-SF): SAS was developed by Kwon et al.

(2013) as a 33-question scale to assess smartphone addiction. (23) However, a 10-question short form was developed later. The 10-question short form of the scale was used in this study. The Turkish validity and reliability study of SAS-SF was conducted by Noyan et al. in 2013. The scale consists of 10 items and is rated on a six-point Likert-type scale. As the score on the test increases, the risk for addiction is considered to increase. The scale has a single factor and no subscales. The Cronbach alpha reliability coefficient of the Turkish version of SAS-SF was calculated as 0.86 (24). Previous studies with nursing students have confirmed the validity and reliability of the SAS-SF in assessing problematic smartphone use in this population. In this study, the Cronbach alpha value was 0.89, supporting its strong internal consistency among nursing students.

Digital Healthy Diet Literacy Scale: The scale was developed by Duong et al. (2020). The validity and reliability of the scale in Türkiye was conducted by Karahan Yılmaz and Eskici (2021). (11, 12) It consists of 4 items with 4 Likert-type response options ranging from 1 (very difficult) to 4 (very easy). The formula, $\text{Index} = (\text{Mean}-1) \times 50/3$, is used in the evaluation of the scale. The index value calculated with the formula ranges from 0 to 50 and higher scores indicate better healthy diet literacy. The Cronbach alpha reliability coefficient of the scale was determined as 0.78 (11). The scale has also been validated in young adult and university student groups, including healthcare and nursing students. In the current sample, the Cronbach alpha coefficient was 0.85, indicating good reliability for this population.

All instruments demonstrated high internal consistency in nursing students, confirming their suitability for use in this study population.

Data Analysis

The statistical analyses were conducted using IBM SPSS Statistics version 25. A significance level of $p < .05$ was adopted. Normality was assessed based on skewness and kurtosis values. Independent samples t-tests, one-way ANOVA, and Kruskal–Wallis tests were used to compare group differences. Additionally, Pearson correlation analysis was applied to examine associations between variables, and multiple linear regression analysis was performed to identify the predictive roles of information technology use and smartphone addiction on digital healthy diet literacy.

The dependent variables were the mean scores of the Information Technology Use Scale, the Smartphone Addiction Scale, and the Digital Healthy Diet Literacy Scale. The independent variables included sex, year of study, and parents' education and employment status.

Ethical Considerations

The necessary permissions were taken from the Clinical Research Ethics Committee of Harran University (dated 01/09/2023 and numbered 2023/01/15), the relevant institution, the participants, and the scales' authors.

Results

Of the students who participated in the study, 76.9% were female and 32.9% were third graders. The mothers of 35.9% of the students were illiterate and 91% were unemployed. Of their fathers, 34% were primary school graduates and 69% were

employed. In the study, the mean scores of the students on the Scale of Utilization of Information Technologies, Smartphone Addiction Scale, and Digital Healthy Diet Literacy Scale were 56.25 ± 8.85 , 32.14 ± 9.86 , and 20.05 ± 10.51 , respectively.

There was no significant difference between the mean scores on the Scale of Utilization of Information Technologies, Smartphone Addiction Scale, and Digital Healthy Diet Literacy Scale according to students' sex, education level, and mother's employment status ($p > 0.05$) (Table 1).

There was a significant difference between the mean scores on the Scale of Utilization of Information Technologies according to the students' grade ($p < 0.05$). As a result of the Tukey analysis, there was a significant difference between the second grade and the fourth grade ($p = .025$) and the difference originated from the fourth grade. There was no significant difference between the students' grades and the mean scores on SAS-SF and the Digital Healthy Diet Literacy Scale ($p > 0.05$) (Table 1).

There was a significant difference between the mean score on the Scale of Utilization of Information Technologies according to the father's education level ($p < 0.05$), while there was no significant difference between the mean scores on SAS-SF and the Digital Healthy Diet Literacy Scale ($p > 0.05$) (Table 1).

There was a significant difference between the mean score on the Scale of Utilization of Information Technologies and the Digital Healthy Diet Literacy Scale according to the employment status of the fathers ($p < 0.05$). However, there was no significant difference between the mean SAS-SF scores of the

students according to the employment status of their fathers ($p>0.05$) (Table 1).

There was a positive, very weak, significant correlation between students' mean scores on the Scale of Utilization of Information Technologies and the Digital Healthy Diet

Literacy Scale ($r=.161$, $p=.002$). There was a positive, very weak, significant correlation between the mean scores of the students on SAS-SF and the Digital Healthy Diet Literacy Scale ($r=.153$, $p=.003$) (Table 2).

Table 1. Distribution of Mean Scores of Utilisation of Information Technologies Scale, Smartphone Addiction Scale and Digital Healthy Diet Literacy Scale According to Some Characteristics of Students

Variables	Scales		
	Utilisation of Information Technologies Scale	Smartphone Addiction Scale	Digital Healthy Diet Literacy Scale
Gender	$\bar{X} \pm SS$	$\bar{X} \pm SS$	$\bar{X} \pm SS$
Female	56.31±8.53	31.96±9.93	25.25±10.30
Male	56.05±9.91	32.74±9.64	24.41±11.24
Test Value	$t= .233$ $p= .816$	$t= -.633$ $p= .527$	$t= .644$ $p= .520$
Classroom			
1st Class	55.04±8.27	30.60±9.09	23.46±11.86
2 st Class	54.33±7.43	32.47±8.21	24.08±8.04
3 st Class	56.19±10.20	33.61±10.29	25.61±11.05
4 st Class	58.14±8.12	31.28±10.57	25.95±10.40
Test Value	$F= 3.264$ $p= 0.022$	$F= 1.751$ $p= 0.156$	$F= 1.084$ $p= 0.356$
Mother's Education Status			
Illiterate	54.97±8.75	32.17±9.83	24.62±10.10
Literate	54.61±8.49	32.75±9.95	24.62±10.19
Primary School	57.21±8.05	32.45±8.84	25.04±11.52
Middle School	58.77±10.25	32.08±10.25	24.30±11.67
High School and above	57.21±9.28	31.18±11.32	26.80±9.31
Test Value	$F= 2.288$ $p= 0.060$	$F= 0.207$ $p= 0.934$	$F= 0.533$ $p= 0.711$
Mother's Employment Status			
Yes	57.06±8.45	32.60±9.34	27.90±8.16
No	56.47±8.87	32.10±9.92	24.77±10.69
Test Value	$t= -1.495$ $p= 0.136$	$t= 0.280$ $p= 0.780$	$t= 1.634$ $p= 0.103$
Father's Education Status			
Illiterate	56.72±9.50	31.27±10.20	24.24±9.46
Literate	55.85±8.53	30.79±8.74	26.47±9.88
Primary School	54.36±7.80	32.85±9.89	23.86±9.55
Middle School	56.68±8.75	30.94±9.73	23.75±11.53
High School and above	58.00±9.68	32.63±10.20	26.79±10.91
Test Value	$K-W= 9.872$ $p= 0.043$	$K-W= 2.775$ $p= 0.596$	$K-W= 5.759$ $p= 0.218$
Father's Employment Status			
Yes	56.55±8.84	32.37±9.94	24.85±10.39
No	55.58±8.89	31.63±9.68	25.51±10.82
Test Value	$t= -3.246$ $p= 0.001$	$t= 0.171$ $p= 0.864$	$t= -2.237$ $p= 0.026$

Table 2. Correlation of the mean scores of students' Utilisation of Information Technologies Scale, Smartphone Addiction Scale and Digital Healthy Diet Literacy Scale

Scales	Digital Healthy Diet Literacy Scale	
	r	p
Utilisation of Information Technologies Scale	0.161	0.002
Smartphone Addiction Scale	0.153	0.003

The multiple linear regression analysis conducted to predict students' digital healthy diet literacy levels showed that the overall model was statistically significant, $F(2,365) = 7.810$, $p < .001$. The model explained 3.6% of the total variance in digital healthy diet literacy scores ($R^2 = .036$) (Table 3). When the independent variables were examined, it was

found that the level of information technology use was a positive and significant predictor of digital healthy diet literacy ($\beta = .135$, $p = .010$). Similarly, smartphone addiction was also identified as a positive and significant predictor of digital healthy diet literacy ($\beta = .126$, $p = .017$) (Table 3).

Table 3. Multiple Regression Analysis Results on the Prediction of Digital Healthy Diet Literacy by Using Information Technologies and Smartphone Addiction

Independent Variable	Dependent Variable	B	SE	(β)	t	p
Constant	Digital Healthy Diet Literacy	11.68	3.63		3.21	0.001
Use of Information Technologies		0.161	0.062	0.135	2.58	0.010
Smartphone Addiction		0.134	0.056	0.126	2.40	0.017

$R^2: 0.036$ $F: 7.810$ $p: 0.000$

Discussion

This study aimed to examine investigate the relationship between the utilization of information technologies and smartphone addiction levels and digital healthy diet literacy among nursing students. Although statistically significant, the correlations identified between digital healthy diet literacy and both information technology use and smartphone addiction were very weak. This indicates that while digital engagement is common among students, its practical impact on their ability to access, evaluate, and apply online nutrition information remains minimal. Therefore, these findings should be interpreted as statistically detectable but not educationally or clinically meaningful associations.

One of the primary findings of the study was that fourth-year students had significantly higher levels of information technology utilization compared to lower grade levels. This is consistent with earlier research reporting that technology use increases as students advance in their academic programs and become more aware of professional expectations and academic needs (1, 25). Previous studies have similarly shown that senior students adopt information technologies more effectively for assignments, clinical skill development, and professional tasks (1, 26) in the present study, the increased technology use among fourth-year students may be attributed to graduation requirements, intensified academic workload, and greater engagement

with digital resources during clinical preparation.

This study also revealed that paternal education level was associated with differences in students' information technology utilization. Students whose fathers had at least a high school education demonstrated higher IT use, supporting prior evidence suggesting that parents' educational background particularly that of the father, plays a critical role in digital access, guidance, and technology-supported learning activities within the household (27–29). Higher paternal education is often associated with increased digital resources at home and more structured support for academic technology use (29). Similarly, the finding that students whose fathers were employed had higher IT utilization aligns with research showing that parental employment may increase household financial and technological resources, enabling better access to digital devices and internet infrastructure (28–30). In contrast, the observation that students with unemployed fathers showed higher digital healthy diet literacy may indicate complex socioeconomic influences on dietary information-seeking behaviors. As highlighted in the literature, parental employment status can shape family nutrition culture, time spent at home, and health information–related interactions in ways that may not always align with financial indicators alone (31).

Regarding the relationship between information technology utilization and digital healthy diet literacy, the positive association—although weak—suggests that students who use technology more frequently may have greater opportunities to

encounter nutrition-related content. However, as emphasized in previous studies, technology access alone is insufficient for improving digital diet literacy unless accompanied by skills in evaluating credibility, identifying misinformation, and interpreting online content accurately (15,16). The weak correlation found here may reflect that nursing students primarily use digital technologies for entertainment and social communication rather than for evidence-based information seeking, thereby limiting their digital literacy development.

Similarly, the weak positive association between smartphone addiction and digital healthy diet literacy warrants careful interpretation. Smartphones offer constant access to health information, self-monitoring tools, and digital nutrition content, which may explain the slight increase in literacy scores among high-frequency users (14). However, this does not indicate that addictive smartphone use is beneficial. Instead, individuals with higher smartphone engagement may unintentionally encounter more nutrition content, even while engaging in non-academic activities. The regression analysis further showed that the overall predictive power of information technology utilization and smartphone addiction was very low ($R^2 = .036$), consistent with prior findings that digital health literacy is influenced more strongly by cognitive, motivational, and socioeconomic factors (17).

Notably, the literature includes contradictory findings regarding the influence of smartphone use on health outcomes. While increased smartphone use may facilitate exposure to nutrition resources, studies also indicate that problematic

smartphone use can reduce critical thinking, increase susceptibility to misinformation, and impair overall health literacy (18–21, 26, 28, 29). These diverging results suggest a dual-effect mechanism, in which smartphones may either enhance or hinder digital healthy diet literacy depending on the purpose of use, digital competencies, and ability to evaluate online sources. Thus, the present findings underscore that the quality—not simply the quantity—of technology and smartphone use determines whether digital engagement contributes to healthier dietary awareness.

Overall, although the study identified several statistically significant relationships, the weak effect sizes highlight the need for targeted educational interventions that emphasize critical digital appraisal skills, responsible technology use, and evidence-based nutrition knowledge. Future research should employ longitudinal or mixed-method designs and incorporate additional explanatory variables such as digital media literacy, motivation, nutrition knowledge, and home digital environment to better clarify the pathways influencing digital healthy diet literacy among nursing students.

Study Limitations and Strengths: This study has several limitations that should be considered when interpreting the results. First, the research was conducted with nursing students from a single institution using a convenience sampling method, which may restrict the generalizability of the findings to wider student populations. Second, all data were collected through self-reported instruments, which may lead to recall bias and socially desirable responses. Third, the cross-sectional design does not allow for causal inferences regarding the

relationship between information technology use, smartphone addiction, and digital healthy diet literacy. Fourth, although validated scales were used, participants' interpretations of digital dietary information may vary depending on their digital experience and personal health beliefs. Lastly, the regression model explained only a small proportion of the variance in digital healthy diet literacy, suggesting that additional psychological, social, and environmental factors not examined in this study may also play an important role. Future studies with longitudinal or mixed-method designs and diverse samples are recommended to gain deeper insights into the determinants of digital nutrition literacy.

Conclusions

This study found that both information technology use and smartphone addiction were statistically significant but very weak predictors of digital healthy diet literacy among nursing students, indicating that increased digital engagement does not necessarily translate into meaningful or functional improvements in students' ability to critically evaluate nutrition information. The associations observed between paternal education, paternal employment, and students' technological behaviors suggest that household digital resources and parental guidance may influence students' exposure to and use of online information. However, given the convenience sampling, self-reported measures, and limited variance explained by the regression model, these findings should be interpreted with caution. Additional unmeasured factors—such as digital media literacy, motivation, prior nutrition knowledge, and socioeconomic

conditions—likely play a more substantial role in shaping digital healthy diet literacy.

To enhance nursing students' competencies, it is essential to integrate structured and targeted digital nutrition literacy education into nursing curricula, with emphasis on evaluating the credibility of online nutrition information, identifying misinformation, and distinguishing between evidence-based and misleading digital content. Short, practical learning activities—such as simulation-based online searches, guided app evaluations, and brief workshops—can help students differentiate functional smartphone use from addictive or passive use that undermines critical thinking. Students with limited digital support at home may benefit from additional orientation on responsible technology use and access to reliable digital nutrition resources. Future research should incorporate longitudinal or mixed-methods designs and assess broader explanatory variables, including digital media literacy, motivation, and environmental factors, to better clarify the mechanisms influencing digital healthy diet literacy.

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