

*Original Article / Araştırma Makalesi*

**THE EFFECT OF HEALTH LITERACY ON RATIONAL DRUG USE BEHAVIOR**

**Sağlık Okuryazarlığının Akılcı İlaç Kullanımı Davranışına Etkisi**

Fuat YALMAN<sup>1</sup> 

Mehmet Selami YILDIZ<sup>2</sup> 

Nazmi VURAL<sup>3</sup> 

<sup>1,2</sup>Düzce University, Faculty of Business Administration, Düzce

<sup>3</sup>Ali Raif Pharmaceutical Industry, İstanbul

*Geliş Tarihi / Received:* 14.01.2022

*Kabul Tarihi / Accepted:* 20.04.2022

**ABSTRACT**

The main purpose of this study is to determine the effects of the factors affecting the health literacy levels of individuals on the factors affecting their rational drug use levels using path analysis and to reveal the path coefficients according to the degree of importance. The study population of the research consisted of patients and their relatives who received health services from pharmacies operating in Sakarya city centres. A population-based cross-sectional research design was applied. Frequency analysis, explanatory factor analysis and path analysis techniques were applied to the research data. IBM SPSS 23 V and AMOS package programs were used in the analysis of the data. Functional health literacy levels of individuals has affected their; correct drug use, effective drug use and safe drug use levels in a statistically significantly and positive manner. In addition, it has been determined that the communicative health literacy levels of individuals affected their; correct drug use, effective drug use and safe drug use levels in a statistically significant and negative way. In this research, it is recommended to provide education and information programs to increase the health literacy level of the society and to raise awareness about the correct rational use of drugs.

**Keywords:** Health literacy, Patients, Rational drug use.

**ÖZ**

Bu çalışmanın temel amacı, bireylerin sağlık okuryazarlık düzeylerini etkileyen faktörlerin, onların akılcı ilaç kullanım düzeylerini etkileyen faktörler üzerindeki etkisini yol analizi ile tespit etmek ve yol katsayılarını önemlilik derecesine göre ortaya koymaktır. Araştırmanın çalışma evrenini Sakarya il merkezlerinde faaliyet gösteren eczanelerden sağlık hizmeti alan hasta ve hasta yakınları oluşturdu. Toplum temelli kesitsel araştırma tasarımı uygulandı. Araştırma verilerine frekans analizleri, açıklayıcı faktör analizi ve yol analizi teknikleri uygulandı. Verilerin analizinde IBM SPSS 23 V ve AMOS paket programları kullanıldı. Fonksiyonel sağlık okuryazarlık düzeyleri, bireylerin; doğru ilaç kullanımını, etkili ilaç kullanımını ve güvenli ilaç kullanımı anlamlı ve pozitif şekilde etkilemiştir. Bunun yanı sıra, iletişimsel sağlık okuryazarlık düzeylerinin, bireylerin; doğru ilaç kullanımını, etkili ilaç kullanımını ve güvenli ilaç kullanımını düzeylerini anlamlı ve negatif şekilde etkilediği tespit edilmiştir. Bu çalışmada, toplumun sağlık okuryazarlık düzeyinin yükseltilmesine yönelik eğitim ve bilgilendirme programlarının sağlanması ve doğru akılcı ilaç kullanımını konusunda farkındalık oluşturulması önerilmektedir.

**Anahtar kelimeler:** Akılcı ilaç kullanımı, Hastalar, Sağlık okuryazarlığı.

---

## INTRODUCTION

Education is essential for a developing society. Education not only makes a successful contribution to the national economy and democracy but it is also considered as a key determinant of health (Yen & Moss, 1999). The increasing elderly population and the prevalence of non-communicable diseases associated with lifestyle require new actions to enable people to take better care of their health and strengthen them. The main goal is to support their well-being and self-management by providing training and involving patients in the collective decision-making process. This requires a sufficient level of health literacy for both patients and those serving people with chronic conditions (Ahmad, Ellins Krelle & Lawrie, 2014; Kayser, Karnoe, Duminski, Somekh & Vera-Muñoz, 2019). Limited health literacy levels are found in major population minorities and this fact is associated with poor self-care, poor general health status, and early death (Baker et al., 2007). A higher level of health literacy is associated with several positive outcomes, such as advanced disease management (Thai & George, 2010).

Health literacy is defined as the capacity of people to acquire, interpret and understand the health information and services which are necessary to make correct decisions (Berkman, Davis & McCormack, 2010). Health literacy has many dimensions, including the meaning of reading, understanding and communicating important medical and health information at different stages of life. Health literacy is at the heart of many health system priorities, including quality, cost control, safety and patient participation in health care decisions (Parker, Ruth, Ratzan, Scott & Lurie, 2003). Health literacy is one of the biggest determinants of health, and the world is recommended to establish a union of all those affected by the disease to monitor and coordinate strategic activities to improve health literacy (World Health Organization, 2012).

Health literacy is about the capacity of people to meet complex health demands in modern society. Due to the clear relationship between low health literacy and poor health outcomes and the potential to reduce these results, it is considered that the development of health literacy among people is crucial worldwide (Berkman et al., 2010; DeWalt, Berkman, Sheridan, Lohr & Pignone, 2004; Sudore et al., 2006). Health literacy improves and supports individuals' ability to access correct information and health services, their ability to use these services, and their ability to read and understand health care instructions correctly. At the same time, it strengthens the proper allocation of resources, creating appropriate and qualified

---

quality conditions in health services and competence on the individual's health and the health of society (Nielsen-Bohlman, Panzer & Kindig, 2004).

Studies in the US in the 1990s linked literacy to health and showed a relation between low literacy and decreased drug compliance, decreased disease information, and reduced personal care management skills (Parker, 2000). While the individuals with adequate health literacy have sufficient health knowledge and benefit from health services effectively, they lead to an increase in the quality of life and the quality of health services, and a decrease in health care costs on the contrary. As the individuals with insufficient health literacy have insufficient health information, they have; a high risk of illness, low levels of understanding of treatment methods, high frequency of hospitalization, and they also increase healthcare costs (U.S. Department of Health & Human Services, 2010).

It was found that patients with low health literacy levels were hospitalized more frequently and for a longer period than those with adequate health literacy levels. However, the lack of health literacy is associated with poor quality of care and creates an additional burden on health resources (La Vonne & Zun, 2008). People with insufficient health literacy levels benefit less from healthcare services, misunderstand health information, often wait longer, and seek medical help only when their problems become critical (Ferguson, 2008). However, an insufficient level of health literacy is also associated with; irrational drug use, non-compliance with doctors' instructions, and a lack of well-being. For this reason, it is necessary to evaluate health literacy to reduce the possibility of the risk arising from an insufficient level of health literacy (Peerson & Saunders, 2009).

Rational drug use requires patients to take medication sufficiently and in time. Taking medications for a sufficient time not only enhances the therapeutic effect of the drugs but also reduces the side effects and adverse reactions of the drugs (Drug Administration & Control Authority [DACA], 1996; World Health Organization, 1993). At the same time, rational drug use recommends correct and appropriate usage by the guidelines and clinical needs, which decrease the cost for the supplier, the community and the patient. The purpose of rational drug use is also to teach the concepts of the right patient, the right medicine, the right dose, the right path and the right time. Rational drug use refers the patients to take medications; at the lowest cost for themselves and their communities, at doses that meet their individual needs for a sufficient period (World Health Organization, 2002).

Although the drugs are important components of healthcare and play an important role in saving lives, their use as a whole is a complex issue for the doctor, the distributor and the patient. The WHO has developed some indicators to evaluate rational drug use practice in

healthcare facilities. These indicators are mostly prescription, health facility and patient care indicators. According to the World Health Organization, prescribing and dispensing inappropriate drugs is responsible for more than 50% of all drugs on the market, and irrational use of drugs results in various health risks and costs (World Health Organization, 2010).

Based on the evidence from former researches done with the general population and patients and their relatives, we speculate that the rational drug use levels of the patients and their relatives in Turkey is affected by the health literacy levels. To our knowledge, no previous studies have been conducted; to analyze the levels of health literacy and rational drug use of patients and their relatives with explanatory factor analysis, and to determine the structural relationship between health literacy and rational drug use level with structural equation modelling. Therefore, this study aimed to; (a) analyze the levels of health literacy and rational drug use of patients and their relatives with explanatory factor analysis, (b) determine the structural relationship between health literacy and rational drug use level with structural equation modelling (path analysis). The hypotheses we studied were that: (1) Patients and their relatives will show moderate or high levels of health literacy and rational drug use; (2) ensuring validity and reliability will show the existence of a structural relationship between health literacy and rational drug use; (3) health literacy will have a positive relationship with health literacy.

## **MATERIAL AND METHOD**

### **Ethics Approval**

This research was carried out upon the approval of the ethics committee of Duzce University Scientific Research and Publication Ethics Committee (Date: 31.12.2020, Decision Number: 2020/282).

### **Participants**

The data were collected from 657 patients and their relatives who received health services from pharmacies operating in Turkey with a face-to-face questionnaire technique. The sampling was incidental, due to the accessibility.

### **Research Design**

This was a cross-sectional study performed with face-to-face questionnaire from January 10, 2020, to March 10, 2020, in 657 patients and their relatives who received health services from pharmacies operating in Turkey. The study was designed and conducted by researchers.

---

## **Measurements of Variables**

The survey form consists of three parts. In the first part, consisting of 34 propositions, there are statements about the level of rational drug use. While 28 propositions with expressions for determining the health literacy levels of individuals are included in the second part, there are statements about the socio-demographic characteristics of the participants in the last part. To determine the health literacy levels of the participants; The European Health Literacy Survey (HLS-EU), a 28-question health literacy level developed by the HLS-EU Consortium as part of the European Health Literacy Project 2009-2012, which is suitable for measuring health literacy at a global level due to its structural and contextual features, has been used. The scale used to determine the factors affecting the rational drug use levels of the participants was created based on the studies of Çelebi (2018) and Demirtaş et al. (2018) (rational drug use scale study).

## **Data Analysis**

All statistical analyzes were performed by using IBM SPSS Statistic Base 23 V and AMOS programs. First of all, descriptive statistics were made to reveal the demographic characteristics of the participants and the scores of the tested constructs (health literacy and rational drug use). Secondly, explanatory factor analysis (EFA), by using IBM SPSS version 23 V, was performed to determine the health literacy levels of the participants and the behaviours towards rational drug use. Third, confirmatory factor analyses (CFA), using structural equation modelling in AMOS, were performed to assess different latent structure models of the relationship between health literacy and rational drug use levels. Criteria for determining confirmatory factor analysis model fit and measurement invariance were based on conventional standards (Brown, 2006; Byrne, 2001; Munro, 2005).

## **RESULTS**

### **Reliability of Research Data and Pilot Study**

#### **Conducting A Pilot Study**

A pilot study was carried out on 30 people with the draft scale, and the expression errors in the questionnaire statements, misunderstandings by the respondents, spelling mistakes etc. have been corrected.

### Test-Retest Reliability

For the test-retest reliability, the draft scale was administered to 30 people twice with a 2-week interval and the total scores from the scale are given below. The level (degree) of the Pearson correlation coefficient between the first and the second application is 0.91 (91%), meaning that there is a very strong positive correlation between the first and the second application. It can be concluded that the measurements taken at different times are very similar, hence, the scale is highly reliable.

### Application of the Draft Scale to the Target Audience

A face-to-face survey technique was applied to 657 patients and their relatives.

### Performing Item Analysis For Internal Consistency Reliability

For the reliability analysis, "item analysis based on item-total correlation" was performed on the data obtained from the target population.

### Demographic Findings and Descriptive Statistics

A total of 657 respondents' responses were considered for the analysis of this study. It can be seen that 43% were males and 57% were females. And also 34% of the participants were between the ages of 18 and 25.51% of the participants were between the ages of 26 and 45.15% of the participants were between the ages of 46 and over. Of the participants; 9% had primary school, 12% had secondary school, 36% had high school, 42% had university, 2% had postgraduate education level. While 69% of participants preferred public hospitals, 31% preferred private hospitals. Also, 68% of participants did not have any chronic diseases and 32% of participants had several chronic diseases. Descriptive statistics are given in Table 1.

**Table 1.** Descriptive Statistics Related to Factors

Factors	N	Mean	Standard Deviation	Variance	Cronbach's alpha
Health Literacy	657	3.887	0.91822	0.049	0.980
Rational Drug Use	657	3.820	0.89123	0.454	0.954

The general reliability coefficient was found to be Alpha= 0.979. Ensuring validity and reliability shows the existence of a structural relationship between health literacy and rational drug use levels of the patients and their relatives.

## Explanatory Factor Analysis Results

An explanatory factor analysis was performed on the data about the health literacy levels of the participants and the behaviours towards rational drug use. The analyzes carried out in this direction are given below (Table 2 and Table 3).

**Tablo 2.** Health Literacy Level - Explanatory Factor Analysis

Factors	Variables	Factor Loads	Announced Variance	Self Value
Functional Health Literacy (FHL)	FHL1	.853	66.048	18.493
	FHL2	.835		
	FHL3	.826		
	FHL4	.804		
	FHL5	.784		
	FHL6	.746		
	FHL7	.741		
	FHL8	.741		
	FHL9	.697		
	FHL10	.656		
	FHL11	.627		
	FHL12	.612		
	FHL13	.612		
	FHL14	.587		
	FHL15	.559		
	FHL16	.553		
Communicative Health Literacy (CHL)	CHL1	.751	4.021	1.126
	CHL2	.750		
	CHL3	.733		
	CHL4	.730		
	CHL5	.682		
	CHL6	.655		
	CHL7	.652		
	CHL8	.650		
	CHL9	.646		
	CHL10	.635		
	CHL11	.615		
	CHL12	.545		
Evaluation Criteria	KMO: 0.975 Chi-Square: 20072.789 Barlett's Test: 0.000 Extraction Method: Principal Components Rotation Method: Varimax Explained Variance Total: 70.069			

The KMO value of the data analyzed to determine the sub-variables of the health literacy factors and the Bartlett test result seem to be acceptable for factor analysis (KMO value 0.975. Bartlett Test result  $p < 0.001$ ). The total variance explained by the first of these 2 factors related to the scale is 66,048% and the second one is 4,021%.

**Table 3.** Rational Drug Use - Explanatory Factor Analysis

Factors	Variables	Factor Loads	Announced Variance	Self Value
Correct Usage (CU)	CU1	.811	44.469	15.120
	CU2	.800		
	CU3	.799		
	CU4	.787		
	CU5	.779		
	CU6	.772		
	CU7	.746		
	CU8	.731		
	CU9	.729		
	CU10	.702		
	CU11	.692		
	CU12	.665		
	CU13	.645		
	CU14	.607		
	CU15	.605		
	CU16	.597		
	CU17	.539		
Conscious Use Level (CUL)	CUL1	.895	15.053	5.118
	CUL2	.878		
	CUL3	.877		
	CUL4	.865		
	CUL5	.799		
	CUL6	.786		
	CUL7	.755		
	CUL8	.705		
	CUL9	.587		
Effective Use (EU)	EU1	.711	3.849	1.309
	EU2	.705		
	EU3	.703		
	EU4	.605		
	EU5	.599		
	EU6	.472		
Safe Use (SU)	SU1	.524	3.509	1.193
	SU2	.521		
Evaluation Criteria	KMO: 0.959 Chi-Square: 18149.558 Barlett's Test of Sphericity: 0.000 Extraction Method: Principal Components Rotation Method: Varimax Explained Variance Total: 66.881			

The KMO value of the data analyzed to determine the sub-variables of rational drug use behaviour factors and the Bartlett test result seem to be acceptable for factor analysis (KMO value 0.995. Bartlett Test result  $p < 0.001$ ).

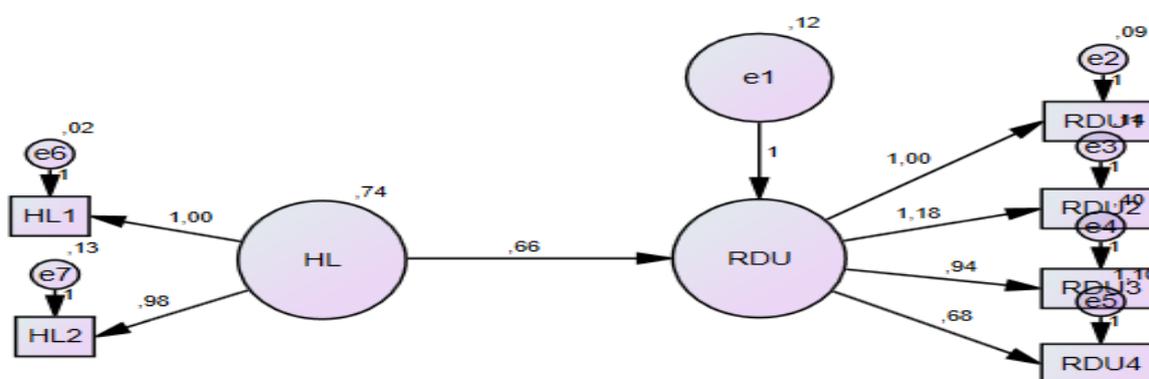
### The Model Fit Measures

The model fit was tested by different model fit indicators, which is given in table 4.

**Table 4.** Model Fit Measures

Measure	Estimate	Limit value	Commentary
CMIN/DF	3.928	Between 1 and 5	acceptable value
CFI	0.971	≥ 0.90	between the range of
GFI	0.949	≥ 0.85	between the range of
RMSEA	0.065	≤ 0.10	between the range of
NFI	0.968	≥ 0.90	between the range of
RFI	0.940	≥ 0.90	between the range of
TLI	0.945	≥ 0.90	between the range of

From Table 4, it can be summarized that this studies' questions/items of the latent variables pass through all the major model fit indicators suggested by Munro (2005), Brown (2006) and Byrne (2001).



**Figure 1.** The Full Model

The results for measuring the reliability and validity of the measurement model are illustrated in table 5. Table 5 represents that the reliability and validity of the constructs applied in this study met the criteria.

**Table 5.** The items' Estimate and the Constructs' Cronbach's  $\alpha$ , AVEs and CRs.

Constructs	Items	Estimate	Cronbach's $\alpha$	AVE	C.R.
Functional Health Literacy	FHL1	.752	0.977	0.64	0.91
	FHL2	.776			
	FHL3	.760			
	FHL4	.817			
	FHL5	.849			
	FHL6	.840			
	FHL7	.828			
	FHL8	.829			
	FHL9	.840			
	FHL10	.824			
	FHL11	.844			
	FHL12	.858			
	FHL13	.875			
	FHL14	.883			
	FHL15	.855			
	FHL16	.887			

Interactive Health Literacy	IHL1	.689	0.987	0.67	0.92
	IHL2	.726			
	IHL3	.888			
	IHL4	.888			
	IHL5	.878			
	IHL6	.685			
	IHL7	.595			
	IHL8	.842			
	IHL9	.806			
	IHL10	.831			
	IHL11	.855			
	IHL12	.753			
Correct Usage	CU1	.824	0.953	0.64	0.82
	CU2	.783			
	CU3	.783			
	CU4	.836			
	CU5	.795			
	CU6	.807			
	CU7	.793			
	CU8	.740			
	CU9	.758			
	CU10	.796			
	CU11	.734			
	CU12	.653			
	CU13	.742			
	CU14	.762			
	CU15	.774			
	CU16	.737			
	CU17	.699			
Conscious Use	COU1	.874	0.943	0.69	0.00
	COU2	.877			
	COU3	.913			
	COU4	.849			
	COU5	.708			
	COU6	.766			
	COU7	.788			
	COU8	.630			
	COU9	.561			
Effective Use	EU1	.819	0.944	0.67	0.81
	EU2	.798			
	EU3	.792			
	EU4	.710			
	EU5	.655			
Safe Use	SU1	.790	0.934	0.61	0.78
	SU2	.779			

Since the calculated AVE values are greater than 0.5, the factors have fit validity. Also since the CR values are greater than 0.7, the factors have high construct reliability. Table 6 shows the results of the structural model.

**Table 6.** The Result of the Structural Model

Hypotheses	Path	Standardized Coefficients	R <sup>2</sup>	Hypothesis Results
H1 <sub>a</sub>	Correct Use <-- Functional Health Literacy	1.534	.758	Supported
H2 <sub>a</sub>	Correct Use <--Communication Health Literacy	-.758		Supported
H1 <sub>c</sub>	Effective Use <-- Functional Health Literacy	1.169	.365	Supported
H2 <sub>c</sub>	Effective Use1<--Communication Health Literacy	-.365		Supported
H1 <sub>d</sub>	Safe Use <-- Functional Health Literacy	1.215	.581	Supported
H2 <sub>d</sub>	Safe Use1 <-- Communication Health Literacy	-.581		Supported
H2 <sub>b</sub>	Conscious Use<--Communication Health Literacy	.370	.370	Supported

The relationship between health literacy and rational drug use level and their properties are shown in Table 6.

### The Results of the Structural Model

When Table 6 is examined, “functional health” which is one of the health literacy dimensions, is the right drug use of individuals ( $\beta= 1.534$ ;  $p <0.05$ ), effective drug use of individuals ( $\beta= 1.169$ ;  $p <0.05$ ) and safe drug use of individuals ( $\beta= 1.215$ ;  $p <0.05$ ) is statistically significant and positively affected. In the light of these findings, the hypotheses numbered H1a, H1c and H1d were supported.

Similarly, when Table 6 is analyzed, it is stated that “communicative health literacy”, which is one of the health literacy dimensions, is the correct drug use of individuals ( $\beta= 0.758$ ;  $p <0.05$ ), effective drug use of individuals ( $\beta= 0.365$ ;  $p <0.05$ ). It was determined that drug use ( $\beta= 0.581$ ;  $p <0.05$ ) and individuals' conscious drug use ( $\beta= 0.370$ ;  $p <0.05$ ) were statistically significant and negatively affected. In the light of these findings, the research's hypotheses numbered H2a, H2b, H2c and H2d were supported, but the direction of the relationship was found different. This finding is somewhat inconsistent with the literature (hypothesis is supported, but unlike a positive relationship, a negative relationship emerged).

### DISCUSSION AND CONCLUSION

This study, which was carried out; to analyze the levels of health literacy and rational drug use of individuals and to determine the structural relationship between health literacy and rational drug use level with structural equation modelling, was conducted on patients and their relatives who received health services from pharmacies operating in Sakarya and Düzce city centres. For this, the study hypothesized, 'health literacy has a direct impact on rational drug use. And also by conducting confirmatory factor analysis, it was observed that the relationships between health literacy and rational drug use had an acceptable index of fit. The general reliability coefficient was found to be Alpha= 0.979.

According to the explanatory and confirmatory factor analysis results; health literacy level is gathered under two dimensions. These are; “functional health literacy” and “communicative health literacy”. Rational drug use levels of individuals were gathered under four dimensions. These are; “correct use”, “conscious use”, “effective use” and “safe use”.

In the results of the path analysis, it was determined that the individuals' health literacy levels had a statistically significant effect on their behaviour towards rational drug use. It was determined that "functional health literacy" which is one of the health literacy dimensions, affects the correct drug use of individuals, effective drug use of individuals, and safe drug use of individuals in a statistically significant and positive way. On the contrary, it was determined that "communicative health literacy", which is one of the health literacy dimensions, affects the correct drug use of individuals, effective drug use of individuals, safe drug use of individuals, and conscious drug use of individuals statistically significantly and negatively.

## REFERENCES

- Ahmad, N., Ellins, J., Krelle, H. & Lawrie, M. (2014). Person-centred care: from ideas to action. *Health Foundation*.
- Baker, D. W., Wolf, M. S., Feinglass, J., Thompson, J. A., Gazmararian, J. A. & Huang, J. (2007). Health literacy and mortality among elderly persons. *Arch Intern Med.*, 167(14), 1503-1509.
- Berkman, N., Davis, T. & McCormack, L. (2010). Health literacy: what is it? *Journal of Health Communication*, 15(2), 9-19.
- Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford Press.
- Byrne, B. M. (2001). *Structural equation modelling with AMOS: Basic concepts, applications, and programming*. Lawrence Erlbaum Associates.
- Çelebi, A. (2018). *Development of parental attitude scale towards rational drug use*. (PhD Thesis). Atatürk University, Erzurum.
- Demirtaş, Z., Dağtekin, G., Sağlan, R., Alaiye, M., Önsüz, M. F., ...Işıklı, B. (2018). Validity and reliability of rational drug use scale. *ESTÜDAM Journal of Public Health*, 3(3), 37-46.
- DeWalt, D. A., Berkman, N. D., Sheridan, S., Lohr, K. N. & Pignone, M. P. (2004). Literacy and health outcomes: a systematic review of the literature. *Journal of General Internal Medicine*, 19, 1228-1239.
- Drug Administration and Control Authority (DACA 1996). *Manual on drug supply management*. Addis Ababa, Ethiopia: Prepared by the department of DACA.
- Ferguson, B. (2008). Health literacy and health disparities: The role they play in maternal and child health. *Nurs Women's Health*, 12(4), 286-98.
- Kayser, L., Karnoe, A., Duminski, E., Somekh, D. & Vera-Muñoz, C. (2019). A new understanding of health-related empowerment in the context of active and healthy ageing. *BMC Health Serv Res.*, 19(1), 242.
- La Vonne, A. D. & Zun, L. S. (2008). Assessing adult health literacy in urban healthcare settings. *J Natl Med Assoc.*, 100 (11), 1304-1308.

- 
- Munro, B. H. (2005). Statistical methods for health care research. *Philadelphia: Lippincott Williams & Wilkins*, 351-376.
- Nielsen-Bohlman, L., Panzer, A. M. & Kindig, D. A. (Eds.). (2004). *Health literacy: A prescription to end confusion*. Washington, DC: National Academies Press.
- Parker, R. (2000). Health literacy: a challenge for American patients and their health care providers. *Health Promot Int.*, 15(4), 277-283.
- Parker, R. M., Ratzan, S. C. & Lurie, N. (2003). Health Literacy: A policy challenge for advancing high-quality health care. *Health Affairs Journal*, 22(4), 147-153.
- Peerson, A. & Saunders, M. (2009). Health literacy revisited: what do we mean and why does it matter?. *Health Promot Int.*, 24 (3), 285-296.
- Sudore, R. L., Yaffe, K., Satterfield, S., Harris, T. B., Mehta, K. M. & Simonsick, E. M. (2006). Limited literacy and mortality in the elderly: The health, aging, and body composition study. *Journal of General Internal Medicine*, 21, 806-812.
- Thai, A. L. & George, M. (2010). The effects of health literacy on asthma self-management. *J Asthma Allergy Educ.*, 1(2), 50-55.
- U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2010). *National action plan to improve health literacy*. Washington, DC.
- World Health Organization (WHO 1993). How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators. Geneva: World Health Organization.
- World Health Organization (WHO 2002). Promoting rational use of medicines: core components. World Health Organization Geneva. Retrieved from: <https://www.who.int/medicines/publications/policyperspectives/ppm05en.pdf>.
- World Health Organization (WHO 2010). The world medicines situations: Chapter 8, rational use of medicines, 2010. Retrieved from: <http://apps.who.int/medicinedocs/en/d/JS/6160e/10.html>.
- World Health Organization (WHO 2012). Social determinants of health. Commission on social determinants of health final report. Geneva: World Health Organization.
- Yen, I. H. & Moss, N. (1999). Unbundling education: A critical discussion of what education confers and how it lowers risk for disease and death. *Annals of the New York Academy of Sciences*, 896(1 ), 350 –351.