



# Examination of health literacy level of male technical personnel, Turkey

Yasin Uzuntarla

## ABSTRACT

**Introduction:** Health literacy is a concept that is influential in protecting and improving health, health choices, and behaviors of an individual and whose use has been increasing. **Objective:** It is aimed at determining the existing health literacy level in technical personnel who frequently have professional illnesses in time and whose socio-demographic characteristics are influential at this level. **Methods:** In this study with cross-sectional characteristic, all the technical personnel working at a South Korean-based international electronics company's regional authorized service center in Ankara were reached. The survey method was used as data collection instrument. In the analysis of data, Kruskal–Wallis and Mann–Whitney *U*-tests were applied using the SPSS 21.0 program. In determining the health literacy level, the Behavior Rating Inventory of the Executive Function (BRIEF) scale was used, and explanatory and confirmatory factor analyzes were done, using the AMOS 21.0 program to measure the structural validity of the scale. **Results:** All the technical personnel were male, and the mean age was found to be  $31.95 \pm 7.87$  years. It was found that the health literacy levels of 90% of participants were insufficient and that socio-demographic characteristics were not influential on the health literacy level. The BRIEF health literacy scale that had been originally developed as a single factor was found as a two-factor scale. **Conclusion:** It is thought that the results of this study in which the health literacy was examined first time on the technical personnel would increase the awareness of health literacy, and provide managers in the electronic and health sectors with important information. In addition, it is considered that the development of the BRIEF health literacy scale in conformity with the Turkish society would be appropriate.

**KEY WORDS:** Health literacy, socio-demographic characteristics, technical personnel

Gülhane Military Medical Academy, Department of Healthcare Services Management, Ankara, Turkey

**Address for correspondence:** Yasin Uzuntarla, Gülhane Military Medical Academy, Organ Transplantation Coordination Center, Ankara, Turkey. E-mail: yuzuntarla@gata.edu.tr

**Received:** February 01, 2016

**Accepted:** February 10, 2016

**Published:** March 02, 2016

## INTRODUCTION

The concept of literacy is a phenomenon that has come to the agenda as a result of advancements in technology and transition of societies to knowledge age and is used in 34 different areas such as knowledge, geography, media, arts, and health [1,2]. The health literacy is an important factor with regard to the health of society and individuals in patient-focused services [3] that has become more and more important and on which comprehensive studies have been conducted [4]. This concept was first used by Simonds in the article titled “Health Education as Social Policy” in 1974 [5]. However, its use has accelerated after the study named “The National Assessment of Adult Literacy” in the United States of America in 2003 [6,7]. Health literacy includes accessing knowledge, understanding, assessment, and application to protect and improve health [8].

That the health literacy, which is influential in the preferences and behaviors of individuals concerning health is at the sufficient level increases understanding the information related to health, accessing health services, and adjusting to treatment [9]. As for not having it at an insufficient level, it shows that the current health knowledge of individuals is little, that the forms on health and treatment are not well understood, that treatment

of chronic diseases such as kidney, heart, hypertension and diabetes, and fight against harmful materials, such as tobacco, salt, and alcohol, were not carried out successfully [10].

It is of great importance to measure and increase the health literacy of individuals from the point of protecting their health, having knowledge about relevant health fields, and acting in the healthiest and most proper way [11]. By this study conducted in this context, it was aimed at determining the current health literacy level of the technical personnel on whom certain professional diseases are frequently seen in time and which of socio-demographic characteristics are influential at this level.

## METHODS

### Participants

An international electronics company from South Korea has three regional authorized service centers in Ankara, Istanbul, and Izmir in Turkey. 60 employees working at the regional authorized service center in the capital city of Ankara constitute the universe of this study with the cross-sectional characteristic. All the personnel are male. The personnel are classified as technician assistant, technician, and administrative

personnel; and the administrative personnel are also originally technicians. In this study conducted in December 2015, all the 60 technical personnel who accepted participating in this study on a voluntary basis were reached.

**Measurements**

The survey method was used as the data collection instrument in the study. In the first section of the questionnaire, there were questions about socio-demographic characteristics; in the second section was the health literacy scale.

To determine the health literacy levels of the individuals, many scales were developed. Rapid Estimate of Adult Literacy in Medicine, Test of Functional Health Literacy in Adults, Medical Term Recognition Test, Wide Range Achievement Test, Newest Vital Sign, Health Activities Literacy Scale (HALS), eHALS, and Behavior Rating Inventory of Executive Function (BRIEF) were some of them [12-16]. In this study, the Brief Health Literacy Screening Tool-BRIEF developed by Haun [17] and Haun *et al.* [18] was used. Adaptation of the scale to Turkish was done by Taskaya and Sahin [19]. In the literature, as a result of the points received from the health literacy scales, individuals are categorized as low, middle, high [20] or in general sufficient-insufficient [21]. The BRIEF scale used in this study consisted of four questions. It was graded by a five-level Likert scale in the range of 1 = Always, 5 = Never. A minimum of 4 and maximum of 20 points are received from the scale. A high point indicates high health literacy. Those receiving 16 points or fewer are considered insufficient, those receiving 17 points or above sufficient [19].

**Statistical Analysis**

In the statistical analyzes of data, SPSS 21.0 program was used. Frequency, percentage, mean, and standard deviation were the descriptive statistics. Since the data did not fit the parametric test distribution, Kruskal-Wallis and Mann-Whitney *U*-tests were applied to find the differences between the groups. In statistical decisions, the significance level was accepted as  $P < 0.05$ .

Whereas one factor structure was seen in the original BRIEF scale, it was found to have a structure with two factors by the explanatory factor analysis that we had applied to the data obtained in our study; and a confirmatory factor analysis was done by AMOS 21.0 program to evaluate the fitness of the model to the data [Figure 1]. In the explanatory factor analysis, “principal component analysis” and “Varimax vertical rotation technique” were used; and “maximum likelihood” method in the confirmatory factor analysis.

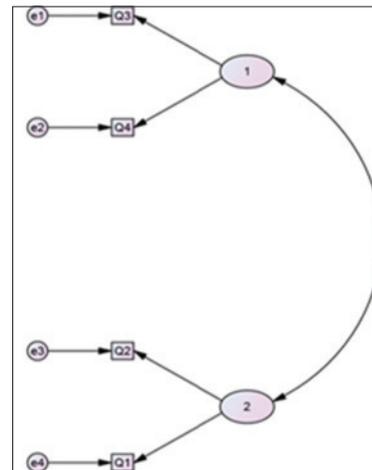
Since the Kaiser-Meyer-Olkin value is  $0.584 > 0.50$ , and the Bartlett test results were significant ( $P < 0.001$ ), our study was considered to be appropriate for factor analysis. By the principal component analysis and varimax vertical rotation technique, dimension reduction was made. It was seen that the structure with two factors obtained as a result of the explanatory factor analysis had explained 81.252% of the total

variance. The internal consistency coefficient of factors and total scale obtained afterward was examined, the Cronbach alpha value was found 0.635 for the factor 1 and 0.855 for the factor 2; 0.701 for the scale sum and the scale was considered to be reliable [Table 1].

Confirmatory factor analysis was applied to the data obtained from our study to evaluate the fitness of one-factor model and two-factor model, and various fitness indexes were examined. The  $\chi^2/df$  ratios in the study were found to be 14.131 in the one-factor model in the original of the scale and 0.120 in the two-factor model. It is considered to be good to have  $\chi^2/df$  ratio  $< 2$ . When examined the root mean square error of approximation (RMSEA) analysis results of the models, they were found to be 0.472 for the one-factor model and 0.000 for the two-factor model. Because the RMSEA value of the two-factor model is  $\leq 0.05$ , it was found to have good fitness. Other fitness indexes were also calculated and that two-factor model index values are above 0.90 has shown that it is a model fitting our observation values [Table 2].

**RESULTS**

The mean age of the technical personnel who participated in the study was found to be  $31.95 \pm 7.87$  years. Of the participants,



**Figure 1:** The model found in the study

**Table 1:** Results of explanatory factor analysis

Factors	F1	F2
Factor 1		
Q1	0.785	
Q2	0.898	
Factor 2		
Q3		0.925
Q4		0.916
Explained variance	53.297	27.954
Cumulative explained variance	53.297	81.252
KMO sampling adequacy		0.584
Bartlett test	$\chi^2=68.78, df=6, P<0.001$	
Cronbach's alpha coefficients	0.635	0.855
Total Cronbach's alpha of scale	0.701	

KMO: Kaiser-Meyer-Olkin

36.7% are 27 years and below, 45.0% have incomes between 850-1185 USD, 56.7% are married, 43.3% are technician, 45.0% have working length between 0 and 7 years, 46.7% are high school graduate, 85.0% do not have any chronic disease [Table 3].

Of the participants, 36.7% expressed that they need the help of others while reading hospital training materials, 31.6% that they have confidence in themselves while filling out medical forms by themselves, 61.6% that they have difficulties in understanding the condition of their illnesses since they have a hard time in understanding the written information, 66.6% that they have difficulty in understanding what doctors and nurses tell them about their illnesses [Table 4].

**Table 2: Results of confirmatory factor analysis**

Model fitness values	Required to be	One-factor model	Two-factor model
$\chi^2/df$	$\leq 3.00$	14.131	0.120
GFI	$\geq 0.90$	0.796	0.998
AGFI	$\geq 0.90$	0.321	0.990
NFI	$\geq 0.90$	0.406	0.997
RFI	$\geq 0.90$	-0.187	0.990
CFI	$\geq 0.90$	0.398	1.000
RMR	$\leq 0.05$	0.365	0.016
RMSEA	$\leq 0.05$	0.472	0.000
AIC	$< 20.000$	56.392 $> 20.000^*$	16.240 $< 20.000^*$
ECVI	$< 0.339$	0.956 $> 0.339^*$	0.275 $< 0.339^*$

\*It was compared with the saturated model. NFI: Normed fit index, AIC: Akaike information criterion, RFI: Relative fit index, ECVI: Expected cross-validation index, GFI: Goodness of fit index, RMSEA: Root mean square error of approximation, AGFI: Adjusted goodness of fit index, RMR: Root mean square residual

**Table 3: Socio-demographic characteristic of participants**

Characteristic	N (%)
Age	
27 and below	22 (36.7)
28-37	19 (31.7)
38 and above	19 (31.7)
Income level	
<850 USD	23 (38.3)
Between 850 and 1185 USD	27 (45.0)
1186 USD and above	10 (16.7)
Civil status	
Married	34 (56.7)
Single	26 (43.3)
Status	
Technician assistant	23 (38.3)
Technician	26 (43.3)
Administrative personnel	11 (18.3)
Working years in profession (years)	
0-7	27 (45.0)
8-16	20 (33.3)
17 and above	13 (21.7)
Education level	
Primary school	7 (11.7)
Secondary school	11 (18.3)
High school	28 (46.7)
University	14 (23.4)
Chronic illnesses	
No	51 (85.0)
Yes	9 (15.0)

Points between 4 and 20 are received from the BRIEF scale. High point shows high health literacy. Those receiving 16 points or fewer are considered insufficient, and 90.0% of the participants are in this range. The remaining 10.0% receiving 17 points or above are considered sufficient with respect to their health literacy. The mean literacy scale point in our study was found to be  $10.48 \pm 3.86$  and it is considered to be insufficient level [Table 5].

A statistically significant difference ( $P > 0.05$ ) was not found in the health literacy levels of the participants with respect to their socio-demographic characteristics, namely, age, income level, civil status, status, length of professional life, education level, and chronic illness. The health literacy levels of the participants in the age group between 28 and 37, with incomes of 1186 USD and higher, with higher status, working 17 years or longer, being primary school graduate, being married, and having chronic illnesses were found higher compared to other groups [Table 6].

## DISCUSSION AND CONCLUSION

By this study, it was aimed at determining the existing health literacy level and which of socio-demographic characteristics are influential at this level in technical personnel on whom certain professional illnesses are frequently seen in time.

At the end of our study, it was found that the BRIEF scale mean point was  $10.48 \pm 3.86$ , and the health literacy levels of 90% of the participants were insufficient. In studies conducted on patients, Aikens and Piette found that the health literacy levels of approximately half the patients were insufficient, whereas these levels being insufficient were found to be 65.3% by Taskaya and Sahin; 26.0% in general by Paasche-Orlow *et al.* in the meta-analysis study in which they reviewed 85 articles; 27.0% of elderly population by Tiller *et al.* [19,22-24]. Furthermore, in a study carried out in eight European countries, the levels of participants were found to be insufficient in Netherlands with the lowest (29.0%) and in Bulgaria with the highest (62.0%) [25]. This ratio is 64.6% in Turkey [26]. In another study done with refugees in Sweden, it was found that the health literacy level of about 60.0% of them was insufficient [27]. When compared with other studies, the health literacy level in our study is seen to be low. It is considered that this might be due to the fact that other studies were conducted on generally on patients and elderly people while our study was on working healthy individuals.

There are different explanations in the literature for socio-demographic characteristics that are influential on the level of health literacy. It was found that the health literacy level in women was higher and that it rose as the education level and age rose [24,28-29]. In a study conducted on the youth, it was found that the health literacy levels of those with low education level and immigrants were lower [30]. It was stated that ethnic and racial minorities, living in rural areas, poverty, being single had a reducing effect on the health literacy level [31-34]. In our study, socio-demographic characteristics were found not to be influential on the health literacy level. It is viewed that this may

**Table 4: Distribution of answers of participants to survey questions**

Questions	N (%)					Mean	SD
	Never	Time to time	Sometimes	Often	Always		
How often do you have someone help you read hospital materials?	13 (21.7)	11 (18.3)	14 (23.3)	15 (25.0)	7 (11.7)	2.86	1.33
How confident are you filling out medical forms by yourself?	8 (13.3)	20 (33.3)	13 (21.8)	11 (18.3)	8 (13.3)	2.85	1.25
How often do you have problems learning about your medical condition because of difficulty understanding written information?	7 (11.7)	4 (6.7)	12 (20.0)	17 (28.3)	20 (33.3)	3.65	1.32
How often do you have a problem understanding what is told to you about your medical condition?	7 (11.7)	4 (6.7)	9 (15.0)	11 (18.3)	29 (48.3)	3.85	1.40

SD: Standard deviation

**Table 5: Health literacy levels of participants**

Health literacy levels (10.48±3.86)	Points range	N (%)
Insufficient (9.62±3.01)	0-16	54 (90.0)
Sufficient (18.16±1.16)	17-20	6 (10.0)
Total	4-20	60 (100.0)

**Table 6: Health literacy levels of technical personnel with respect to socio-demographic characteristics**

Characteristics	N	Health literacy points Mean±SD (median)	Test
<b>Age</b>			
27 and below	22	9.68±3.70	$\chi^2=2.371$ $P=0.30^a$
28-37	19	11.36±3.83	
38 and above	19	10.52±4.07	
<b>Income level</b>			
<850 USD	23	10.43±3.94	$\chi^2=0.009$ $P=0.99^a$
Between 850 and 1185 USD	27	10.33±3.50	
1186 USD and above	10	11.00±4.89	
<b>Civil status</b>			
Married	34	10.97±3.91	$Z=-1.12$ $P=0.26^b$
Single	26	9.84±3.78	
<b>Status</b>			
Technician assistant	23	10.08±3.57	$\chi^2=0.407$ $P=0.81^a$
Technician	26	10.34±3.57	
Administrative personnel	11	11.63±5.10	
<b>Working years in profession (years)</b>			
0-7	27	10.29±3.33	$\chi^2=1.741$ $P=0.41^a$
8-16	20	9.65±3.30	
17 and above	13	12.15±5.25	
<b>Education level</b>			
Primary school	7	12.14±5.30	$\chi^2=1.712$ $P=0.63^a$
Secondary school	11	10.81±2.99	
High school	28	9.92±3.54	
University	14	10.50±4.41	
<b>Chronic illnesses</b>			
No	51	10.66±4.50	$Z=-0.10$ $P=0.99^b$
Yes	9	10.45±3.79	

$P<0.05$ , <sup>a</sup>Kruskal–Wallis test, <sup>b</sup>Mann–Whitney U-test. SD: Standard deviation

be influenced by that the number of participants were low, and the participants had similar characteristics.

With the explanatory and confirmatory factor analyzes applied to the data obtained in our study, using the BRIEF health literacy scale developed as one dimensional by Haun and *et al.* [18] to measure the health literacy level, it was found that the factor structure with two dimensions would be fit for the Turkish society. In our study, it was seen that the fitness indexes

of the two-factor structure were higher compared to the one-factor structure. It is regarded that it would be appropriate to develop the scale for the Turkish society.

In conclusion, in this study with cross-sectional characteristic, it was found that the health literacy level of the technical personnel working at the regional authorized service center in Ankara of an electronics company from South Korea operating at international level was insufficient, and the socio-demographic characteristics were not influential on health literacy level.

Since the health literacy level is influential on the health, decisions and behaviors of society and individuals, health professionals and trainers are considered to be important actors in delivering the relevant major services. It is viewed that it would be beneficial to give lifelong training on health literacy from early childhood age to the end of life to improve the health literacy. In addition, it is recommended to conduct further studies on health literacy in other professions.

## REFERENCES

1. Snaveley L, Cooper N. The information literacy debate. *J Acad Librarianship* 1997;23:9-14.
2. Guven I. Examination of information literacy and media literacy levels of science and technology teacher candidates. *Turk Stud* 2014;9:787-800.
3. Nutbeam D. The evolving concept of health literacy. *Soc Sci Med* 2008;67:2072-8.
4. Altin SV, Finke I, Kautz-Freimuth S, Stock S. The evolution of health literacy assessment tools: A systematic review. *BMC Public Health* 2014;14:1207.
5. Simonds SK. Health education as social policy. *Health Educ Monogr* 1974;2:1-25.
6. Egbert N, Nanna KM. Health literacy: Challenges and strategies. *Online J Issues Nursing* 2009;14:1-9.
7. Balçık PY, Taskaya S, Sahin B. Health literacy. *TAF Prev Med Bull* 2014;13:321-6.
8. Sørensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, *et al.* Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health* 2012;12:80.
9. Demircioglu S, Bulanik E, Cennet O, Boybay Z, Benderlioglu E, Aslan D. Content analyses of obesity news at high circulated national newspapers on march, august, October 2011 and February 2012. *TAF Prev Med Bull* 2013;12:271-82.
10. Kanj M, Mitic V. Promoting Health and Development: Closing the Implementation Gap. Kenya: 7<sup>th</sup> Global Conference on Health Promotion Nairobi.
11. Coffman MJ, Norton CK, Beene L. Diabetes symptoms, health literacy, and health care use in adult Latinos with diabetes risk factors. *J Cult Divers* 2012;19:4-9.
12. Peiravian F, Rasekh HR, Jahani Hashemi H, Mohammadi N, Jafari N, Fardi K. Drug literacy in Iran: The experience of using "The Single

- Item Health Literacy Screening (SILS) Tool". Iran J Pharm Res 2014;13 Suppl:217-24.
13. Al Sayah F, Williams B, Johnson JA. Measuring health literacy in individuals with diabetes: A systematic review and evaluation of available measures. *Health Educ Behav* 2013;40:42-55.
  14. Davis TC, Long SW, Jackson RH, Mayeaux EJ, George RB, Murphy PW, *et al.* Rapid estimate of adult literacy in medicine: A shortened screening instrument. *Fam Med* 1993;25:391-5.
  15. Weiss B, Mays MZ, Martz W, Castro KM, De Walt DA, Pignone MP, *et al.* Quick assessment of literacy in primary care: The newest vital sign. *Ann Fam Med* 2005;3:514-22.
  16. Aslantekin F, Yumrutas M. Health literacy and measurement. *TAF Prev Med Bull* 2014;13:327-34.
  17. Haun JN. Health Literacy: The Validation of a Short form Health Literacy Screening Assessment in An Ambulatory Care Setting. PhD Thesis, University of Florida; 2007.
  18. Haun J, Noland-Dodd V, Varnes J, Graham-Pole J, Rienzo B, Donaldson P. Testing the BRIF health literacy screening tool. *Federal Pract* 2009;26:24-31.
  19. Taskaya S, Sahin B. The effects of socio-demographic and clinical characteristics on the health literacy levels of patients with diabetes. 8<sup>th</sup> Health and Hospital Management Congress, Turkish Republic of Northern Cyprus; 2014.
  20. Sayah FA, Williams B. An integrated model of health literacy using diabetes as an exemplar. *Can J Diabetes* 2012;36:27-31.
  21. Sequeira SS, Eggermont LH, Silliman RA, Bickmore TW, Henault LE, Winter MR, *et al.* Limited health literacy and decline in executive function in older adults. *J Health Commun* 2013;18 Suppl 1:143-57.
  22. Aikens JE, Piette JD. Diabetic patients' medication underuse, illness outcomes, and beliefs about antihyperglycemic and antihypertensive treatments. *Diabetes Care* 2009;32:19-24.
  23. Paasche-Orlow MK, Parker RM, Gazmararian JA, Nielsen-Bohman LT, Rudd RR. The prevalence of limited health literacy. *J Gen Intern Med* 2005;20:175-84.
  24. Tiller D, Herzog B, Kluttig A, Haerting J. Health literacy in an urban elderly East-German population - Results from the population-based CARLA study. *BMC Public Health* 2015;15:883.
  25. HLS EU Consortium. The European Health Literacy Project (HLS-EU). Maastricht, 2012.
  26. Durusu-Tanriover MD, Yildirim HH, Ready ND, Cakir B, Akalin HE. Health literacy research in Turkey. Ankara: Saglik-Sen Yayinlari; 2014.
  27. Wångdahl J, Lytsy P, Mårtensson L, Westerling R. Health literacy among refugees in Sweden - A cross-sectional study. *BMC Public Health* 2014;14:1030.
  28. Nakayama K, Osaka W, Togari T, Ishikawa H, Yonekura Y, Sekido A, *et al.* Comprehensive health literacy in Japan is lower than in Europe: A validated Japanese-language assessment of health literacy. *BMC Public Health* 2015;15:505.
  29. Duong VT, Lin IF, Sorensen K, Pelikan JM, Van Den Broucke S, Lin YC, *et al.* Health literacy in Taiwan: A population-based study. *Asia Pac J Public Health* 2015;27:871-80.
  30. Quenzel G, Schaeffer D, Messer M, Vogt D. Health literacy among less well-educated young people: Influencing factors and consequences. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz* 2015;58:951-7.
  31. Ferguson LA, Pawlak R. Health literacy: The road to improved health outcomes. *J Nurse Pract* 2011;7:123-9.
  32. Cho YI, Lee SY, Arozullah AM, Crittenden KS. Effects of health literacy on health status and health service utilization amongst the elderly. *Soc Sci Med* 2008;66:1809-16.
  33. Morris NS, Maclean CD, Littenberg B. Change in health literacy over 2 years in older adults with diabetes. *Diabetes Educ* 2013;39:638-46.
  34. Chiarelli L. The Impact of Low Health Literacy on Chronic Disease Prevention and Control. Canadian Public Health Association Publication; 2006.

© SAGEYA. This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted, noncommercial use, distribution and reproduction in any medium, provided the work is properly cited.

**Source of Support: Nil, Conflict of Interest: None declared.**