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ORIGINAL ARTICLE

Health literacy in a population of primary health-care patients in Belgrade, Serbia

Aleksandra Jovic-Vranes · Vesna Bjegovic-Mikanovic · Jelena Marinkovic · Nikola Kocev

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Abstract
Objective Our objective was to evaluate the health literacy and its association with sociodemographic variables, the self-perception of health and the presence of chronic conditions in primary health-care patients.
Methods A cluster survey was conducted. A total of 1,500 patients were enrolled. Functional health literacy was measured by the Serbian version of the Short Test of Functional Health Literacy in Adults. Chi-square testing and multilevel logistic regression analyses were applied.
Results We found that health literacy was inadequate and marginal in 436 (32%) and 195 participants (14.4%), respectively, and adequate in 730 participants (53.6%). A better health literacy score was present among the following participants: younger, employed, and those with a high level of education, a good self-perception of health, a good socioeconomic status and no chronic conditions. If, on multilevel analysis, the primary health center and individual variables were included, the probability for adequate health literacy was higher among younger, employed, higher educated and those with no chronic conditions.
Conclusions Primary health-care patients do not have the literacy skills necessary to function adequately in the health-care environment.

A. Jovic-Vranes (✉) · V. Bjegovic-Mikanovic
Institute of Social Medicine,
Medical School Belgrade University, Dr Subotica 15,
11000 Belgrade, Serbia
e-mail: aljvranes@yahoo.co.uk

J. Marinkovic · N. Kocev
Institute of Medical Statistics and Informatics,
Medical School Belgrade University,
Dr Subotica 15, Belgrade, Serbia

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Introduction

Health literacy as a discrete form of literacy is becoming increasingly important for social, economic and health development. Early definitions tended to focus on a patient's ability to read and understand health-care information and their compliance with medical instructions. Subsequently, definitions broadened to include the ability to assess health information, make informed choices, personal empowerment and the importance of context (Kickbusch et al. 2006). An important step in examining literacy and health outcomes is clarifying what literacy means and how it has been measured. In its most common usage, literacy refers to an individual's ability to read and write OED (2008). Literacy is also sometimes used to describe a person's facility with or knowledge about a particular topic. For example, we often see phrases such as "science literacy" or "computer literacy". These terms generally refer to a person's ability to function in a particular context that requires some background knowledge. In this same way, "health literacy" has been defined as a constellation of skills that constitute the ability to perform basic reading and numerical tasks, which are required to function in the health-care environment (AMA 1999). Patients with adequate health literacy can read, understand and act on health-care information (Nutbeam 2000). Some authors have used an expanded definition of health literacy that includes a working knowledge of disease processes, self-efficacy and motivation for political action regarding health issues.

Currently, there is no measure of health literacy that reflects the broad range of skills captured in the definition.

Instruments for measuring literacy in the health-care setting have focused on the ability to read and in some cases to use numbers. Commonly used instruments include the Wide Range Achievement Test (WRAT) reading subset (WRI 1993), the Rapid Estimate of Adult Literacy in Medicine (REALM) (Davis et al. 1993) and the Test of Functional Health Literacy in Adults (TOFHLA) (Parker et al. 1995).

Limited health literacy is seen more frequently in lower-income individuals with limited education, among the elderly and racial minorities (Sudore et al. 2006; CCL 2007; AHRQ 2004). Limited health literacy has been associated with poorer clinical outcomes, increased mortality and higher costs at the health system level (Johnston et al. 2005; Howard et al. 2005). According to data, the costs of limited health literacy in the US or in Switzerland correspond to 3–5% of the total health-care spending (Eichler et al. 2009). The deleterious effects of poor health literacy have been seen in diverse disease conditions such as asthma, HIV/AIDS and diabetes mellitus (Mancuso and Rincon 2006; Kalichman et al. 2000; Schillinger et al. 2002).

The purpose of this paper was to evaluate health literacy and its association with sociodemographic variables, self-perception of health and the presence of chronic conditions in primary health-care patients in Belgrade, Serbia.

The period after 1990 coincided with a very difficult period with respect to political, social and cultural transition in Serbia. The health-care system in Serbia is now undergoing tremendous changes due to health-care reform. The basic characteristics of the population of the Republic of Serbia include demographic aging, high prevalence of non-communicable diseases and health risk behavior. The literacy rate (%) in the population >15 years of age is 96.5 (Institute of Public Health of Serbia 2009). Due to these facts, it is possible that a high percentage of the adult population has a low level of health literacy, which may impair an individual's ability to function in the health-care environment.

Methods

Sample and setting

The study was conducted in 16 primary health-care centers in Belgrade, Serbia. A total of 1,500 patients were enrolled during a 6-week period in June and July 2008. The sample size was calculated based on the number of total and first visits in each primary health-care center in the previous year. To diminish selection bias, patients were selected sequentially from the medical charts of patients waiting to be seen. Exclusion criteria were age <18 years, lack of cooperation, insufficient visual activity to read the instruments being tested and being too ill to participate. Ethical approval was obtained from the Medical School of the University of Belgrade. A letter of introduction describing the study was given to all participants and written informed consent was obtained from all participants prior to beginning the testing.

Instrument and procedure

The original English versions of the Test of Functional Health Literacy in Adults (TOFHLA) and the Short Test of Functional Health Literacy in Adults (STOFHLA) were translated into the Serbian language by a multidisciplinary team following the standard methods of translating and adapting the questionnaires (Sperber et al. 1994). The aim of cultural adaptation was to provide a version that was conceptually as close as possible to the original questionnaire, considering the patients' understanding. The Serbian versions of the TOFHLA and STOFHLA were administrated to ten primary care patients. Subsequently, the problematic items were changed (i.e., questions regarding health-care insurance were adapted to the Serbian health-care insurance system and US dollars were converted to Serbian dinars). In the preceding pilot study, it was shown that STOFHLA had good internal consistency, reliability (Cronbach $\alpha = 0.90$ for all items combined), and construct validity compared with the long version of the TOFHLA ($r = 0.89$). For the purpose of this study, we measured health literacy by the STOFHLA.

The STOFHLA (reading comprehension) tests a patient's ability to read passages using real material from the health-care setting and consists of 36 items. The test has two health-related passages (instructions for preparation for an upper GI series and patient's rights and responsibilities) and uses the modified Cloze procedure. The readability levels of these passages on the Gunning–Fog index are grades 4.3 and 10.4. The passages were ordered by increasing difficulty. Each passage had every fifth to seventh word deleted; for each blank, the respondent selected from a list of four words the one that best completed the sentence (modified Cloze procedure). The STOFHLA took 7 min to administer.

An additional self-completed questionnaire, containing 11 questions, was used. Individual level variables covered the sociodemographic characteristics (gender, age, education level, employment, and marital status), self-perception of socioeconomic status, self-perception of health, health system utilization (i.e., self-reported doctor visits) and health status (presence of chronic conditions, including hypertension, diabetes mellitus, coronary artery disease, heart failure, chronic bronchitis or emphysema, asthma,

arthritis and cancer). The group-level variable was the primary health-care center.

The level of education was classified into three categories as follows: low, primary school or less (≤8 years of school completed); medium, secondary school (8–12 years of school completed); and high, high and higher school (>12 years of school completed). Employment and marital status were categorized as employed/married and others. Self-perception of socioeconomic status and health status was measured with a five-point Likert scale, but for the final analysis we summed the responses using a three-point scale (poor, average and good).

The outcome variable was health literacy. We analyzed health literacy as scores and categories as follows: inadequate literacy, STOFHLA score of 0–16; marginal literacy, STOFHLA score of 17–22; and adequate literacy, STOFHLA score of 23–36. Also, the inadequate and marginal categories were combined into one denoting limited functional health literacy.

Data analysis

Descriptive statistics were reported in terms of the mean and standard deviation for the continuous variables, and absolute frequencies and percentages for categorical variables. The chi-square test was applied for assessing the significance of differences by patient characteristic and functional health literacy categories. A multilevel modeling technique was used to account for the hierarchical and cluster structure of the data (primary health-care centers). Differences in health literacy categories (adequate vs. limited) across sociodemographic variables, self-perception of health and presence of chronic conditions were examined by means of univariate and multivariate multilevel (hierarchical, mixed-effect) logistic regression analysis. The model used was a mixed logit model with random intercepts and fixed slopes. In all analyses, a random primary health center effect was included in the model to take the cluster structure of the data into account. The potential predictive variables were selected using an enter method with a p value < 0.20. All significance testing was done using the likelihood ratio test. We used the interclass correlation coefficient (ICC) to estimate the variability in health literacy between primary health-care centers. This coefficient represents the proportion of variability explained by the presence of clusters in the observed population (Merlo et al. 2005).

Data were entered and analyzed by the Statistical Package for Social Sciences (SPSS), version 17.0. Multilevel analysis was done with procedure *xtmelogit* in STATA 11.0. The probability, $p < 0.05$, was taken as the minimum level of significance.

Results

The study included 1,500 primary care patients: 1,361 patients completed the questionnaires giving a response rate of 90.73%. The sample contained a higher percentage of female patients (824; 60.6%). Patients ranged in age from 18 to 99 years (mean age 52.25 ± 16.63 years). Most of the respondents were secondary school educated (626; 53.9%), and 648 (60.1%) assessed their socioeconomic status as average. One or more chronic conditions were reported among 1,061 (78%) of the patients (mean 1.89 ± 1.47). Table 1 shows the respondents' characteristics and mean of

Table 1 Descriptive statistics: respondent characteristics and Short Test of Functional Health Literacy in Adults (STOFHLA)

	STOFHLA[a]		
	N	Mean	Standard deviation
Gender			
Male	537	20.75	10.34
Female	824	22.08	9.70
Age (years)			
≤44	426	26.20	8.29
45–64	552	22.17	9.23
≥65	349	15.86	9.60
Marital status			
Married	761	22.06	9.78
Others	600	20.94	10.19
Employment			
Employed	597	25.26	9.98
Others	764	18.68	10.11
Education (years of school completed)			
Low: primary school or less (≤8)	123	15.00	9.34
Medium: secondary school (8–12)	626	22.51	9.54
High: high and higher school (>12)	412	24.36	9.29
Socioeconomic status			
Poor	154	19.04	9.50
Average	648	23.15	9.68
Good	277	23.33	9.98
Self-perceived health			
Poor	161	18.55	9.62
Average	537	21.27	10.03
Good	446	25.25	8.81
Chronic conditions			
Without	300	25.48	9.21
One	329	23.34	9.27
Two	257	21.56	9.90
Three	162	18.97	10.03
>Three	313	17.29	9.47

Belgrade 2008

[a] STOFHLA (score 0–36)

the STOFHLA scores. Younger participants (<44 years) had the highest TOFHLA score (mean 26.20 ± 8.29), and the lowest score was present among those with ≤8 years of school completed (mean 15.00 ± 9.34).

Inadequate and marginal health literacy was found in 436 (32.0%) and 195 participants (14.3%), respectively. Adequate health literacy was present in 730 participants (53.6%). The distribution and association of health literacy by sociodemographic factors, self-perception of health and the presence of chronic conditions are shown in Table 2. Functional health literacy was significantly different based on age, employment, education, socioeconomic status, self-perception of health and chronic conditions.

Health literacy scores varied between gender and tended to decline with age. The gap between participants with more and less education tended to become more pronounced as they aged. Patients who reported their socioeconomic status as average or good and perceived their health as good had higher adequate health literacy scores (Table 2).

Table 3 shows the factors selected for the model with the estimated odds ratios (ORs) and 95% confidence

Table 2 Respondent characteristics by health literacy level

Characteristics	Functional health literacy			
	Adequate ($n = 730$)	Marginal ($n = 195$)	Inadequate ($n = 436$)	p value[a]
Gender				0.079
Male	269 (50.0)	79 (14.7)	189 (35.3)	
Female	461 (55.9)	116 (14.1)	247 (30.0)	
Age (years)				0.000
≤44	327 (76.8)	40 (9.4)	59 (13.8)	
45–64	296 (53.6)	98 (17.8)	158 (28.6)	
≥65	102 (29.2)	51 (14.6)	196 (56.2)	
Marital status				0.110
Married	426 (56.0)	108 (14.2)	227 (29.8)	
Others	304 (50.7)	87 (14.5)	209 (34.8)	
Employment				0.000
Employed	415 (69.5)	85 (14.2)	97 (16.2)	
Other	315 (41.2)	110 (14.4)	339 (44.4)	
Education (years of school completed)				0.000
Low: primary school or less (≤8)	32 (26.0)	15 (12.2)	76 (61.8)	
Medium: secondary school (8–12)	360 (57.5)	93 (14.9)	173 (27.6)	
High: high and higher school (>12)	271 (65.8)	52 (12.6)	89 (21.6)	
Socioeconomic status				0.000
Poor	64 (41.6)	24 (15.6)	66 (42.9)	
Average	395 (61.0)	80 (12.3)	173 (26.7)	
Good	169 (61.0)	36 (13.0)	72 (26.0)	
Self-perceived health				0.000
Poor	63 (39.1)	22 (13.7)	76 (47.2)	
Average	280 (52.1)	74 (13.8)	183 (34.1)	
Good	317 (71.1)	54 (12.1)	75 (16.8)	
Chronic conditions				0.000
None	220 (73.3)	29 (9.7)	51 (17.0)	
One	209 (63.5)	37 (11.2)	83 (25.2)	
Two	133 (51.8)	47 (18.3)	77 (30.0)	
Three	66 (40.7)	31 (19.1)	65 (40.1)	
>Three	102 (32.6)	51 (16.3)	160 (51.1)	

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Data are given as counts (percentages)

[a] According to chi-square test

Table 3 Multilevel logistic models for health literacy

Characteristics	Univariate		Multivariate	
	OR	95% CI	OR	95% CI
Gender				
Male	1.24	0.99–1.54	1.17	0.84–1.64
Female	1		1	
Age				
≤44	10.06	7.11–14.23	5.40	3.10–9.58
45–64	3.01	2.23–4.06	2.32	1.49–3.60
≥65	1		1	
Marital status				
Married	1.14	0.92–1.43	1.07	0.75–1.51
Others	1		1	
Employment				
Employed	3.48	2.74–4.43	1.69	1.16–2.46
Others	1		1	
Education				
Low: primary school or less (≤8)	1		1	
Medium: secondary school (8–12)	3.74	2.39–5.85	2.60	1.51–4.48
High: high and higher school (>12)	5.60	3.50–8.96	4.92	2.70–8.94
Socioeconomic status				
Poor	1		1	
Average	2.03	1.40–2.94	1.09	0.66–1.81
Good	2.04	1.34–3.09	0.84	0.47–1.51
Self-perceived health				
Poor	1		1	
Average	1.70	1.17–2.46	1.39	0.84–2.31
Good	3.85	2.60–5.69	1.74	0.97–3.12
Chronic conditions				
None	6.09	4.24–8.74	2.01	1.05–3.83
One	3.38	2.54–5.03	1.36	0.82–2.27
Two	2.21	1.56–3.15	1.12	0.67–1.89
Three	1.36	0.91–2.03	0.84	0.48–1.47
>Three	1		1	

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intervals (CIs). The multilevel univariate logistic model for health literacy shows that that probability for adequate health literacy was significantly higher among the following participants: younger (OR 10.06, 95% CI 7.11–14.23), employed (OR 3.48, 95% CI 2.74–4.43), high school educated (OR 5.60, 95% CI 3.50–8.96), those with average socioeconomic status (OR 2.03, 95% CI 1.40–2.94), those good self-perception of health (OR 3.85, 95% CI 2.60–5.69), and those with no chronic conditions (OR 6.09, 95% CI 4.24–8.74).

The multivariate multilevel logistic model confirmed that the following factors were most strongly associated with adequate health literacy: age (≤44 years) (OR 5.40, 95% CI 3.10–9.58), employed status (OR 1.69, 95% CI 1.16–2.46), high level of education (OR 4.92, 95% CI 2.70–8.94) and no chronic conditions (OR 2.01, 95% CI 1.05–3.83).

The ICC (0.15; i.e., 15% of the variance in participant's health literacy was attributable to between primary health center variation) denotes the degree of similarity among the outcomes of participants of the same primary health center.

Discussion

Our study showed that inadequate and marginal health literacy was present in 631 participants (46.4%) and adequate health literacy in 730 participants (53.6%). Adequate health literacy was more likely to be present among younger participants, the employed, those with a higher level of education, those with a good self-perception of health, those with better socioeconomic status and participants without chronic conditions. Multilevel logistic model confirmed that the following factors were most strongly associated with adequate health literacy: age (≤44 years), employment status, high level of education and no chronic conditions.

The ICC of 15% showed that the total individual differences in health literacy occurred at the primary health-care center level and might be attributable to contextual neighborhood factors or to the different composition of neighborhoods.

The prevalence of inadequate and marginal health literacy in our study, which was 46.4%, was higher compared to results from some previous cross-sectional studies (Ginde et al. 2008; Wagner et al. 2007; Wolf et al. 2005; Gazmamarian et al. 1999). A possible explanation may include a lesser degree of health knowledge and skills, a low level of formal education, a decline associated with aging and social stigma. Unfortunately, there is also a lack of school health education programs to address students' health issues, confusing or conflicting health information from the media and the Internet, complex health systems, demanding self-care regimes for chronic diseases, and lack of awareness and knowledge about health literacy among health professionals.

Many studies have emphasized that low health literacy may impair functioning in the health-care environment, affect patient–physician communication dynamics, and inadvertently lead to substandard medical care (AMA 1999; Schillinger et al. 2003). Low health literacy is associated with a poor understanding of written or spoken medical advice, adverse health outcomes, and negative effect on the health of the population. Some groups have an especially high prevalence of low literacy and include people who had completed fewer years of education, persons of certain

racial or ethnic backgrounds, the elderly and persons with lower cognitive abilities. Other factors associated with lower literacy include place of residence, female gender and income status classified as poor or near poor (Kirch et al. 2002; Baker et al. 2000; Berkman et al. 2004).

Functional health literacy in a national sample of British adults was 11.4% of participants who had either marginal or inadequate health literacy. In a national managed care program for Medicare enrollees, 34% of English-speaking patients had inadequate or marginal literacy based on the short-TOFHLA (S-TOFHLA). As a result of these and other reports, the nation has become more aware of the prevalence of low literacy and its effect on the health of the population (Wagner et al. 2007; Gazmamarian et al. 1999). A study among 2,923 enrollees in Cleveland, OH, USA showed that approximately one-third of the respondents had low health literacy (Wolf et al. 2005). Respondents with limited health literacy were more likely to be older, to have a lower annual income and fewer years of education, and significantly higher rates of some chronic conditions compared to those with adequate skills (Ginde et al. 2008; Wagner et al. 2007; Wolf et al. 2005), which correspond to our results.

This study was designed to assess the functional health literacy of primary health-care patients in Serbia where it has not previously been studied. Also, there are no studies that have explored functional health literacy in eastern European countries.

Several limitations may restrict the broader application of this study. The sample of this study was randomly selected, but it only reflects one city in Serbia. Therefore, the findings of this study should be limited to primary health-care centers in Belgrade. Caution must be used when generalizing the findings to participants in other cities and settings. Also, the cross-sectional study design does not allow us to establish causal relationships among variables, and self-perception, compared to facts, can be time sensitive and could increase the correlation due to a reporting bias.

In conclusion, our results showed that limitations in health literacy are widespread among primary health-care patients. Policies and programs are needed to develop an alliance with the education sector. Incorporating health knowledge and skills into school curricula would also help establish a foundation of health literacy in early age. All levels of government need to be involved in developing and supporting such health literacy policies and programs to reduce the numerous and interconnected individual and system barriers to health literacy. Also, attention should be directed to the population groups that appear most likely to have low levels of health literacy. None of this will happen without the recognition that health literacy is a serious concern, which needs to be addressed.

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