

## Determining The Effect of Health Literacy On Healthy Life Style And Rational Drug Use By Path Analysis

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### ABSTRACT:

**Purpose:** The main purpose of this study is; to determine the effect of health literacy on healthy lifestyle and rational drug use by path analysis.

**Material and Methods:** The universe of the research consists of patients and their relatives who receive health services from pharmacies operating in the city center of Bolu. The total number of questionnaires evaluated and used in data analysis is 400. SPSS 26 and AMOS 24 package programs were used in the analysis of the data. For reliability, item analysis based on item-total correlation was performed. Factors were determined by explanatory factor analysis (EFA), and the effect of health literacy on healthy lifestyle and rational drug use was determined with path analysis. With item analysis based on item-total correlation, it was seen that the data met the reliability requirement. The construct validity revealed by the explanatory factor analysis was also confirmed by path analysis.

**Results:** Ensuring validity and reliability; shows the existence of a structural relationship in the effect of health literacy on healthy lifestyle and rational drug use. It was determined that health literacy has a positive effect on rational drug use ( $\beta=1.055$ ;  $p<0,05$ ) and healthy lifestyle ( $\beta=0.496$ ;  $p<0,05$ ).

**Conclusion:** For the model, the effect of a healthy lifestyle on rational drug use, the effect of rational drug use on a healthy lifestyle, and also whether the indirect effect of health literacy on rational drug use through healthy lifestyle was examined, and it was determined that there was no effect.

**Keywords:** Health literacy, Healthy lifestyle, Rational drug use, Path Analysis

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### INTRODUCTION

Health literacy is defined by the US National Academies Medical Institute as “the degree to which individuals have the capacity to obtain, process and understand basic health information and services necessary to make appropriate health decisions” (Ratzan and Parker, 2000). There are two ways to conceptualize health literacy. The first of these is a risk factor and the other is something valuable. Health literacy as a risk factor fits best in clinical settings and focuses on improved communication between doctors and patients. Valuable things, on the other hand, refer to a set of skills needed in

everyday life to make decisions that affect a person's health (Nutbeam, 2008).

Health literacy; It includes the skills individuals need to understand and guide health information, such as knowing how to use health services, improving health behaviors, increasing compliance with treatment, using drugs correctly, understanding the information provided, and making decisions about self-care and disease management (Hersh et al., 2015). Low health literacy is an important public health problem that affects the general health of individuals and increases disease-related problems. At the same time, low health literacy can make it

difficult for patients to work effectively in the healthcare system. At the same time, low health literacy; poor health status (Wang et al., 2013), lack of knowledge about medical conditions and related care (Song et al., 2012), lack of interaction with healthcare providers (Easton et al., 2013), difficulty understanding medical information, increased mortality, poor health status has consistently been associated with poor health outcomes, including increased hospitalizations (Berkman et al., 2011; Song et al., 2012), higher healthcare costs, and poorer use of preventive healthcare services (DeWalt et al., 2004).

Health-related quality of life refers to how individuals subjectively evaluate their own well-being and ability to perform physical, psychological, and social functions. There are many studies examining the relationship between health-related quality of life and health literacy in patients with chronic diseases (Wang et al., 2008). Insufficient health literacy causes many problems such as increased number of hospitalizations, increased use of emergency care services, less preference for preventive healthcare services, inadequate or regular use of medicines, inability to manage chronic diseases, inability to understand health-related messages, and waste of limited resources for health expenditures (Geboers et al., 2015).

Rational drug use by the World Health Organization (WHO); defined as "the process where patients receive medications appropriate to their clinical needs in doses that meet their individual needs, for a sufficient period of time and at the lowest cost for themselves and their communities" (WHO, 1985). Rational drug use plays a vital role in the success of treatment processes. Considering that drug use is also related to individuals' decision-making mechanisms, rational drug use and health literacy are known to cause a variety of problems worldwide (Desalegn, 2013). Levels should be considered together (Abacigil et al., 2019).

Rational drug use is closely related to education and health literacy levels in addition to socio-cultural, economic and regulatory mechanisms. Health literacy can be defined as "the knowledge, motivation and competence of an individual in accessing, understanding, evaluating and applying

information to prevent disease and improve health in daily life" (HLS-EU Consortium, 2012). Low levels of health literacy have been shown to have a negative impact on patients' compliance with medical treatment and the management of diseases, leading to a lack of knowledge about diseases, and thus being associated with higher rates of hospitalization, morbidity and premature death (Kickbusch et al., 2013). Improving the health literacy level of the population can reduce self-medication, increase treatment adherence, and thus increase awareness of rational drug use (Haaiker-Ruskamp, 1997; Tosun vd., 2018; Abacigil, 2019).

In this study, it is aimed to determine the effect of health literacy on healthy lifestyle and rational drug use with path analysis. The fact that such a study has not been encountered in the health sector and health services field before adds originality to the study and reveals its importance, while increasing the health literacy level of the society in terms of preparing the ground for the formation of a healthier and more conscious society, it makes them behave healthier lifestyle behaviors and use drugs more rationally. It is foreseen that it will contribute to their performance. In addition, this study is aimed to be a pioneer in future studies to be carried out by expanding its scope.

## **MATERIAL and METHODS**

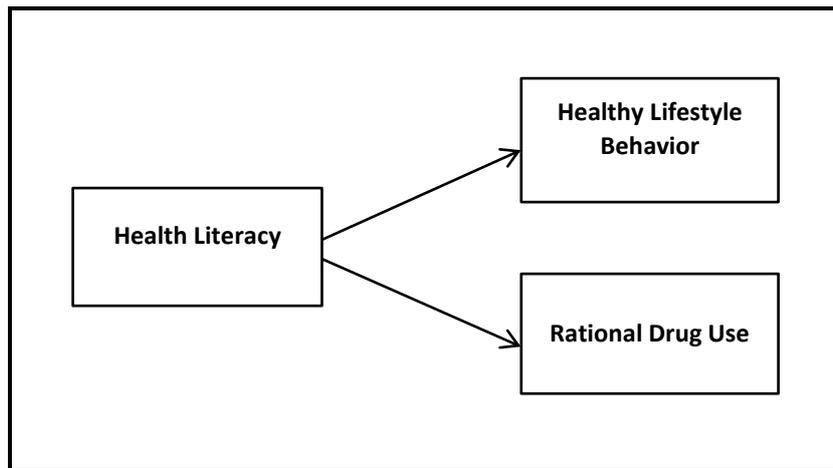
### **Purpose and Type of the Study**

Considering the purpose of the research and the problematic of the research, it was thought that the most appropriate method for achieving the aim and solving the problematic was the quantitative research method and the quantitative research method was preferred in the research. SPSS 26 and AMOS 24 statistical analysis programs were used for the analysis of the data set within the scope of the research.

### **Conceptual Model of the Research**

Similar model studies were examined with the literature review during the model development phase and the conceptual/theoretical model of the research was created. Determining the effect of health literacy on healthy lifestyle and rational drug use with path analysis constitutes the subject of the

study. The relationships between the conceptual model of the research are shown in Figure 1.



**Figure 1:** Conceptual Model of the Research

**Research Hypothesis Development**

In the literature, it has been shown that low health literacy has a negative effect on patients' compliance with medical treatment and management of diseases, leads to a lack of knowledge about diseases and is therefore associated with higher hospitalization rates, morbidity rates, and premature death (Kickbusch et al., 2013). At the same time, low health literacy; poor health status (Wang et al., 2013), lack of knowledge about medical conditions and related care (Song et al., 2012), lack of interaction with healthcare providers (Easton et al., 2013), difficulty understanding medical information, increased mortality, poor health status has consistently been associated with poor health outcomes, including increased hospitalizations (Berkman et al., 2011; Song et al., 2012), higher healthcare costs, and poorer use of preventive healthcare (DeWalt et al., 2004). The basic hypothesis developed in this direction is as follows: "H<sub>1</sub>: "Health literacy has a statistically significant and positive effect on healthy lifestyle and rational drug use."

**Sampling and participant**

The universe of the research consists of patients and their relatives who receive health services from pharmacies operating in the city center of Bolu. The sample group consists of 400 participants. The data were obtained by using face-to-face survey

technique between December 1, 2019 and February 10, 2020 with the easy sampling method.

**Data Collection Tools**

Face to face survey technique was used as data collection method. The study was carried out as a cross-sectional study of patients and their relatives who receive health services from pharmacies operating in Bolu city center. The questionnaire form developed; It was discussed in detail with academicians and experts in the field of health management and the final version was formed. A pilot study (pre-test) was carried out on 20 people in order to ensure the structural validity of the updated questionnaire after the necessary arrangements were made in line with the criticisms made about the expressions in the questionnaire. The questionnaire form consists of four parts in total. In the first part, there are statements to determine health literacy consisting of 25 statements. In the second part, there are expressions to measure healthy lifestyle behavior consisting of 22 statements. In the third section, there are statements about rational drug use consisting of 19 propositions, while the last section includes statements about the basic characteristics of managers.

**Scales Used in the Study**

In order to determine the health literacy levels of the participants; The European Health Literacy Survey (HLS-EU) utilized the health literacy questionnaire

form developed by the HLS-EU Consortium within the scope of the European Health Literacy Project 2009-2012 (HLS-EU CONSORTIUM, 2012). To determine the health literacy of the participants in the research; The European Health Literacy Survey (HLS-EU), a 28-question questionnaire developed by the HLS-EU Consortium within the scope of the European Health Literacy Project 2009-2012, as it is suitable for measuring the level of health literacy at the global level due to its structural and contextual characteristics. Form was prepared by taking an example. While preparing the healthy lifestyle behavior scale; The studies of Bahar et al. (2008) and Duran et al. Finally, the scale of attitude towards rational drug use was used from scale forms developed by Çelebi (2018) and Demirtaş et al. (2018).

### **Statistical Analysis**

SPSS 26 and AMOS 24 statistical analysis programs were used together for the analysis of the data set within the scope of the research. The data were analyzed in terms of variance, mean, frequency and percentage values, which express descriptive analysis. For reliability, item analysis based on item-total correlation was performed. Then, explanatory factor analysis and path analysis were performed.

### **Data Set Analysis Criteria**

#### **Criteria for Explanatory Factor Analysis**

Common factor variance was taken into account to generally examine the factor load values of the items before rotation. As the factorization technique, principal component analysis, which is the most widely used and easiest to interpret in social sciences, was used. In order to exclude variables that do not measure the same structure, the lower limit for the load values in the factor in which the variables are included was accepted as 0.40. Items that were collected under more than one factor and the difference between factor loads was less than 0.10 were defined as an overlapping factor and removed from the scale. Factors with an original value above 1 are considered as important factors. As the explained variance ratio, 55% was accepted as the limit value. Rotation was performed to ensure the independence of the factors, clarity and significance

in interpretation. Vertical rotation technique is used as a rotation technique.

### **Criteria for Path Analysis**

It was checked whether the standardized loadings of the observed variables on each structure are significant and the superior convergent validity is higher than 0.5. Then, compound reliability (CR) test was performed to check validity. If the mean variance extracted for each construct was greater than the variance shared with other constructs, the case that discriminative validity was provided was checked.

### **Ethical Approval**

The universe of the research consists of patients and their relatives who receive health services from pharmacies operating in the city center of Bolu. The sample group consists of 400 participants. The data were obtained by using face-to-face survey technique between December 1, 2019 and February 10, 2020 with the easy sampling method.

## **RESULTS**

### **Reliability of Research Data**

In the research, reliability measurement was made by calculating the Cronbach Alpha coefficient for each structure. The health literacy factors, which constitute the variables of the study, were subjected to reliability analysis with 25 questions, healthy lifestyle behavior factors with 22 questions, and rational drug use factors with 19 questions. Reliability coefficients for the variables are given in Table 1. Therefore, considering all dimensions, it is seen that the reliability of the study is quite high.

### **Demographic Findings**

While 65% of the individuals participating in the research were male, 35% were female managers; 48% are middle age group (between 36-55) managers, 89% are at least high school and university graduates, 53% are middle-level managers, 48% are upper-level managers.

### **Findings Regarding the Explanatory Factor Analysis**

Explanatory factor analysis was performed on the data constituting the participants' health literacy levels, healthy lifestyles and rational drug use. The

analyses performed in this direction are given below.

**Table 1.** Reliability analysis results

Variable names	Cronbach's Alpha Coefficient
Health Literacy (HL)	0,920
Healthy Lifestyle Behaviour (HLB)	0,885
Rational Drug Use (RDU)	0,896

**Table 2.** Health literacy-explanatory factor analysis results

Factors	Variables	Factor Loads	Variance Explained	Self Value
Critical Health Literacy (CHR)	CHR10	,694	34,416	8,604
	CHR16	,664		
	CHR17	,637		
	CHR9	,600		
	CHR12	,538		
	CHR14	,520		
Functional Health Literacy (FHL)	CHR11	,484	6,716	1,679
	FHL3	,728		
	FHL1	,667		
	FHL2	,660		
	FHL5	,603		
	FHL4	,566		
	FHL7	,554		
Experiential Health Literacy (EHL)	FHL6	,484	5,168	1,292
	EHL24	,726		
	EHL23	,682		
	EHL25	,658		
	EHL18	,475		
Cognitive Health Literacy (CHL)	EHL22	,454	4,912	1,228
	CHL28	,743		
	CHL27	,659		
Interactive Health Literacy (IHL)	CHL26	,528	4,123	1,031
	IHL20	,709		
	IHL21	,690		
Evaluation Criteria	IHL19	,545		
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0,919			
	Approx. Chi-Square: 3774,751			
	Barlett's Test of Sphericity: 0,000			
	Extraction Method: Principal Components			
Rotation Method: Varimax				
Sum of Explained Variance: 55,335				

The result of Bartlett test is significant since  $p$  (sig) = 0.000 < 0.05 for the data subjected to factor analysis to determine the sub-variables of health literacy factors. That is, there are high correlations between variables and it means that the data came from multiple normal distribution. The result is perfect, as the KMO coefficient is 0.919. For this reason, sample size is sufficient for research.

The result of the Bartlett test is significant since  $p$  (sig) = 0.000 < 0.05 for the data subjected to factor analysis in order to determine the sub-variables of

healthy lifestyle behavior factors. That is, there are high correlations between variables and it means that the data came from multiple normal distribution. The result is perfect as the KMO coefficient is 0.866. For this reason, sample size is sufficient for research.

The result of the Bartlett test is significant since  $p$  (sig) = 0.000 < 0.05 for data subjected to factor analysis to determine the sub-variables of behavioral factors for rational drug use. That is, there are high correlations between variables and it means that the

data came from multiple normal distribution. The result is perfect as the KMO coefficient is 0.897. For this reason, sample size is sufficient for research.

**Table 3.** Healthy lifestyle behaviour-explanatory factor analysis results

Factors	Variables	Factor Loads	Variance Explained	Self Value
Balanced Diet (BD)	BD38	,789	29,667	6,527
	BD36	,687		
	BD35	,642		
	BD32	,625		
	BD39	,574		
	BD44	,441		
Physical Activity (PA)	PA10	,809	8,247	1,814
	PA16	,745		
	PA11	,632		
	PA9	,569		
Compatibility (C)	C52	,746	7,126	1,568
	C49	,691		
	C51	,680		
	C50	,596		
Interpersonal Relationships (IR)	IR13	,691	5,445	1,198
	IR21	,682		
	IR27	,667		
	IR15	,666		
Spiritual Development (SD)	SD23	,748	5,001	1,100
	SD24	,683		
	SD43	,537		
	SD18	,467		
Evaluation Criteria	Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0,866 Approx. Chi-Square: 2816,171 Barlett's Test of Sphericity: 0,000 Extraction Method: Principal Components Rotation Method: Varimax Sum of Explained Variance: 55,486			

**Table 4.** Rational Drug Use-Explanatory Factor Analysis Results

Factors	Variables	Factor Loads	Variance Explained	Self Value
Correct usage (CU)	CU2	,778	35,478	6,741
	CU1	,748		
	CU4	,703		
	CU5	,682		
	CU3	,571		
Conscious Use (CU)	CU23	,759	7,137	1,356
	CU25	,720		
	CU21	,647		
	CU26	,586		
Effective Use (EU)	EU10	,768	6,607	1,255
	EU12	,587		
	EU13	,581		
	EU11	,541		
	EU9	,438		
Safe Use (SU)	EU14	,437	6,077	1,155
	SU17	,768		
	SU16	,749		
Evaluation Criteria	SU18	,722		
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0, 897 Approx. Chi-Square: 2735,135 Barlett's Test of Sphericity: 0,000 Extraction Method: Principal Components			

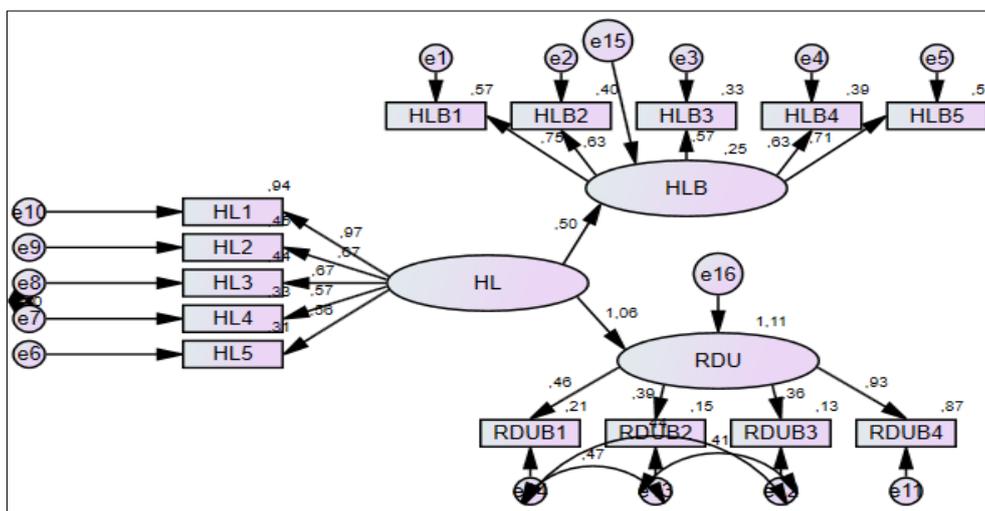
**Findings Regarding Path Analysis**

Path analysis is a method used to reveal the structural relationship between quantitative variables and to determine how much of the total effects of independent variables on dependent variables occur directly and how much indirectly. Path analysis with latent variables is an analysis that produces more reliable results than path analysis with observed variables. The diagram of model fit is obtained as follows.

The values of RMR, GFI, NFI, IFI, TLI, CFI given above show that the model fit is achieved. There is no limit

to the values to look at. Reported values may vary according to the values that the researcher wants to draw attention to. The fit values for the created model are given below. In addition, the explained variances and reliability of the factors calculated to determine the validity and reliability of the path analysis are given in Table 5.

When the standardized values of the total effects are examined, it is seen that the total predictive power of HL to RDU is 1,055 units, and the total predictive power of HL to HLB is 0.496 units.



HL: Health Literacy; HLB: Healthy Lifestyle Behaviour; RDU: Rational Drug Use  
[(X2/df: 4,263; GFI: 0.89; NFI: 0.90; CFI: 0.92; RMR: 0.044; TLI: 0.90; IFI: 92; AGFI: 0.84)]

**Figure 1.** Health literacy-healthy lifestyle behavior-rational drug use path diagram and goodness of compliance results

**Table 5.** Research model SEM results

Effects	Structural Relations	Standardized Regression Coefficients (β)	Critical Rate (C.R.)	P
Standardized Total Impact	RDU<--- HL	1,055	13,122	***
	HLB<--- HL	,496		
Standardized Direct Effect	RDU<--- HL	1,055	7,468	***
	HLB<--- HL	,496		

In Table 6 below, the values obtained after the analysis of well-accepted fit index values in the literature are shown. As a result, it was determined that health literacy significantly and positively affected rational drug use (= 1.055; p <0.05) and healthy lifestyle (= 0.496; p <0.05). For the model,

the effect of a healthy lifestyle on rational drug use, the effect of rational drug use on a healthy lifestyle, and whether there is an indirect effect of health literacy on the use of smart drugs through a healthy lifestyle were also examined, and it was determined that there was no effect.

As seen in Table 6, the results obtained show that the fit indices of the proposed research model are at an acceptable level of fit. Findings obtained by

explanatory factor analysis and path analysis show that the construct validity of the model is ensured.

**Table 6.** Structural Model Goodness of Fit Indices

General Model Compliance	Good Compliance	Acceptable Compliance	Achieved Compliance Values
$\chi^2/sd$	≤3	≤5	4.263
NFI	≥0.95	≥0.90	0.903
CFI	≥0.97	≥0.95	0.923
IFI	≥0.95	0.94-0.90	0.924
AGFI	>0.95	≥0.85	0.843
GFI	≥0.90	0.89-0.85	0.894
RMR	<0.05	<0.08	0.043

**CONCLUSION**

In recent years, changes have been observed in the behavior of individuals in the field of health, as in many other fields (Tamer Gencer vd., 2019). Studies in the literature have shown that people with limited health literacy have higher disease rates, worse health status, worse health outcomes, and higher health care costs than individuals with adequate literacy (Weiss et al., 2003; McCray, 2005). Over the past 20 years, researchers have identified health literacy issues, its role in understanding medical and personal care information, and its relevance to health outcomes ( Speros, 2004).

This study, which was conducted in order to determine the effect of health literacy on healthy lifestyle and rational drug use, through path analysis, the universe of the research consists of patients and their relatives who receive health services from pharmacies operating in the city center of Bolu. The results obtained from the research are given below: By making path analysis; it has been observed that the effect of health literacy on healthy lifestyle and rational drug use has an acceptable index of fit. In the reliability analysis performed for all variables, it was determined that the reliability levels of the scales were high.

When the standardized values of total effects are examined, it is seen that the total predictive power of health literacy on rational drug use is 1,055 units, and the total predictive power of health literacy on healthy lifestyle is 0.496 units. In Table 6 below, the values obtained after the analysis of well-accepted fit index values in the literature are shown. As a result, it was determined that health literacy significantly and positively affected rational drug use

(= 1.055; p <0.05) and healthy lifestyle behaviour (= 0.496; p <0.05). In addition, the effect of a healthy lifestyle on rational drug use, the effect of rational drug use on a healthy lifestyle, and whether there is an indirect effect of health literacy on the use of smart drugs through a healthy lifestyle were examined, and it was determined that there was no effect.

Considering that health literacy has a positive effect on rational drug use and healthy lifestyle in this study, it is recommended to increase the health literacy level of the society in general. Both health professionals and health workers and hospital management have a great role in the development of health literacy. It is suggested that health literacy should be addressed by all its stakeholders and increased through public service announcements and training provided by health professionals. In this direction, it is necessary for healthcare professionals to listen to the patient in order to communicate better with the patient, to inform the patient in all processes, and to cooperate with the patient in the preparation of written and visual messages. In addition, it is recommended that this study be conducted in different samples and with different variables.

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