JECH
Journal of Education and Community Health
J Educ Community Health, 2024; 11(4):190-197. doi:10.34172/jech.3022
http://jech.umsha.ac.ir

Original Article

The Relationship Between E-Health Literacy and Lifestyle Dimensions in Women Attending Health Centers in Mashhad, Iran

Fatemeh Goldani Moghaddam[1,2], Nasrin Talkhi[3], Nooshin Peyman[4,5*]

[1]Department of Health Education and Health Promotion, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran
[2]Student Research Committee, Mashhad University of Medical Sciences, Mashhad, Iran
[3]Department of Biostatistics, School of Allied Medical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[4]Department of Health Promotion and Education, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran
[5]Social Determinants of Health Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

Article history:
Received: June 16, 2024
Revised: August 27, 2024
Accepted: September 26, 2024
ePublished: December 31, 2024

***Corresponding author:**
Nooshin Peyman,
Email: peymann@mums.ac.ir

Abstract

Background: With increasing access to the internet and social networks, women are recognized as active users in this space, and this can have a profound impact on their lives. Therefore, the present study aimed to determine the relationship between lifestyle and e-health literacy in women attending health centers in Mashhad for usual care.

Methods: The present cross-sectional study was conducted on 322 women receiving usual care at health centers in Mashhad in 2023. The participants were selected using proportional stratified sampling method. The required data were collected using standard questionnaires on lifestyle and electronic health literacy. The data were analyzed using chi-square, Kruskal-Wallis, and Spearman's correlation coefficient tests in SPSS version 25.0. The significance level was set at 0.05.

Results: The mean age of the participants was 35.74 ± 11.11 years. The mean lifestyle score was 150.51 ± 25.53 (in the range of 61-210) and the mean score of electronic health literacy was 24.72 ± 7.62 (in the range of 8-40). Statistically significant correlations were found between e-health literacy and psychological health ($P=0.006$), social health ($P=0.005$), drug abuse avoidance ($P=0.02$), accident prevention ($P=0.001$), and environmental health ($P=0.001$). Among lifestyle dimensions, the weight control and nutrition dimension were related to e-health literacy as a protective effect. Additionally, the two factors of drug avoidance and environmental health acted as the risk factors of e-health literacy.

Conclusion: A statistically significant relationship was found between women's e-health literacy and mean scores of lifestyle dimensions (psychological health, social health, drug avoidance, accident prevention, and environmental health). E-health literacy plays an important role in promoting a healthy lifestyle among women by providing easy access to health information as well as education based on modern technologies. The development of educational programs based on electronic technologies can help improve women's health and quality of life.

Keywords: E-health literacy, Healthcare centers, Lifestyle, Mashhad, Women

Please cite this article as follows: Goldani Moghaddam F, Talkhi N, Peyman N. The relationship between e-health literacy and lifestyle dimensions in women attending health centers in Mashhad, Iran. J Educ Community Health. 2024; 11(4):190-197. doi:10.34172/jech.3022

Introduction

Improving community health depends on acknowledging women's vital role in raising children, as they are essential for society's future. Ignoring women's health may result in failed health initiatives. Therefore, prioritizing women's health, especially their lifestyle, is crucial for effective community health improvement (1).

Lifestyle is defined as the daily activities willingly done in life. This concept is a regular part of one's daily life and can seriously affect one's health (2). Thus, inappropriate lifestyle is an influential cause of chronic diseases. In this regard, the World Health Organization (WHO) stated at the first global healthy lifestyle conference in Moscow (2011) that unhealthy lifestyle behaviors account for 60% of global deaths and 80% of deaths in developing countries. Moreover, the WHO stated that the resultant global mortality rate will reach 75% by 2030 (3).

Previous studies showed that 90% of type 2 diabetes,

80% of cardiovascular diseases, and one-third of cancers can be prevented by changing lifestyle (4).

In this regard, a key point to adopt preventive behaviors is people's level of health literacy (5). Health literacy is defined as having knowledge, motivation, and the ability to access, understand, value, and use health data to empower people. It is also defined as having the power to make decisions in daily life, maintain and improve quality of life, and prevent various diseases (5).

The findings of several studies conducted on women in different parts of the world showed that their health literacy status was at an average and insufficient level (6,7). The results of some studies conducted in Iran showed that most Iranian women have an average to low level of health literacy (8-10).

Electronic health literacy, as a subset of the concept of health literacy, is effective in shaping people's health behaviors (11). Therefore, there seems to be a development in the concept of traditional health literacy to electronic health literacy (one's ability to search, find, understand, and evaluate health information from electronic sources and apply this knowledge to address or solve a health problem) (11,12).

Today, due to the vast expansion of information, the world around us is moving towards the use of media to shape and change the thoughts and behaviors of the audience in all domains (13). Additionally, with the development of these media and communication technology, a significant part of health-related information is accessed through the internet (11).

Moreover, the virtual space is among the most basic factors of socialization that affects women's health behaviors today. In this regard, some studies showed that women spend 50-80% of their waking hours on these media (14). In general, most people do not pay attention to the quality of information provided by media or get confused while searching (14). Given that the endless information available on the internet may be inaccurate or unreliable, it is necessary to improve one's ability to understand and use the health information available on the internet (5). The results of a systematic research showed that e-health literacy in patients with cancer is relatively low and needs to be improved (15). Studies show that people with a high level of e-health literacy use more effective online search strategies to find high-quality health information (16).

In general, differences in e-health literacy levels across countries and regions pose significant challenges to healthcare professionals and online content creators (17). Therefore, health policymakers can assess e-health literacy to empower individuals. When developing plans and policies, the most effective methods should be used to empower people regarding health issues presented in the media (14).

Although many studies in different parts of the world have explored the relationship between e-health literacy and health-related behaviors (11), no study has explored the relationship between lifestyle and e-health literacy in Iranian women so far. No studies have evaluated influential individuals who shape family members' views and actions. However, it is valuable to examine women's lifestyle as a "culture-forming" factor that transmits values, beliefs, and behaviors across generations (1). Electronic health literacy enhances the ability to recognize, critique, and distinguish information from various digital media sources (13). Considering that women spend a considerable portion of their time in the virtual world, this issue requires special attention. Therefore, the present study was conducted to determine the relationship between lifestyle and e-health literacy in women receiving services from healthcare centers in Mashhad.

Materials and Methods

The present cross-sectional descriptive-analytic study was carried out on women visiting health centers in Mashhad in 2023. Healthcare centers are among the most important sectors in Iran's health system, providing preventive, care, and treatment services and improving the quality of life of different groups, including mothers, children, the elderly, and so on.

In this study, the city of Mashhad was divided into 5 geographical regions or classes. Then, according to the population density of the areas, two centers were randomly selected from two of the densely populated areas and one center from the rest. Finally, a total of 7 centers were selected randomly. Next, using the information available in the Sib system, 38 people from each center were selected randomly, and after checking the inclusion criteria, they were included in the study.

The inclusion criteria were: married women visiting health centers to receive services, residence in Mashhad, access to the internet, computer, laptop, and smartphone and the ability to use them, and giving an informed consent to take part in the study. Incomplete questionnaires were excluded from the study.

The required sample size (3) was estimated at 38, with a 95% confidence interval, a test power of 80%, and a minimum correlation coefficient of 0.22 using the following formula. Seven health centers were considered as clusters; therefore, 38 cases were selected from each cluster and a total number of 266 cases were considered as the required sample for this research. With a 20% dropout due to incomplete questionnaires, the sample size was estimated at 322.

$$w=\frac{1}{2}Ln\frac{1+r}{1-r}\quad n=\frac{(z_{1-\alpha/2}+z_{1-\beta})^2}{w}+3\Rightarrow\quad n=\frac{2(z_{1-\alpha/2}+z_{1-\beta})^2}{Ln\frac{1+r}{1-r}}+3$$

Data Collection Instruments

Demographic Information Questionnaire (12 questions): The information included age, marital status, number of children (daughters and sons), current pregnancy, education level, husband's education level, occupation, husband's occupation, family income, and family size.

Lifestyle Questionnaire: In 2012, Lali et al (18) used factor analysis to substantiate the construct validity of the lifestyle questionnaire as a multi-dimensional instrument to measure lifestyle. The results of the factor analysis showed that the lifestyle questionnaire covered 10 dimensions, including physical health, exercise and wellness, weight control and nutrition, disease prevention, psychological health, spiritual health, social health, avoiding drugs and alcohol, accident prevention, and environmental health. In addition, the reliability of the questionnaire was confirmed, with the Cronbach's alpha coefficient of 0.87 (physical health: 0.89, exercise and wellness: 0.87, weight control and nutrition: 0.85, disease prevention: 0.87, psychological health: 0.88, spiritual health: 0.84, social health: 0.82, avoiding drugs: 0.79, accident prevention: 0.85, and environmental health: 0.76. This questionnaire contains 70 questions (e.g., I try to keep my body healthy and fit) and it aims to evaluate different dimensions of lifestyles (physical health with 7 questions, exercise and health with 7 questions, weight control and nutrition with 7 questions, disease prevention with 7 questions, psychological health with 7 questions, spiritual health with 7 questions, social health with 7 questions, drug avoidance with 6 questions, accident prevention with 8 questions, and environmental health with 7 questions). The items are rated on a 4-point Likert scale (never: 0, sometimes: 1, usually: 2, and always: 3). Therefore, the lowest lifestyle score in this 70-item questionnaire is 0 and the highest is 210. Finally, a score between 0 and 70 means poor healthy lifestyle. A score between 70 and 105 means moderate healthy lifestyle and a score above 105 implies strong healthy lifestyle.

E-health Literacy Questionnaire: In this study, the standard electronic health literacy questionnaire (eHEALS) was used. Bazm et al (19) tested the validity and reliability of the Iranian version of the electronic health literacy questionnaire in a study. The results showed that the factor loading of the items was favorable (from 0.723 to 0.862). Moreover, the scale demonstrated adequate internal consistency, with a Cronbach's alpha coefficient of 0.88, and the test-retest reliability for the items was high, indicated by a correlation coefficient of 0.96 ($P<0.001$). This questionnaire contains 8 questions (e.g., "I can distinguish high- and low-quality e-health resources"), all rated on a 5-point Likert scale (from very little to very much). For each item, the lowest score is 1 and the highest score is 5. To calculate the overall score of the questionnaire, the total points related to each question are added together, and for this reason, the lowest e-health literacy score is 8 and the highest is 40. Higher overall scores indicate higher health literacy and vice versa. A score of 32 or higher indicates a high level of e-health literacy.

Statistical Analysis

The collected data were entered into the SPSS software version 25.0 for coding and analysis. Mean and standard deviation were used to describe interval variables. Frequency and percentage were used as descriptive statistics. In inferential statistics, the normality of distribution was checked using the Kolmogorov-Smirnov test (using Force-Correction analysis method). Then, Kruskal-Wallis, chi-square, and Pearson correlation coefficient tests were used. Phi coefficient was used to check the strength of the relationship. The logistic regression and multivariate regression analysis were used to study the association between e-health literacy and lifestyle quality adjusting demographic characteristics. An exploratory regression analysis was used. The desired variable was kept in the model and other variables were removed from the model in the order of the largest P value until all the variables in the model were statistically significant. In all cases, a significance level of 0.05 was considered.

Results

The present study investigated 322 women visiting the health centers of Mashhad city from April to June 2023. The mean age of the participants was 35.74 ± 11.11. Most women were married (93.2%), had an education level below diploma (52.5%), and were housewives (62.7%).

The mean lifestyle score was 150.51 ± 25.53 —in the range of 61-210; low: 1 (0.3%), average: 8 (2.5%), and high: 313 (97.2%)—and the mean score of e-health literacy was 24.72 ± 7.62 (in the range of 8-40; low: 23.08 ± 6.50 and high: 36.97 ± 2.41).

Based on the findings of the present study, 38 participants (11.8%) had a high level of e-health literacy and 284 participants (88.2%) had a low level of literacy. There was a significant relationship between lifestyle variables and marital status ($P=0.007$ and Phi = 0.2), husband's occupation ($P<0.001$ and Phi = 0.38), and family income ($P=0.04$ and Phi = 0.22). Additionally, e-health literacy was significantly correlated with level of education ($P=0.006$ and Phi = 0.15) and husband's occupation ($P=0.03$ and Phi = 0.18). Further details are provided in Table 1.

The findings summarized in Table 2 show statistically significant relationships between e-health literacy and psychological health ($P=0.006$), social health ($P=0.005$), drug avoidance ($P=0.02$), accident prevention ($P=0.001$), and environmental health ($P=0.001$) as the dimensions of lifestyle.

The results of logistic regression analysis in Table 2 showed that the weight and nutrition control were associated with e-health literacy as a protective effect ($P=0.023$, OR = 0.883). Two factors, drug avoidance ($P=0.049$, OR = 1.200) and environmental health ($P=0.026$, OR = 1.205), were risk factors for e-health literacy.

The results of multivariate regression analysis in Table 3 revealed that e-health literacy was associated with psychological health, social health, drug avoidance, prevention of events, and environmental health with P values (eta effect size) of 0.030 (0.015), 0.003 (0.028), 0.009 (0.022), 0.005 (0.025), and 0.007 (0.024), respectively.

Table 1. Demographic Information of Iranian Women Visiting Health Centers in Mashhad in 2023 (N=322)

Variable		LSQ		E-Health Literacy			*P*-value[a] (Phi)	*P*-value[b] (Phi)
		Low	Average	High	Low	High		
Marital status	Married	1(0.3)	5(1.6)	294(91.3)	263(81.7)	37(11.5)	0.007(0.2)	0.44
	Divorced	0(0)	1(0.3)	10(3.1)	10(3.1)	1(0.3)		
	Widowed	0(0)	2(0.6)	9(2.8)	11(3.4)	0(0)		
Current pregnancy	Yes	0(0)	2(0.6)	53(16.5)	54(16.8)	1(0.3)	0.75	0.75
	No	1(0.3)	6(1.9)	260(80.7)	230(71.4)	37(11.5)		
Level of education	Diploma or lower degree	1(0.3)	4(1.2)	164(50.9)	157(48.8)	12(3.7)	0.62	0.006(0.15)
	University degree	0(0)	4(1.2)	149(46.3)	127(39.4)	26(8.1)		
Husband's level of education	Diploma or lower degree	1(0.3)	4(1.2)	172(53.4)	161(50)	16(5)	0.63	0.09
	University degree	0(0)	4(1.2)	141(43.8)	123(38.2)	22(6.8)		
Occupation	Housewife	1(0.3)	4(1.2)	197(61.2)	183(56.8)	4(1.2)	0.80	0.057
	Office work	0(0)	2(0.6)	75(23.3)	62(19.3)	15(4.7)		
	Freelance	0(0)	2(0.6)	41(12.7)	39(12.1)	4(1.2)		
Husband's occupation	Unemployed	1(0.3)	0(0)	6(1.9)	5(1.6)	2(0.6)	<0.001 (0.38)	0.03(0.18)
	Office work	0(0)	3(0.9)	97(30.1)	81(25.2)	19(5.9)		
	Freelance	0(0)	4(1.2)	177(55)	167(51.9)	14(4.3)		
	Manual work	0(0)	0(0)	20 (6.2)	19(5.9)	1(0.3)		
	Retired	0(0)	1(0.3)	13(4)	12(3.7)	2(0.6)		
Income	≤3 million	1(0.3)	0(0)	21(6.5)	20(6.2)	2(0.6)	0.04(0.22)	0.059
	3-5 million	0(0)	2(0.6)	49(15.2)	49(15.2)	2(0.6)		
	5-7 million	0(0)	2(0.6)	55(17.1)	54(16.8)	3(0.9)		
	7-10 million	0(0)	1(0.3)	95(29.5)	80(24.8)	16(5)		
	>10 million	0(0)	3(0.9)	93(28.9)	81(25.2)	15(4.7)		
Age (years)		33±0*	39.88±8.38	35.65±11.18	35.56±11.21	37.13±10.36	0.40	0.30
Family size		5±0 *	3.75±1.03	3.72±1.21	3.68±1.22	4.03±1.02	0.44	0.06
Number of daughters		2±0 *	1.38±1.18	1.07±1.04	1.05±1.04	1.34±1.02	0.41	0.06
Number of sons		1±0*	1.13±1.64	0.83±0.88	0.83±0.90	0.84±0.97	0.90	0.88

The data are reported as N (10%) and mean±standard deviation (SD).
Chi-square, Kruskal-Wallis, Mann-Whitney U, and Wilcoxon tests were used.
[a] Relationship between LSQ and demographic variables; [b] Relationship between e-health literacy and demographic characteristics.
* Not enough observations to estimate SD.

Table 2. The Relationship Between E-Health Literacy and Lifestyle Dimensions Using Logistic Regression Analysis

Variable		E-Health Literacy		*P* Value[a]	*P* Value[b]	OR (95% Confidence Interval)
		High	Low			
LSQ	Physical health	4.16±15.42	3.72±14.67	0.12	0.28	0.94 (0.85, 1.04)
	Physical activity and fitness	5.10±11.56	4.95±10.01	0.06	0.98	0.99 (0.92, 1.08)
	Weight and nutrition control	3.55±13.89	4.22±13.63	0.56	0.02	0.88 (0.79, 0.98)
	Prevention of diseases	2.89±17.81	2.94±17.06	0.12	0.45	0.94 (0.80, 1.10)
	Psychological health	3.94±16.42	4.00±14.79	0.006	0.21	1.06(0.96, 1.18)
	Spiritual health	3.18±17.81	3.39±14.16	0.08	0.81	0.98(0.87, 1.11)
	Social health	3.18±17.81	3.90±15.94	0.005	0.09	1.10(0.98, 1.24)
	Drug avoidance	1.90±14.68	2.91±13.58	0.02	0.04	1.20(1.00, 1.43)
	Prevention of events	3.95±20.50	4.34±18.14	0.001	0.43	1.04(0.93, 1.16)
	Environmental health	2.62±18.57	2.93±16.98	0.001	0.026	1.20(1.02, 1.42)

[a] Mann-Whitney U test; [b] Logistic regression analysis LSQ dimensions on e-Health; OR: odds ratio; CI: confidence interval

Table 3. The Relationship Between Lifestyle Dimensions and e-Health Literacy Using Multivariate Regression Analysis

Dependent Variable	Independent Variable	Coefficient	*P* Value	95% Confidence Interval	Partial Eta Squared
Physical health	e-Health literacy	-0.73	0.25	(-2.002, 0.52)	0.004
Physical activity and fitness	e-Health literacy	-1.52	0.08	(-3.25, 0.21)	0.01
Weight and nutrition control	e-Health literacy	-0.19	0.77	(-1.54, 1.15)	<0.001
Prevention of diseases	e-Health literacy	-0.59	0.23	(-1.56, 0.38)	0.005
Psychological health	e-Health literacy	-1.53	0.03	(-2.91, -0.15)	0.01
Spiritual health	e-Health literacy	-0.68	0.26	(-1.88, 0.51)	0.004
Social health	e-Health literacy	-2.02	0.003	(-3.34, -0.692)	0.02
Drug avoidance	e-Health literacy	-1.26	0.009	(-2.21, -0.31)	0.02
Prevention of events	e-Health literacy	-2.12	0.005	(-3.60, -0.64)	0.02
Environmental health	e-Health literacy	-1.41	0.007	(-2.42, -0.39)	0.02

Discussion

The present study aimed to determine the relationship between lifestyle and e-health literacy in women receiving services from healthcare centers in Mashhad.

The results of the present study showed a low level of e-health literacy in women. Similarly, Rasouli et al showed that the level of e-health literacy in patients (adults at or above 18 years) visiting military hospitals was low (20). In another study, Shiferaw et al found that e-health literacy was relatively low in chronically ill patients. The findings of a systematic research showed that in 7 out of 9 studies that used the same eHeals tool, e-health literacy was not high in patients with cancer and still needed to be improved (15). However, in the study conducted by Demir et al in Samsun, pregnant women had a moderate level of e-health literacy (21). Moreover, George et al showed that most black women in the United States had a high level of health literacy (22). The results of another study conducted on Saudi women in Riyadh showed a high level of e-health literacy (12). Additionally, a study conducted on 400 patients visiting health care centers of Shahid Beheshti University of Medical Sciences (Tehran) showed that the e-health literacy level of the participants was higher than average. Arguably, most participants had academic degrees and were aware of the benefits of using the internet; thus, the results were predictable. Therefore, to educate and disseminate health information, considering the capacity of society, more emphasis can be placed on e-health literacy (23). This finding contradicts the current results. Today, despite the growing trend of technology around the world and the excessive use of these technologies by some, there is an urgent need to improve people's electronic health literacy to obtain correct and valid information from false and invalid content in social networks, media, and other platforms of virtual space. To this end, by preparing and designing specific websites for people with different social and economic situations, easy access to reliable information can be provided. Considering that the majority of people have access to smartphones, this device can be used to transmit reliable information by launching appropriate applications.

In addition, the current study showed a significant relationship between lifestyle dimensions, marital status, husband's occupation, and family income. Some studies conducted on women of reproductive age living in the southeast of Iran showed that occupation, husband's education, pregnancy interval, ethnicity, and the head of household are among the factors affecting one's lifestyle and can directly predict the lifestyle (24). Mohsenian et al also showed that family income is the main factor related to health-enhancing lifestyle (25). This study showed that people's better access to health services, which ultimately leads to better health performance, was due to their higher economic status (25). In another study, a significant relationship was found between health-promoting behaviors and the economic status of the elderly (26). These findings confirm the results of the present study. Estebsari et al also found that some demographic information of the participants, such as age, level of education, occupation of pregnant women, and husbands' education level, is significantly correlated with health-promoting behaviors (27). Meanwhile, in the study conducted by Goudarzi et al, no significant relationship was found between the marital status and lifestyle of students of Tehran University of Medical Sciences (28). In general, the findings highlight the importance of demographic variables in adopting health-promoting behaviors and leading people towards a healthy lifestyle. For example, marriage can act as an effective factor that leads people to follow health guidelines.

Moreover, according to the present findings, e-health literacy was significantly correlated with the education level of the person and husband's occupation. In other studies that explored the relationship between the participants' e-health literacy and demographic information, different results were found. Rasouli et al, who investigated the predictors of e-health literacy, showed that the mean score of e-health literacy had a statistically significant difference across age groups, gender, and education levels. The mean score of e-health literacy in different educational levels showed a statistically significant difference (20). A study by Almoajel et al showed that e-health literacy is influenced by age and education level. Findings indicated that the youngest participants achieved higher e-health

scores than their older counterparts. In addition, an increase in education level is associated with an increase in e-health scores (12). Demir et al reported that pregnant women's e-health literacy levels varied considerably based on their age, level of education, gestational week, and number of prior pregnancies (21). Besides, the results of another study on chronic patients in the University of Gondar comprehensive specialized hospital (UOGCSH) showed that the job type, educational status, place of residence, monthly salary, level of computer literacy, frequency of using the internet, and attitude towards the use of online resources were statistically significant factors related to e-health literacy skills on the internet (29). In addition, Zhang et al showed that the level of education, income, frequency of internet use, knowledge, attitude, and computer literacy had a significant effect on the e-health literacy skills of cancer survivors (15). Of note is that in the present study, despite having a university degree, most participants had a low level of e-health literacy, which requires careful attention. Therefore, to assess information needs, it is necessary to find the best place to obtain valid health information, evaluate it, and examine various contextual factors, including the level of education.

Moreover, the current study showed a significant relationship between e-health literacy and mean scores of lifestyle dimensions, namely psychological health, social health, drug avoidance, accident prevention, and environmental health. In addition, among lifestyle dimensions, the weight control and nutrition were associated with e-health literacy as a protective effect. Moreover, the two factors of drug avoidance and environmental health acted as risk factors in e-health literacy. Another study by Eyimaya et al showed a significant and positive relationship between e-health literacy and healthy lifestyle and its dimensions in Turkish adolescents (2). Therefore, healthy lifestyle behaviors increased with improvement in the level of e-health literacy (2). Another study on adult internet users in Japan showed that high e-health literacy may promote physical exercise and balanced nutrition as healthy behaviors (30). Another study among Taiwanese students showed that e-health literacy promotes healthy behaviors such as exercising, consuming vegetables and fruits, eating low-fat foods and low-sugar grains, and quality sleep (31). Individuals with e-health literacy have a better understanding of their health status and adopt healthier behaviors (31). A study of the elderly in a retirement center in Tehran confirmed the existence of a significant positive relationship between health-promoting behaviors and e-health literacy and vice versa (26). This study showed that due to the fact that the dimensions of health-promoting lifestyle are highly correlated and influence each other, e-health literacy can directly or indirectly affect different aspects of lifestyle (26).

These findings show that the lifestyle components are influenced by the promotion of e-health literacy and vice versa and that they can be improved. Therefore, promoting these factors as well as e-health literacy can provide a healthy environment for women and, as a result, their families.

It seems that the difference between some of the findings of the current research and other studies may be explained by different working methods, duration of studies, different samples, research environments, geographical locations, and data collection tools.

Limitations

One limitation of the current study was that the participants were only women visiting urban health centers in Mashhad. If it had been possible to access their husbands or influential characters in their lives, better results could probably have been obtained. However, this was beyond the researcher's control. Moreover, given that this research did not include other women at the community level, the findings should be generalized with caution. Another limitation was the self-reporting nature of the questionnaire surveys, which makes it possible for respondents to give socially desirable answers that can confound the results. Yet, this is the alleged issue with self-reporting questionnaire surveys, and the researcher could not avoid it.

Conclusion

The findings of the present study revealed a statistically significant relationship between e-health literacy and the mean score of lifestyle dimensions, including psychological health, social health, drug avoidance, accident prevention, and environmental health. Additionally, among the components of lifestyle, the weight control and nutrition had a relationship with e-health literacy as a protective effect. Moreover, the two factors of drug avoidance and environmental health acted as the risk factors involved in e-health literacy. This finding points to the importance of e-health literacy in adopting a healthy lifestyle and vice versa. This issue shows the need to pay more attention to e-health literacy in health promotion programs. In fact, by increasing the level of e-health literacy, as a primary factor in the age of information and communication, it is possible to facilitate the adoption of health-promoting behaviors, thereby distinguishing correct information from incorrect information and creating a healthier society. It is suggested that health policymakers and decision makers pay more attention to media as the key and influential elements in human health and plan to take measures to design appropriate interventions to improve people's e-health literacy.

Acknowledgements

The researchers hereby express their gratitude to the vice president of research of Mashhad University of Medical Sciences for the financial support and cooperation of all participants and employees of the health centers of Mashhad. Special appreciation goes to Ms. Daroodi, Azghadi, Akbarian, Ebrahimi, Shojaei, and Izadi for facilitating the data collection.

Authors' Contribution

Conceptualization: Nooshin Peyman, Fatemeh Goldani Moghaddam.
Data curation: Fatemeh Goldani Moghaddam.
Formal analysis: Nasrin Talkhi.
Investigation: Fatemeh Goldani Moghaddam, Nasrin Talkhi, Nooshin Peyman.
Methodology: Nasrin Talkhi.
Project administration: Fatemeh Goldani Moghaddam, Nasrin Talkhi, Nooshin Peyman.
Software: Nasrin Talkhi.
Supervision: Nooshin Peyman.
Validation: Fatemeh Goldani Moghaddam, Nasrin Talkhi, Nooshin Peyman.
Visualization: Nasrin Talkhi, Fatemeh Goldani Moghaddam.
Writing–original draft: Fatemeh Goldani Moghaddam, Nasrin Talkhi, Nooshin Peyman.
Writing–review & editing: Fatemeh Goldani Moghaddam, Nasrin Talkhi, Nooshin Peyman.

Competing Interests

The authors declare no competing interests.

Ethical Approval

This study was approved by the Research Vice-Chancellor of Mashhad University of Medical Sciences (IR.MUMS.FHMPM.REC.1402.009). At all stages of the research, the Declaration of Helsinki was taken into consideration, and verbal consent was obtained from all the women to participate in the research.

Funding

This research was supported by the Research Vice Chancellor of Mashhad University of Medical Sciences (Grant number 4020012).

References

1. Habibpour Gatabi K, Safary Shali R. Typology of women lifestyle in Tehran city. Women's Strategic Studies. 2019;22(85):7-27. doi: 10.22095/jwss.2019.109563. [Persian].
2. Eyimaya A, Özdemir F, Tezel A, Apay SE. Determining the healthy lifestyle behaviors and eHealth literacy levels in adolescents. Rev Esc Enferm USP. 2021;55:e03742. doi: 10.1590/s1980-220x2020021603742.
3. Jahani Eftekhari M, Peyman N, Doosti H. Health literacy and health-promoting lifestyle among health volunteers in Neyshabour. J Ilam Univ Med Sci. 2018;26(3):7-15. doi: 10.29252/sjimu.26.3.7. [Persian].
4. Sajjadi H, Hosseinpour N, Sharifian Sani M, Mahmoodi Z. Association between health literacy and life style in married rural women in Izeh, Iran. Journal of Health. 2016;7(4):479-89. [Persian].
5. Coşkun S, Bebiş H. Effects of health promotion courses on development of healthy lifestyle behaviours and eHealth literacy in nursing. Gulhane Med J. 2019;61(2):52-8.
6. Tsai HM, Cheng CY, Chang SC, Yang YM, Wang HH. Health literacy and health-promoting behaviors among multiethnic groups of women in Taiwan. J Obstet Gynecol Neonatal Nurs. 2014;43(1):117-29. doi: 10.1111/1552-6909.12269.
7. Shieh C, Halstead JA. Understanding the impact of health literacy on women's health. J Obstet Gynecol Neonatal Nurs. 2009;38(5):601-2. doi: 10.1111/j.1552-6909.2009.01059.x.
8. Charoghchian Khorasani E, Tavakoly Sany SB, Orooji A, Ferns G, Peyman N. Health literacy in Iranian women: a systematic review and meta-analysis. Iran J Public Health. 2020;49(5):860-74.
9. Askarian-Tavandari P, Hashemian M, Joveini H, Solimanian A, Rastaghi S. A survey on the level of health literacy among the women in Bardaskan city, Iran, in year 2016: a cross-sectional study. J Health Syst Res. 2018;14(1):35-40. doi: 10.22122/jhsr.v14i1.3302. [Persian].
10. Zareban I, Izadirad H, Jadgal K. Evaluation of health literacy, health status and health services utilization in women in Baluchistan region of Iran. J Health Lit. 2016;1(2):71-82. doi: 10.22038/jhl.2016.10852. [Persian].
11. Kim K, Shin S, Kim S, Lee E. The relation between eHealth literacy and health-related behaviors: systematic review and meta-analysis. J Med Internet Res. 2023;25:e40778. doi: 10.2196/40778.
12. Almoajel A, Alshamrani S, Alyabsi M. The relationship between eHealth literacy and breast cancer literacy among Saudi women. Front Public Health. 2022;10:841102. doi: 10.3389/fpubh.2022.841102.
13. Jahangiri Zarkani R, Hashemi S, Granmayehpour A. Investigating the relationship between media literacy and physical health literacy of citizens of Bandar Abbas. Journal of Culture-Communication Studies. 2021;22(55):39-62. doi: 10.22083/jccs.2020.230109.3078. [Persian].
14. Ghadian Anarmarzi F. The role of media literacy on women's health literacy in the use of cyberspace case study: women in Mahmoud Abad, Mazandaran province. Journal of Applied Studies in Social Sciences and Sociology. 2019;2(2):1-12. [Persian].
15. Zhang Y, Xu P, Sun Q, Baral S, Xi L, Wang D. Factors influencing the e-health literacy in cancer patients: a systematic review. J Cancer Surviv. 2023;17(2):425-40. doi: 10.1007/s11764-022-01260-6.
16. Ameri F, Dastani M, Sabahi A, Hooshangi F, Rahimkarimi M, Rajabi E, et al. The role of eHealth literacy in preventive behaviors for COVID-19: a systematic review. J Health Lit. 2022;6(4):88-97. doi: 10.22038/jhl.2021.61581.1241.
17. Pourrazavi S, Kouzekanani K, Bazargan-Hejazi S, Shaghaghi A, Hashemiparast M, Fathifar Z, et al. Theory-based eHealth literacy interventions in older adults: a systematic review. Arch Public Health. 2020;78:72. doi: 10.1186/s13690-020-00455-6.
18. Lali M, Abedi A, Kajbaf MB. Construction and validation of the lifestyle questionnaire (LSQ). Psychol Res. 2012;15(1):64-80. [Persian].
19. Bazm S, Mirzaei M, Fallahzadeh H, Bazm R. Validity and reliability of the Iranian version of eHealth literacy scale. J Community Health Res. 2016;5(2):121-30.
20. Rasouli HR, Abbasi Farajzadeh M, Tadayon AH. Evaluation of eHealth literacy and its predictor factors among patients referred to a military hospital in Tehran, Iran, 2017. J Mil Med. 2018;20(1):83-92. [Persian].
21. Demir Y, Dağ E, Özpinar S. The relationship of eHealth literacy with cyberchondria: a cross-sectional study on pregnant women. J Health Lit. 2024;9(1):89-101. doi: 10.22038/jhl.2024.76171.1501.
22. George N, Reynolds S, de Long R, Kacica M, Ahmed R, Manganello J. Social media and black maternal health: the role of health literacy and eHealth literacy. Health Lit Res Pract. 2023;7(3):e119-29. doi: 10.3928/24748307-20230614-01.
23. Raisi Filabadi Z, Estebsari F, Sheikh Milani A, Feizi S, Nasiri M. Relationship between electronic health literacy, quality of life, and self-efficacy in Tehran, Iran: a community-based study. J Educ Health Promot. 2020;9:175. doi: 10.4103/jehp.jehp_63_20.
24. Khayat S, Dolatian M, Fanaei H, Navidian A, Mahmoodi Z, Kasaeian A. Study of lifestyle, the most important challenge and its related factors in suburban women. Journal of

Health. 2021;11(5):652-63. doi: 10.52547/j.health.11.5.652. [Persian].
25. Mohsenian M, Hajian S, Pazandeh F, Razzaghi Z, Abbasi Fashami M. Comparison of health promoting lifestyle and health literacy between men and women. An analytical-comparative study among the Tehranian middle-aged population. Islamic Life Style. 2022;6(2):41-50. [Persian].
26. Soleimaninejad A, Asadi ZS, Fathi Manesh S, Moqaddas A. Correlation between electronic health literacy and health promoting behaviors in elderly. Health Educ Health Promot. 2021;9(4):387-93.
27. Estebsari F, Jalili-Bahabadi F, Rohani C, Rahimi Khalifeh Kandi Z, Mostafaei D. Socio-economic determinants affecting the lifestyle of pregnant women. Iran J Health Educ Health Promot. 2020;8(3):261-71. doi: 10.29252/ijhehp.8.3.261. [Persian].
28. Goudarzi L, Nazari A, Rajabi Vasokolaee G, Salimi M, Raadabadi M. The lifestyle of allied medical students studying at Tehran University of Medical Sciences in 2012. Payavard Salamat. 2014;8(4):294-304. [Persian].
29. Shiferaw KB, Tilahun BC, Endehabtu BF, Gullslett MK, Mengiste SA. eHealth literacy and associated factors among chronic patients in a low-income country: a cross-sectional survey. BMC Med Inform Decis Mak. 2020;20(1):181. doi: 10.1186/s12911-020-01202-1.
30. Mitsutake S, Shibata A, Ishii K, Oka K. Associations of eHealth literacy with health behavior among adult internet users. J Med Internet Res. 2016;18(7):e192. doi: 10.2196/jmir.5413.
31. Hsu W, Chiang C, Yang S. The effect of individual factors on health behaviors among college students: the mediating effects of eHealth literacy. J Med Internet Res. 2014;16(12):e287. doi: 10.2196/jmir.3542.