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Original article

An Empirical Study on the Effect of Social Media Marketing in Perspective of Digital Literacy Level on Healthy Eating Attitude of Obese Women

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Abstract

Objective: In this prospective cross-sectional study, it was aimed to evaluate effect of social media advertisement and digital literacy level on healthy eating attitude of obese women. ***Methods:*** A total of 387 women, 234 of whom were non-obese and 153 obese, residing in the central district of İzmir in 2022 were subjected to the study. A questionnaire including demographic information form, Digital Literacy Scale and Attitude Scale towards Healthy Eating was applied to the participants. ***Results:*** Age, economic status, chronic disease, malnutrition and family obesity history distributions were significantly different between obese and non-obese groups ($p<0.05$). Body Mass Index (BMI) and Malnutrition (MN) means were higher in non-obese group, and digital literacy, Information on Nutrition (IN), Emotion for Nutrition (EN), Positive Nutrition (PN) and Healthy Nutrition Behavior (HNB) total scores were higher in obese group. The digital literacy level difference was significant between patient groups ($p<0.05$). Digital literacy was positively correlated with IN ($r=0.184$; $p<0.01$), and negatively correlated with positive nutrition ($r=-0.326$; $p<0.01$) and malnutrition ($r=-0.142$; $p<0.05$) in non-obese group. Digital literacy was negatively correlated with malnutrition ($r=-0.255$; $p<0.05$) in obese group. Digital literacy level has significant and negative correlation with HNB ($r=-0.121$; $p<0.05$). ***Conclusion:*** The level of digital literacy significantly affects the level of health knowledge, positive nutrition and malnutrition in non-obese women. In obese women, the relationship between digital literacy and only malnutrition is statistically significant.

Keywords: ***Healthy eating; digital literacy; nutrition.***

1. Introduction

Nutrition is one of the most important issues that concern all health status areas and characteristics of individuals. The body's needs such as energy, nutrients, vitamins and supplements are realized through nutrition [1,2]. In addition, the protection of the body from harmful foods and beverages is also an output and result of the nutrition process [3-5]. For this reason, nutrition can be described as the most important variable regarding the health of individuals.

Nutritional needs, characteristics and form are determined and shaped by many factors, from the society in which the individuals grow up to the geography. The daily life of the society in which the individual lives has a great influence, especially in the acquisition of positive or negative eating habits [6,7]. Changes in the daily lives of individuals also affect their nutritional level and habits.

With the more intense use of social media and digital communication opportunities, the food consumption habits of individuals have also started to change, compared to the past, individuals have consumed more functional food, and there has been an unhealthier or more unnatural diet. In this whole process, the way of marketing the products or services of companies or businesses that offer the foods that individuals consume for commercial purposes has also changed, and there has been a nutrition and food marketing situation that has shifted to digital media more than in the past [8,9].

As a result, the marketing understanding of companies has changed in the direction of advertising more in digital environments. The main reasons for this change are the increasing interest in digital media channels and the fact that people spend more of their time in digital channels [10]. In addition, digital media channels and especially social media marketing methods have become an important marketing area that enables businesses to survive in a competitive environment.

Social media marketing is actually a variation of digital marketing. In social media marketing, similar to classical marketing methods, products or services allow market segmentation, market positioning, identifying customer segments, analyzing relevant customer segments, and evaluating past marketing strategies according to analysis results. In this whole process, digital literacy levels are at the forefront of the most important conditions for better communication of marketing tools and marketing communications to customers [11,12]. The success and expressive power of companies and their marketing strategies are related to the extent and how they are perceived by the customer segment.

From this point of view, the concept that is directly related to and comes to the forefront with marketing opportunities and strategies today is the term digital literacy. In its most general definition, digital literacy indicates the degree to which an individual can understand, interpret and extract information and content in digital environments. Digital literacy can also be described as the

power of individuals to interpret the information and content hidden in digital content in a positive and beneficial way. From this point of view, digital literacy can be described as the process of acquiring the ability that will allow people to flow information in the digital environment.

Healthy nutrition refers to the level of individuals to take foods that contain the nutrients and energy necessary for them. A healthy individual should have the ability to analyze the nutrients and foods that his metabolism needs and to get them through nutrition. For this, the individual must first of all have the ability to collect, interpret and evaluate information. In this respect, digital literacy may be a concept associated with individuals' healthy eating levels.

Although there have been studies on the concepts of digital literacy and healthy nutrition in the literature, there have not been enough studies evaluating these two concepts together. Therefore, in this study, the relationship between digital literacy and healthy eating attitude in obese and non-obese women was examined within the framework of social media marketing.

2. Methods

2.1. Research Model

The research was designed as a cross-sectional study in the descriptive survey model. Questionnaire method was used in data collection.

2.2. Research Sample

In the research, a survey was conducted on a total of 387 women, 234 of whom were non-obese and 153 obese, residing in the central district of İzmir in 2022, who were included in the research on a voluntary basis. BMI over 25 was accepted obese according to World Health Organization criteria. Participation in the research was provided on a voluntary basis. Ethical approval was taken from Cyprus Health and Social Sciences University.

The research sample was selected by cluster sampling method. Accordingly, the participants were included in the research with the random spin method within each cluster. While determining the size of the research sample, the minimum number of people recommended by Cohen et al [13] was found to be 383 and 387 people were reached.

2.3. Data Collection Form

A questionnaire including demographic information form, Digital Literacy Scale and Attitude Scale towards Healthy Eating was applied to the participants.

Demographic Information Form

The demographic information form used in the study questions the participants' employment status, age, economic status, chronic disease status, height, weight and family history of obesity.

Digital Literacy Scale

The scale developed by Üstündağ et al [14] examines the level of digital literacy in one dimension and with 10 five-point Likert type items. Expressions in the scale are scored positively, and a high score indicates a high level of digital literacy. The Cronbach alpha coefficient calculated for the internal consistency of the scale was found to be 0.86.

Healthy Nutrition Behavior Scale

The scale, developed by Tekkurşun Demir and Cicioğlu [15], examines the healthy eating attitude in 21 items and four dimensions. These dimensions are Information on Nutrition (IN), Emotion for Nutrition (EN), Positive Nutrition (PN), and Malnutrition (MN). The Cronbach Alpha internal consistency coefficient of the scale was reported as 0.90 for IB, 0.84 for EN, 0.75 for PN and 0.83 for MN.

2.4. Statistical Method

In the study, frequency analysis was used to define nominal and ordinal data, and Chi-square and Fischer's Exact tests were used for differences. The mean and standard deviation values were used to define the measurement data. Before the difference analysis, Kolmogorov Smirnov Test was used for the normality distributions of the measurement data. Mann-Whitney U test was used in the difference analysis, since not all scale distributions were in accordance with the normal distribution. Spearman's rho analysis was performed for relational screening analyses. All analyzes were performed in SPSS 17.0 for Windows with 95% confidence interval.

3. Results

Baseline characteristics of respondents were given in the Table 1.

Table 1: Baseline characteristics of respondents

	Non-obese (n=234)		Obese (n=153)		p
	n	%	n	%	
Age, n (%)					
19-28	21	9.0	55	35.9	
29-38	89	38.0	37	24.2	0.000[a]
39-48	90	38.5	45	29.4	
49 and over	34	14.5	16	10.5	
Economic status, n (%)					
Low	57	24.4	38	24.8	
Moderate	160	68.4	70	45.8	0.000[a]
High	17	7.3	45	29.4	
Chronic disease, n (%)					
No	216	92.3	64	41.8	0.000[b]
Yes	18	7.7	89	**58.2**	
Malnutrition, n (%)					
No	180	76.9	135	88.2	0.003[b]
Yes	54	**23.1**	18	11.8	
Obesity family history, n (%)					
No	143	61.1	137	89.5	0.000[b]
Yes	91	**38.9**	16	10.5	

a. Chi-Square Test, b. Fischer's Exact Test.

Age, economic status, chronic disease, malnutrition and family obesity history distributions were significantly different between obese and non-obese groups ($p<0.05$). Malnutrition and family obesity history were more common in non-obese group, whereas chronic disease was more common in obese group.

BMI, digital literacy and healthy nutrition behavior differences between groups were given in the Table 2.

Table 2: BMI, digital literacy and healthy nutrition behavior differences between groups

	Non-obese (n=234)	Obese (n=153)	p[a]
BMI	**28.66±3.73**	28.12±3.76	0.403
Digital Literacy	41.07±4.71	**42.70±3.41**	0.000
IN	20.82±3.23	**20.97±3.25**	0.567
EN	25.48±2.68	**25.50±2.92**	0.783
PN	21.14±2.27	**21.16±2.44**	0.768
MN	**20.77±2.68**	20.59±2.76	0.309
HNB Total	88.21±4.70	**88.22±5.08**	0.841

a. Mann Whitney U Test, BMI: Body Mass Index, IN: Information on Nutrition, EN: Emotion for Nutrition, PN: Positive Nutrition, MN: Malnutrition, HNB: Healthy Nutrition Behavior.

Although BMI and MN means were higher in non-obese group, and digital literacy, IN, EN, PN and HNB total were higher in obese group; only digital literacy level difference was significant between patient groups ($p<0.05$).

Table 3: Spearman's rho correlation analysis between digital literacy and BMI and healthy nutrition behavior

	Non-obese (n=234)	Obese (n=153)
BMI	0.076	0.047
IN	0.184**	0.112
EN	-0.076	-0.091
PN	-0.326**	-0.148
MN	-0.142*	-0.255**
HNB Total	-0.111	-0.153

**p<0.05 **p<0.01 BMI: Body Mass Index, IN: Information on Nutrition, EN: Emotion for Nutrition, PN: Positive Nutrition, MN: Malnutrition, HNB: Healthy Nutrition Behavior.*

According to Spearman's rho correlation analysis, digital literacy was positively correlated with IN ($r=0.184$; $p<0.01$), and negatively correlated with positive nutrition ($r=-0.326$; $p<0.01$) and malnutrition ($r=-0.142$; $p<0.05$) in non-obese group. Digital literacy was negatively correlated with malnutrition ($r=-0.255$; $p<0.05$) in obese group.

Spearman's rho correlation analysis results between HNB and research parameters were given in the Table 4.

Table 4: Spearman's rho correlation analysis between HNB and research parameters

HNB Total	r	p
Digital Literacy	-0.121*	0.017
Working	0.010	0.842
Age	-0.054	0.289
Economic status	0.027	0.603
Chronic disease	0.036	0.483
Malnutrition	0.028	0.585
Obesity family history	-0.033	0.515
BMI	0.031	0.539

Spearman's rho analysis results showed that digital literacy level has significant and negative correlation with HNB ($r=-0.121$; $p<0.05$). All other correlations between HBN and research parameters were insignificant ($p>0.05$).

4. Discussion

In this study, the relationship between the level of digital literacy and healthy eating attitude in obese and non-obese women was examined. In this context, a survey was conducted on the sample of obese and non-obese women and the effects of digital literacy levels on healthy eating habits were analyzed. In this way, it is aimed to reveal the effect of digital literacy and obesity status on nutritional habits.

Healthy nutrition has always been an important issue from the past to the present. However, in recent years, on the one hand, the developments in the internet and technology and the increase in the production of artificial products, on the other hand, the radical and important changes in the daily lives of individuals have increased the importance of nutrition [16,17]. Today, together with nutrition, the concept of malnutrition has become even more important. While malnutrition was talked about more in the past, with the increase of functional and artificial foods, nutritional products have become cheaper. As a result, the concept of malnutrition rather than malnutrition has become more common.

Nutrition refers to the process of getting the basic elements and components that the body needs through food. With nutrition, individuals receive the energy and other requirements necessary to carry out the daily activities of their bodies. However, there are types of nutrition that negatively affect health, such as inadequate, bad or malnutrition. While the concepts of malnutrition, negative or malnutrition mean close to each other in the literature, malnutrition also refers to the state of not benefiting sufficiently from the available nutritional opportunities [18,19]. In fact, it should be stated that bad and negative nutritional conditions also result in malnutrition.

Employment status, unlike other demographic characteristics of individuals, is one of the issues that most affect the level of nutrition. Since most of the daily lives of individuals are spent in the workplace, besides lunches, breakfasts are also shaped according to their working status. Since women are generally

responsible for food and nutrition at home, the working status of women is a more effective concept on the diet [20-22]. For this reason, being a woman and working status were considered as particularly effective factors in the study.

According to the results of the study, although the differences between the demographic characteristics of obese and non-obese women were statistically significant, the differences in nutritional levels were not statistically significant. This shows that women pay attention to their nutritional level regardless of whether they are obese or not. In general, the differences between healthy nutrition knowledge levels in both the obese sample and the non-obese sample are not statistically significant.

When the digital literacy levels of obese and non-obese women are compared, it is seen that the digital literacy levels of obese women are statistically significantly higher than those of non-obese women. This situation is compatible with the studies in the literature, and higher digital literacy is observed in obese women.

The correlation analysis results showed that the level of digital literacy significantly affects the level of health knowledge, positive nutrition and malnutrition in non-obese women. In obese women, the relationship between digital literacy and only malnutrition is statistically significant. In both groups and in the whole sample, as the level of digital literacy increases, the level of healthy nutrition of individuals decreases. In other words, individuals with a high level of digital literacy seem to pay less attention to healthy nutrition. It can be stated that the increase in digital literacy with obesity status, the abundance of unhealthy information about nutrition on the internet and virtual media, and the inability of working individuals to spare enough time for nutrition have an impact on this result.

The limitations of the research are that the research is single-centered and that many of the daily food consumption records or other factors affecting digital literacy are among the research limitations. Research results can be expanded on larger samples with larger budget, time and opportunity. On the other hand, research makes an important contribution to science and the field, as the subject is multidisciplinary, pioneering in the field and being a source for further studies.

5. Conclusion

According to the results of the research, as the level of digital literacy increases, the level of healthy nutrition of individuals decreases. This result may be due to the fact that the level of digital literacy is higher in cities, but opportunities such as access to organic food or regular nutrition are more limited in cities. Similarly, there is a high level of disinformation in the content and shares presented in digital media, especially in the internet and virtual media. It can also be stated that individuals with high digital literacy levels have low physical activity levels and spend more time in front of the computer. It would be beneficial to examine all these possibilities in further research.

Since the concept of health is a global public good and nutrition is the most important and indispensable part of a healthy life today, more studies are needed in this area. In particular, the effect of digitalization and the changing social structure on nutritional habits can be examined on a larger scale, with studies that bring together different branches of science.

Data availability

Data of the research is stored to OSF with following link: https://osf.io/kym8z/
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