

Original Article

Factors Affecting Health Literacy in Adults: A Community Based Study in Konya, Turkey

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Abstract

Background: Health literacy has a strong relation with the health status and general well-being of individuals.

Objective: The aim of this study was to measure the health literacy level in a Turkish population and determine the factors affecting health literacy.

Methods: A community based cross-sectional study was carried out in Konya comprised of 195 adults belonging to twenty-five neighborhood (clusters) around five health centers located in the city. Data were collected using health literacy questionnaire (HLQ) and Newest Vital Sign (NVS) tool. The relationship between health literacy levels and various independent variables were analyzed using backward logistic regression.

Results: According to the HLQ tool, 70% possessed adequate literacy level and the remaining had limited literacy. According to NVS tool however, 27% of the population were found to have inadequate literacy, 31% had limited literacy and 42% had adequate literacy. Health literacy level was found to rise with increasing levels of education for both the tools and with income, only for HLQ tool.

Conclusion: Increasing awareness and understanding of health professionals regarding health literacy level of the addressed individuals can improve health outcomes.

Key words: health literacy, community, health care.

Introduction

Health literacy, a concept introduced in the early 1970s, has gained significant importance in the public health care field in the recent years. Research on health literacy although restricted to United States and Canada in the past, has been popularized and studied extensively in Northern Europe, Asia, and Australia over the last decade (Sorensen et al, 2012; Kondilis et al, 2008). A number of definitions exist for health literacy in the literature (Freedman et al, 2009, Berkman et al, 2008; Kickbusch & Nutbeam, 2008, Parker et al, 1999). However, the definition developed by National Library of Medicine, which is widely

used defines health literacy as, “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Neilson-Bohlman, Panzer, Kindig, 2004, Ratzan et al, 2000)). Health literacy has been shown to have a strong relation with the health status and general well-being of an individual. Moreover, health literacy leads to lower healthcare costs, increased health knowledge, shorter periods of hospitalization and less frequent use of healthcare services (Baker, 2006; Mancuso, 2008; Speros, 2005)). A low health literacy level in individuals has been found to result in inadequate understanding of

health information, carrying out directives and accessing health services (Neilson-Bohlman, Panzer, Kindig, 2004). Other studies have reported that low health literacy is related to negative health outcomes like poor health status (Kim, 2009; Wolf, Gazmararian, Baker, 2005), inadequate disease management (Powell, Hill, Clancy, 2007), lower rates of medicine adherence and higher hospitalization incidences (Kalichman, Ramachandran, Catz, 1999; Baker et al, 1998) and use of less preventive medical services (Scott et al, 2002). Although health literacy of an individual may vary depending on his learning ability, it may also be affected by culture, age, environment and his communication skills with health service personnel (Neilson-Bohlman, Panzer, Kindig, 2004).

In order to minimize the negative outcomes of inadequate health literacy in a population and raise public health standards, it is essential to be aware of the health literacy level and the affecting factors. Several instruments have been developed in order to evaluate health literacy (McCormack et al, 2010, Pleasant & Kuruvilla, 2008; Weiss et al, 2005; Parker et al, 1995; Davis, Long, Jackson, 1993) that may be listed as; Rapid Estimate of Adult Literacy in Medicine (REALM) (Davis, Long, Jackson, 1993), Test of Functional Health Literacy in Adults (TOFHLA) (Parker et al, 1995), and Newest Vital Sign (NVS) (Weiss et al, 2005). The structures of the instruments are different from each other, but in general, they evaluate writing, understanding and simple arithmetic abilities of individuals.

Turkey's health care system has been undergoing an extensive reform process since 2003. Radical changes have occurred in varied fields like the implementation of family medicine practice models providing preventive and curative medical services functioning from local health centers, expansion of the social security coverage to include total health service costs, proliferation of private health sector providing quality health services and so on in order to provide a better quality service in the health sector, a growing interest has developed in the field of health literacy among health professionals like doctors, nurses, nutritionists in Turkey in the recent years. This subject has been the center of interest in the academic arena and has been profoundly discussed in symposiums and congresses organized on National Public Health in Turkey. In spite of this focus and attention, lack of consensus regarding the definition of health

literacy poses a handicap in structuring standardized measurement techniques in the Turkish population. Few studies exist in Turkey regarding measurement of health literacy, conducted on hospital outpatients only (Ozdemir et al, 2010; Ugurlu, 2011). Although NVS has been validated and used in Turkey; it has its limitations. NVS does not include economic perception into consideration. Moreover, due to cultural differences among populations and functioning mode of various healthcare service organizations, there is a need for an ideal instrument for measuring health literacy of a particular community or population as the Turkish population.

This study was planned as a cross sectional community based study aimed to measure the health literacy level and related factors using a health literacy questionnaire, developed by the researchers, as well as the NVS tool.

Methods

Design and sample

This study was planned as a community-based cross sectional study performed in the Konya metropolitan of central Turkey. The target population of the study comprised of individuals between 18-65 years of age. Cluster sampling was used and the sample size was determined according to the formula suggested by Ozdemir et al. Taking into account the expected health literacy to be 60% (Ozdemir et al, 2010), design effect to be 2.0 for cluster sampling, and 95% confidence level with two-sided confidence interval width of 0.20, the total sample size was calculated to be two hundred (n=200).

The clusters were constituted in the following manner. Out of the sixty eight family medicine centers present in Konya metropolitan, five family medicine centers were selected where nursing and medical students were being trained as interns. Five neighborhoods per center (twenty five in total) were included in the study. Each neighborhood was considered as a single cluster. From each cluster (neighborhood), eight participants were included constituting a total sample size of 200. In order to increase the population representation strength of the sample, size of the clusters were kept small and the numbers high. Using the registration list of the health center, eight families agreeing to participate in the study were selected in a serial order beginning from any random point on the

list. One adult member for each family was interviewed in their home. Information regarding the study was provided to all participants and approval for participation was sought prior to their inclusion in the study. The conditions required for eligibility were to be above 18 years of age, literate, not educated in health related fields, having no cognitive, visual or auditory impairment and having given verbal consent for participation in the study.

Measures

The measurement tools comprised of a 10-item health literacy questionnaire (HLQ) designed by the researchers and the Newest Vital Sign Tool (NVS) (Weiss et al, 2005). The questionnaire was completed by the participants in the course of a face to face interview.

Seven items in health literacy questionnaire comprised of questions adapted from the 16 item health literacy screening tool proposed by Chew et al. (2004), which was most suitable among other questionnaires as far as the translation and adaption into Turkish language and conformation to Turkish community was concerned. The questions chosen, enabled participants to evaluate themselves regarding health literacy in four different areas where the patients frequently faced problems, namely “navigate the health care system”, “perform expected procedures in hospital”, “interact with health care providers”, and “comprehend medical forms, labels, brochures”. The questions were aimed to determine the frequency of instances when the participants faced hardships on being confronted with health literacy related topics, by asking them “how often” they faced such a problem. The five-level Likert scale was utilized for the responses. People who chose “never” or “rarely” options in these questions were regarded as adequately literate.

The eighth and ninth items comprised of the following two numerical questions:

- i) “If the first dose of a medicine that needs to be taken thrice a day has been taken by you at 8:00 am, when should you take the second dose?”
- ii) “Your doctor has instructed you to take 750 mg of antipyretic medicine. How many should you take from tablets of 500 mg each?”

Participants answering the questions correctly were considered as adequately literate.

In the last item, participants were asked to explain ten medical terms commonly used by health professionals. The percentage of participants who knew all the ten terms were considered adequately literate. As a whole, participants providing successful responses to six out of ten items of health literacy questionnaire were accepted to be adequately literate, rest were considered as inadequately literate as per the hypothesis of the study.

NVS is a screening tool that includes a standardized “Nutrition Facts Label” and six accompanying questions, requiring basic reading and numeracy skills. The tool is specifically designed for quick screening test of participants having lower levels of literacy in primary care settings (Weiss et al, 2005). NVS tool was used in this study to compare the results obtained by health literacy questionnaire. Initial translation of the tool into Turkish language was performed by the authors, following which the translation was reviewed by an English-language expert who was a native Turkish speaker. The survey was then translated back into English by an independent translator who had not seen the original questionnaire (Sperber, 2004). As specified in the tool, a copy of the label on a 500 ml ice-cream container was given to each of the participant and was asked to read the label carefully. A series of six questions related to the label was asked orally to the participants. The participants were allowed to refer to the copy of the label while answering the questions. The responses were recorded in a score sheet and level of health literacy was measured based on the number of correct answers provided. Four or more correct answers indicated adequate literacy; 2 to 3 correct answers indicated possible limited literacy, and 0 to 1 correct answers indicated limited health literacy.

Analytic Strategy

Total HLQ performance was calculated as percent of questions answered correctly. At least six or more correct answers in HLQ tool and four or more correct answers in NVS tool were taken as adequate health literacy. Health literacy was collapsed into dichotomous variables as adequate/inadequate and backward logistic regression analysis was performed to examine the relationship of health literacy with independent /predictor variables. Predictor variables included in the logistic regression model are age, gender, marital status, education,

profession, income status, health problem, experience of hospitalization, and an overall satisfaction with health services. The relationship between adequate literacy (according to HLQ and NVS) and demographic features was examined with chi-square test. $P < 0.05$ was considered significant.

A pilot study was conducted prior to the interview. The questionnaire was applied to 10 adults, all of whom stated that the clarity of questionnaire was satisfactory and completely understood with no ambiguous phrases. The outcome of the pilot study was not included in the actual data.

Ethical Considerations

All legal approvals regarding conducting such a study were obtained from The Ethical Committee of Selcuk University in 2014. Participants were informed about the study and their verbal consents were obtained. Confidentiality of data was guaranteed by the researchers.

Results

Five questionnaires were excluded from the evaluation because of missing information. Of the 195 participants included in the study, 44% were males ($p > 0.05$), 62% were younger than 35 years of age, 69% were married and 60% had graduated from primary and high schools (Table 1). According to the Health Literacy Questionnaire tool, 70% of the participants had adequate literacy and the remaining had limited literacy. According to Newest Vital Sign tool however, 27% of the population were found to have inadequate literacy, 31% had limited literacy and 42% had adequate literacy (Table 2).

On analyzing the health literacy based on materials as drug labels, prospectus and hospital poster; the level of understanding was found to vary between 47% and 83%. Level of understanding was highest in calculating doses of medicines and the directions of use provided by the pharmacist while the level of understanding was lowest for drug prospectuses and application times of medicine (Table 3). On examining the relationship between adequate literacy (according to HLQ and NVS) and demographic features, significant relationship was found between adequate level of literacy and education level for both HLQ and NVS, and perception of income level and occupation only for HLQ only (Table 4).

Findings of this study, identified relationship between adequate health literacy level and some independent variables (age, gender, education level, perception of income) for only five of the ten health literacy related questions in HLQ (Table 5).

Variables which were found to affect the adequacy of health literacy level, namely education and perception of income levels, were evaluated with backward logistic regression analysis. Occupation was not included in multivariate analysis because of its significant correlation with education. Health literacy level was found to rise with increasing levels of education for both the tools and income, only for HLQ tool (Table 6).

Discussion

Konya is the fourth largest city in Turkey, where the study was carried out. It is located in the Middle Anatolia Region, and according to the census data for 2013, the total population of Konya is 2,079,225, of which 1,031,563 are males and 1,047,662 are females. For Turkish population in general percent having no reading and writing skills comprise 4.7% whereas in Konya, it is 3.5% (males 1%, females 6%) (TUIK, 2013). More importantly, the population constitutes more or less a homogenous group representing the central Anatolia. Moreover, demographic characteristics of Konya reflect the general population of Turkey. Family health centers provide service to all individuals from the society. Therefore a random selection of health centers, neighborhoods and finally the families constituting the experimental sample in this study could be considered to be an appropriate representation of the general population in Turkey. Although statistically insignificant, women constituted the majority of the sample due to men being at work at the hours when the study was conducted.

In this study, on evaluation of total scores, 70% of the participants were shown to have adequate literacy according to HLQ while only 42% were found to be adequately literate according to the NVS tool score. Although, factors related to adequacy were similar for both instruments (Table 5, 6), this variation may have arisen due to the difference in structure of instruments. In HLQ there were only two numerical questions that required calculation skills, rest were based on individual perception.

Table 1. Distribution of participants according to demographic characteristics

Variable		N	%
Gender	Male	85	44
	Female	110	56
Age	24 and lower	45	23
	25-34	76	39
	35 and over	74	38
Marital status	Single	61	31
	Married	134	69
Education	Primary sch.	41	21
	High school	76	39
	Higher educ.	78	40
Occupation	Officer	57	29
	Housewife	41	21
	Craftsman-merchant	59	30
	Worker	18	9
	Student	20	10

Table 2. Health literacy scores according to HLQ and NVS tools

Tools	N	%
HLQ Score		
Adequate literacy	137	70.3
Inadequate literacy	58	29.7
NVS Score		
Adequate literacy	82	42.1
Limited literacy	61	31.2
Inadequate literacy	52	26.7

HLQ: Health Literacy Questionnaire NVS: Newest Vital Sign

Table 3. Percentages of correct answers/success by participants about health literacy topics (HLQ)

Health Literacy subjects	Percentage of correct answers/success
Calculation of medicine doses	83
Understanding pharmacist's instructions for medicine doses	82
Understanding written information on vaccine cards or diet forms	81
Understanding labels, posters and brochures in hospital	76
Understanding the information given by doctor and nurse	70
Understanding directions in hospital	61
Recognizing 10 most commonly used medicinal terms	61
Performing expected procedures in hospital on her/his own	57
Calculating application time for medicines	56
Understanding medicine prospectuses	47

HLQ:Health Literacy Questionnaire

Table 4 Distribution of participants with adequate HLQ and NVS scores according to demographic characteristics

Variable	N (%)	HLQ		NVS	
		%	P [†]	%	P [†]
Gender	Male	85 (44)	68	0.587	0.341
	Female	110 (56)	72		
Age	24 and lower	45 (23)	60	0.189	0.538
	25-34	76 (39)	71		
	35 and over	74 (38)	76		
Marital status	Single	61 (31)	62	0.101	0.913
	Married	134 (69)	74		
Education	Primary or High school	117 (60)	62	0.003	<0.001
	Higher educ.	78 (40)	82*		
Occupation	Officer	57 (29)	86*	0.018	0.026
	Housewife	41 (21)	63		
	Craftsman-merchant	59 (30)	68		
	Worker	18 (9)	67		
	Student	20 (10)	50		
Perception of income	Bad	143 (73)	65	0.014	0.012
	Good	52 (27)	84*		
Health problem	Absent	134 (69)	69	0.469	0.407
	Present	61 (31)	74		
Experience of hospitalization	Absent	106 (54)	71	0.868	0.298
	Present	89 (46)	70		
Overall satisfaction with health services	Unsatisfied	107 (55)	69	0.712	0.243
	Satisfied	88 (45)	72		

HLQ: Health Literacy Questionnaire

NVS: Newest Vital Sign

†Chi-square test

*Different group

Table 5. The relationship between health literacy topics (HLQ) and demographic variables (log reg. results)

Health Literacy topics	Independent variable		OR	P	95% CI
Understanding labels, posters and brochures in hospital	Perception of income	Bad	1.00		
		Good	2.81	0.048	1.04-8.41
Understanding information given by doctor or nurse	Gender	Male	1.00		
		Female	1.76	0.049	1.05-3.27
Calculating medicine application times	Education	Primary/ High S.	1.00		
		Higher Ed.	4.57	0.001	1.93-10.79
	Perception of income	Bad	1.00		
		Good	4.76	0.002	1.81-12.48
Calculating medicine doses	Age group:	Young	1.00		
		Adult	3.27	0.033	1.10-9.70
Recognizing 10 mostly used medicinal terms	Education	Primary/ High S.	1.00		
		Higher Ed.	3.77	0.001	1.98-7.226

OR: Odds Ratio HLQ: Health Literacy Questionnaire

Table 6. Factors affecting health literacy according to HLQ and NVS tools (results of log reg.)

Measurement tool	Variable		OR	P	95% CI
HLQ	Education	Primary or High S.	1.00		
		Higher Ed.	2.40	0.015	1.19-4.85
	Perception of income	Bad	1.00		
		Good	2.48	0.035	1.07-5.79
NVS	Education	Primary or High S.	1.00		
		Higher Ed.	4.30	<0.001	2.34-7.92

HLQ: Health Literacy Questionnaire NVS: Newest Vital Sign

Therefore, while answering these questions participants may not have reflected their actual health literacy levels. Apart from this, the low NVS tool scores can also be explained by Turkish individuals' poor habit of reading and using nutritional labels (Besler, Buyuktuncer, Uyar, 2012; Aygen, 2012) as well as calculation skills required for the NVS tool. Although NVS is a tool that is short and can be applied easily, however the scores of subjects obtained by NVS were shown to be lower as compared to some other tools applied together with NVS (Osborn, 2007; Patel et al, 2011). Ozdemir et al. used REALM and NVS tools on an experimental population (n=456) which was very similar to this study in terms of race, age, gender and education level. 59% of the participants were found to be adequately literate as per REALM while according to the NVS tool, only 28% of them were found to have adequate literacy (2010).

Average understanding and identification rate of situations requiring health literacy for HLQ was found to be 70% (min. 47% and max. 83%). This was a little higher than the expected level of 60%. The study was performed on an urban population which may have contributed to this difference. Moreover, the increase of average number of annual hospital visits to eight in recent years, indicate an increase in the level of health literacy of the population. Participants were found to comprehend medical information provided by pharmacists with a higher degree of understanding than information provided by physicians and nurses (Table 3). This may be due to the fact that, pharmacies belong to the private sector whose working principle is based on customer relation and satisfaction whereas the health care services belong to the public sector in Turkey.

The relationship between demographic variables and health literacy levels of participants provide certain clues regarding means of increasing health literacy in the population. Gender, age, education level and income levels were found to affect the level of health literacy (Table 4). Women were found to have a better understanding of the health information provided by physicians and nurses, probably due to more frequent use of health care services, as compared to men. A positive relation was observed between age and ability to calculate medicine doses, as well as recognize frequently used medical terms. Health literacy increased with

education and income levels, indicating that an improvement in health literacy of population in the following years can be achieved in Turkey with increased schooling rate and economic development.

Adequate level of health literacy (according to HLQ) was found to be related to education and income level (Table 6). Levinthal et al. (2008) in their study, also found a positive correlation between health literacy and education, and stated that this positive affect was due to the connection between education and cognitive skills. However, there are also studies showing that this relation is not always valid (Weiss, 2003). Adequate health literacy according to NVS tool is also related to education level, which may be an evidence for the validity of health literacy questionnaire instrument. Health literacy level of government employees were found to be higher than those having other occupations (Table 5). Apart from the fact that government employees are at least high school or university graduates, they deal with matters and documentations requiring literacy in their work places. Since majority of the health care services are provided in public health institutions in Turkey, government employees with the health related documentations, procedures and rules.

Health literacy has been shown to be related with demographic and socio-economic factors in various studies (Ozdemir et al, 2010; Neilson-Bohlman, Panzer, Kindig, 2004). In spite of the fact that education is the strongest factor affecting health literacy (Martin et al, 2009), they are not essential for each other. An individual demonstrating adequate literacy skills at home or work place may not demonstrate the same level of literacy skills in health related fields (De Walt & Pignone, 2005). Education level of an individual just reflects the number of formal school years and not his actual literacy skills. According to IOM reports 55% of high school graduates possessed low health literacy levels (Neilson-Bohlman, Panzer, Kindig, 2004).

There were a few limitations in this study. The primary limitation was, it was conducted on a relatively small sized population and limited to a certain geographical area in Turkey. Although random sampling was done, because of the small sample size, some of the confidence intervals were relatively large. Therefore, before the findings can be generalized, it is suggested that similar studies be carried out in different

geographical areas and cities to get a better and more detailed understanding of health literacy level in the population and related factors in Turkey. The second limitation was that the participants mainly consisted of females, since the study was conducted during the day on weekdays when the male members in the family were mostly away at work. It may be interesting to carry out the study and evaluate the health literacy levels of males in the same population. The third limitation was that individuals with visual, auditory and cognitive impairment could not be included in the study. Cognitive impairment was accepted as per declaration of the individual.

Conclusion

Developing a new scale for measurement of health literacy was not the intension of this study. In fact, the major objective of this study was to apply the health literacy questionnaire developed by the authors and evaluate the health literacy level of the experimental sample and compare the results with the health literacy level obtained by NVS tool executed on the same population. At the same time, this study was also intended to increase the awareness of the population in the field of health literacy. It was recommended that increasing general education level is a sound way of improving health literacy in a population.

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