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IMPACT OF HEALTH LITERACY ON WEIGHT LOSS IN OBESE INDIVIDUALS

Zeynep YILMAZ AK[1], Hakan DEMIRCI [2]

[1] Umraniye Merkez Family Health Center, Istanbul, TURKEY

[2] Department of Family Medicine, University of Health Sciences Turkey Bursa Yuksek Ihtisas Training and Research Hospital, Bursa, TURKEY

ABSTRACT

Aim: The aim of this study was to investigate the relationship between health literacy of obese individuals and their loss of weight following their visit to a dietician.

Methods: Volunteers consisted of obese patients aged between 18-65 years who visited the hospital dietician between January 2018 and March 2018. In this study, we used a questionnaire for the socio-demographic characteristics of volunteers and the Health Literacy Scale European Union (HLS-EU) to measure health literacy level. Weight-loss status of the participants at the end of the first month was assessed.

Results: 321 of the obese individuals participating in our study were females and 71 were males. One third (33.20%) of the obese patients were in the sufficient/perfect HL level group according to General Health Literacy (HL) scores. It was detected that weight-loss in individuals with a perfect health literacy level was significantly higher than those with insufficient and limited health literacy (respectively, $p=0.001$ and $p<0.001$).

Conclusions: Patients with high health literacy among those visiting a dietician lose more weight. Physicians can contribute to more efficient performance of patients and help patients to recuperate by directing obese patients with high health literacy to dieticians.

Keywords: Health literacy, Diet, obesity management, patient adherence, tratment adherence

Corresponding Author: Hakan DEMIRCI drhakandemirci@hotmail.com

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Introduction

Obesity is a major health problem accompanied by various chronic diseases that affects about one third of society (1-3). Obesity prevalence increases in parallel with sedentary life style and malnutrition (4-7). Patients are in a struggle to get rid of their extra kilos with pharmacologic and non-pharmacologic methods in order to fight against obesity (8-12). There is a wide range of methods for solving obesity from bariatric surgery to complementary and alternative treatments (13-15). Diet and exercise are among the most commonly referred methods (16-19).

Personal reasons, media and healthcare providers may be effective in referring obesity patients to dieticians (20). Among the known personal reasons for going to a dietician there are: aesthetic concerns, accompanying health problems and decrease of functional work capacity (21). Any of these may be a source of motivation. Media sources are another effective factor (22). Among healthcare providers, primarily family physicians, internists, cardiologists, pulmonologists, orthopedists encourage their patients to lose weight (23).

Reasons affecting the success of weight-loss of obese patients after visiting a dietician can be listed as: experience of the dietician, compatibility of the recommended diet to the patient, reasons for visiting a dietician and degree of obesity (24). All of these are sources of motivation. Experience of both the physicians and dieticians in motivational negotiation has a direct effect on treatment success.

Health literacy can be described as the individual's acquisition, interpretation and comprehension capacity of primary health information and services in a manner to protect and develop one's health and recuperate deteriorated health (25).

The relationship between obesity and health literacy may be multi-dimensional. As is evident from the description, health literacy is associated with exerting effort to protect health. Treatment endeavors of obesity patients are also expected to be associated with health literacy. Individuals with adequate health literacy level may be expected to be active people in order to ameliorate their health status (26).

Health literacy is associated with several positive health behaviors. Many research studies have been done on disease control, especially for chronic diseases. In this study, we aimed to investigate the effect of health literacy of obese individuals on their weight-loss status following a dietician visit.

Methods

This study was conducted with the participation of 250 obese patients aged between 18-65 years who visited the Dietician Polyclinic between January 2018-March 2018 to lose weight and 142 obese patients with similar age and gender who were admitted to the Training Family Health Center. Consent of the volunteers was obtained and a survey method was used.

Inclusion Criteria

Admission to the Dietician Polyclinic and Training Family Health Center, being between 18- 65 years of age and having a BMI (Body mass index over) 30 were the inclusion criteria.

Questionnaires

In this study, we used a questionnaire for socio-demographic characteristics of the volunteers and the Turkish translation of the Health Literacy Scale European Union (HLS-EU) to measure health literacy level (27). Topics interrogated by the questionnaire on socio-demographic data were: protocol number,

gender, age, marital status, educational status, height, weight, body mass index, waist circumference, smoking status, alcohol usage, whether they read the newspaper or not and number of newspapers read per week, number of books read in the last one year, job, income state, chronic diseases and medications used.

Procedures

Among the anthropometric measurements, height and weight were measured using standard measuring tools. The individuals were asked to take off their shoes during linear measurement. They were required to wear light clothes during weight measurement. BMI: Body mass index of the patient was calculated by dividing his/her weight by his/her height squared (kg/m²). Waist circumference was measured with a non-elastic tape in standing position, and the narrowest diameter between the arcus costarum and processus spina iliaca anterior superior was accepted as the waist circumference. Weight of the patients after diet was measured one month later.

Statistical Analysis

Posterior power analysis *(Post hoc power analysis)* was done using influence quantity considering current results of the study. Influence quantity value was achieved as a result of the comparison of general health literacy score between groups visiting and not visiting the dietician. Considering the sample volumes of the groups visiting (n=250) and not visiting (n=142) the dietician, current power was achieved as 0.99 for α= 0.05 using the related influence quantity (r=0.51). Compatibility of the variables to normal distribution was analyzed with Shapiro Wilk test. Continuous variables were expressed with median (minimum: maximum) and mean ± standard deviation values. Categorical variables were expressed with n (%). Mann Whitney test was used for comparisons of continuous variables as a result of test of normality between groups visiting and not visiting the dietician, and Kruskal Wallis test was used for comparisons of continuous and discrete variables within health literacy subgroups. In case of general significance achievement following Kruskal Wallis test, Dunn Bonferroni approach was used for sub group analysis among health literacy groups. Pearson chi-square, Fisher's exact chi-square and Fisher Freeman-Halton tests were used for comparisons of categorical variables among groups. Internal consistency of the health literacy scale was analyzed with Cronbach alfa coefficient. SPSS program (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) was used for statistical analysis and $p<0.05$ was accepted as statistically significant.

Results

250 individuals who visited the dietician and 142 individuals who did not visit the dietician participated in this study (Table-1). Age and gender distribution of the participants were similar. Period of education was higher in the control group. While the rate of individuals reading the newspaper was higher in the group visiting the dietician, the rate of individuals reading books was higher in the group not visiting the dietician.

Table1. Comparison of socio-demographic data of the participants

	Visit to the Dietician		**p-value**
	Yes (n=250)	**No (n=142)**	
Age (years)	47(18:71)	42(18:65)	0.064[a]
Gender (F/M)	203/47	118/24	0.639[b]
BMI	34.96(26.30:57.26)	34.20(26.30:48.65)	0.251[a]
Marital Status			
Single	33(13.20%)	17(12%)	0.410[b]
Married	208(83.20%)	123(86.60%)	
Widow	9(3.60%)	2(1.40%)	
Smoking	36(14.40%)	19(13.40%)	0.780[b]
Alcohol Usage	6(2.40%)	3(2.10%)	1.00[c]
Newspaper Reading	105(42%)	41(28.90%)	**0.010[b]**
Book Reading	108(43.20%)	80(56.30%)	**0.012[b]**
Educational Status			
Pre-Secondary School	181(72.40%)	99(69.70%)	0.739[b]
Secondary School	42(16.80%)	24(16.90%)	
Post-secondary School	27(10.80%)	19(13.40%)	
Education Period (years)	5.50(0:16)	6.50(2:18)	**0.005[a]**
Income State			
Low	19(7.60%)	9(6.30%)	0.793[b]
Moderate	145(58%)	80(56.30%)	
High	86(34.40%)	53(37.30%)	

Data given as median (minimum: maximum) and n (%).

a: Mann Whitney U test, b: Pearson chi-square test, c: Fisher's exact chi-square test

The relationship between health literacy status and weight-loss of the participants is shown in (Table-2). The most successful individuals in weight-loss were in the group with the best health literacy. No difference

was found between groups as a result of comparison of initial weight levels among HL groups. Percentage change level was calculated in the control measurement of weight in order to analyze the change with respect to the initial measurement. When related percentage change values were analyzed, it was determined that individuals with perfect health literacy level lost more weight than those with insufficient and limited health literacy (respectively, p=0.001 and p<0.001) (Figure1 and 2). Similarly, it was also reported that weight-loss was higher in the group with sufficient and limited health literacy level than the group with insufficient health literacy level (respectively, p<0.001 and p<0.001).

Table2. Relationship between Health Literacy and Weight Change of Individuals

HL	Initial weight	Final Weight	Weight Change (%)
Insufficient (n=100)	91(63:138)	91(62:135)	0(-5.98:3.16)
Problematic (n=43)	91(76:141)	88(55:136)	-4(-39.56:0)
Sufficient (n=50)	89.50(66:154)	84.50(62:150)	-5.03(-10.98:-1.74)
Perfect (n=38)	88(73:136)	84(66:128)	-6.44(-12.79:0)
p-value	0.693[d]	-	**<0.001[d]**

Data given as median (minimum: maximum).

HL: Health Literacy, d: Kruskal-Wallis test

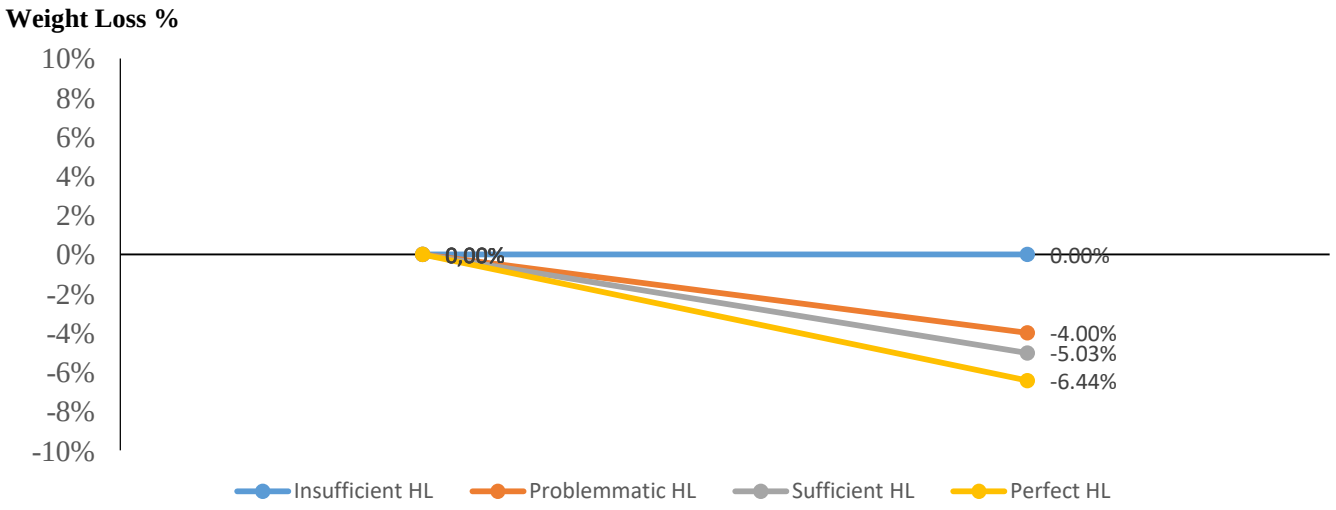

Figure1. Weight-loss percentages of patients with regard to health literacy (HL)

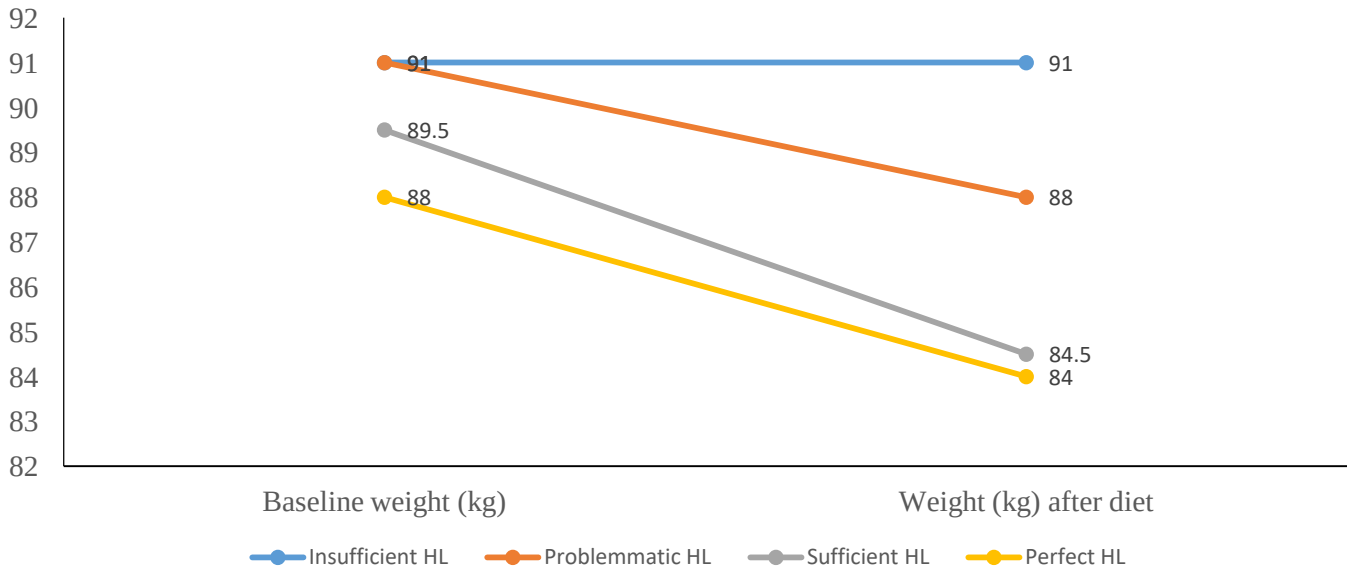

Figure2. Weight-loss of patients with regard to health literacy (HL)

A difference was detected between groups in terms of the time passed as obese (Table-3). Time passed as obese was shorter in individuals with a perfect level of health literacy than those with insufficient and problematic/limited level of health literacy (respectively, p=0.026 and p<0.001). This time period was longer in the group with insufficient health literacy compared to the group with sufficient health literacy (p=0.005).

Table3. Health Literacy and Period of Obesity and Number of Diets

HL	**Period of Obesity**	**Number of Diets**
Insufficient *(n=126)*	10.50(1:50)	0(0:12)
Problematic *(n=136)*	10(0:50)	0(0:15)
Sufficient *(n=90)*	9(1:35)	0(0:7)
Perfect *(n=40)*	6(1:35)	2(0:10)
p-value	**<0.001[d]**	**0.001[d]**

Data given as median (minimum: maximum) and mean ± standard deviation.

HL: Health Literacy, d: Kruskal-Wallis test

There was a difference between groups in terms of number of diets implemented. The number of diets implemented by individuals with a perfect level of health literacy was higher than those with an insufficient level of health literacy (p=0.001). There was no difference between groups in terms of the early period of obesity (Table-3).

89.10% of the patients who visited a dietician and whose health literacy level was "insufficient" were those referred to the dietician due to disease, 6.70% visited a dietician due to aesthetics reasons, 0.80% visited a dietician upon the partner's or family's request.63.20% of the patients who visited a dietician and whose health literacy level was "perfect" were those referred to a dietician due to disease, 34.20% visited a dietician due to aesthetics reasons and 2.60% visited a dietician due to loss of functional working capacity (Table-4).

Table4. Relationship of Health Literacy and Treatment Initiatives in Volunteers

	Health literacy			
	Insufficient n=119	**Limited n=43**	**Sufficient n=50**	**Perfect N=38**
Attempt				
None	79(62.70%)	57(41.90%)	34(37.80%)	14(35%)
Diet	34(27%)	55(40.40%)	39(43.30%)	21(52.50%)
Sports	13(10.30%)	15(11%)	17(18.90%)	5(12.50%)
Physician	0	9(6.60%)	0	0
Reason				
None	4(3.40%)	2(4.70%)	0	0
Disease	106(89.10%)	32(74.40%)	34(68%)	24(63.20%)
Aesthetics	8(6.70%)	8(18.60%)	16(32%)	13(34.20%)
Partner/Family	1(0.80%)	0	0	0
Loss of Function	0	1(2.30%)	0	1(2.60%)

Data was given as n (%).

Discussion

As a result of this study, we found that among patients who visited a dietician, the weight loss of those with a adequate level of health literacy was higher than those with an insufficient and limited level of health literacy. The period passed as obese was shorter in individuals with perfect health literacy level than those with an insufficient and problematic/limited level of health

literacy and these patients attempted more diets. While the most common reason for visiting a dietician was co-morbid disease, aesthetic concerns had an important place in the group with adequate health literacy.

The determining role of health literacy in weight-loss following a dietician visit was investigated for the first time in this study. The effect of health literacy in benefiting from treatment services was asserted in previous studies (28). However, its direct effect on weight-loss was not acknowledged. In this respect, health literacy will give guidance to physicians in two ways in referring patients to the dieticians. Primarily, bringing together patients with good health literacy with dieticians will increase the efficiency of the dietician during the treatment. Secondly, training the patients with low health literacy level before referring them to the dietician may increase the expectation from these patients. Further studies are needed on this issue.

The effect of health literacy on the period of obesity is also asserted in this study. Individuals with a high health literacy level exert effort in struggling with disease, primarily including diet trials. In a study of bariatric surgery, which can be considered as one of the most effective obesity treatment methods, it was indicated that health literacy had a positive effect on the search for treatment (29). It is understood that obesity patients attain treatment by advancing towards the most effective method in their search for treatment, which starts with diet. This situation gives important clues about the importance of health literacy training in the struggle with disease.

Health literacy and aesthetics concerns are the interesting results of this study. Individuals with a high health literacy level make an effort to improve their physical appearance. Thus, health literacy not only aims at improving general health but also amelioration of physical appearance. Psychological analysis of this situation should be done in further studies.

High rates of visiting a dietician of individuals who read the newspaper more can be explained by the effect of media. The effect of media on health is a well-known fact. This effect can be both positive and negative (30). Media follow-up can also be implicitly associated with health literacy. Individuals who read more on the matter of obesity treatment are expected to have better health literacy levels. A longer education period in the control group can be explained by the fact that patients visiting a dietician are those referred by an internist or an endocrinologist.

Limitations

This was a mono-centered study and individuals in the same location were trained by the same dietician. For this reason, a generalization cannot be made through the results achieved in this study. Another limitation is that surveillance was limited to only one month. The effect of health literacy on weight-loss in obese patients followed-up for a longer period of time must be examined in further studies.

Conclusions

As a result of this study, it was seen that individuals with a high literacy level were more successful in losing weight. Physicians can contribute to more efficient performance of patients and help patients to recuperate by directing obese patients with high health literacy to dieticians. Training of patients with low health literacy levels can be encouraged.

Conflict of interest

The authors declare that they have no conflict of interest.

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