Health Literacy Levels and Predictors Among Lebanese Adults Visiting Outpatient Clinics in Beirut

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ABSTRACT

Background: To date, there has been a dearth of research on health literacy in the Eastern Mediterranean Region and in particular Lebanon. **Objectives:** This cross-sectional study assessed the levels and correlates of health literacy in Lebanese adults. **Methods:** A total of 587 participants (54.5% women) were recruited from the outpatient clinics of five health facilities in Beirut. The questionnaire consisted of the Arabic version of the Functional Health literacy Scale, the Arabic short version of the European Health Literacy Survey, and questions on sociodemographic and health-related factors. Descriptive and inferential statistics were performed to assess the association of these factors with functional health literacy (FHL) and comprehensive health literacy (CHL) levels. **Key Results:** About 65.8% had inadequate or problematic FHL and 43.8% had inadequate or problematic CHL. Although FHL was negatively correlated with long-term illness, it was positively correlated with ability to pay and health status. CHL was positively correlated with education, income, ability to pay for treatment, health status, and FHL level, whereas it was negatively correlated with long-term illness. Binary logistic regression showed that low education, low socioeconomic status, and being a widow were predictive of inadequate FHL. Moreover, having inadequate FHL and low income increased the likelihood of having inadequate CHL. **Conclusion:** This study has identified those with risk factors for inadequate health literacy and unfavorable health outcomes. A national action plan can guide the promotion of health literacy and its embeddedness in society to instill competencies and the environment that would eliminate health inequities and sustain health in Lebanon. [**HLRP: Health Literacy Research and Practice**. 2021;5(4):e295-e309.]

Plain Language Summary: This study examined health literacy levels and correlates in 587 Lebanese adults using two recognized screening tools. The first tool measured functional health literacy (FHL), which represents the ability of a person to acquire information on health through reading or writing. The second tool assessed comprehensive health literacy (CHL), which encompasses the ability of a person to use their social skills to acquire health information from different media and make appropriate health decisions based on this information. Close to two-thirds of the participants had inadequate or problematic FHL. More specifically, low education, low socioeconomic status, and widowhood were predictive of inadequate FHL. Nearly one-half of the participants had inadequate or problematic CHL with an increased likelihood of inadequate levels in people with low FHL and low income.

The term "health literacy" first emerged in the 1970s in reference to health education in schools (Simonds, 1974). Since then, the concept has gained in complexity and multidimensionality (Okan et al., 2019). The European Health Literacy Consortium proposes the following integrated definition (Sørensen et al., 2012, p.3):

Health literacy is linked to literacy and entails people's knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgments and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course.

Thus, recent definitions of health literacy not only focus on individual skills, but also on the interaction of individual skills with the demands of the health care system and other situational complexities. Rudd et al. (2003) underlines the importance of the broader "health context," which includes the health care and educational systems, media, government agencies, the marketplace, society, and culture. People continuously evolve and interact with these systems on matters related to health. Thus, health literacy arises from the complex interactions among the people, their own capacity or unique set of skills, and their health context. Nutbeam (2008) proposes to make a distinction by type of health literacy. Functional health literacy (FHL) describes the ability of an individual to read, write and understand information on health services and health risks. The outcome of FHL is a better understanding of information relating to health. As for comprehensive health literacy (CHL), the individual's FHL is coupled with social skills that help an individual understand information and derive meaning from different forms of communication to be applied in their everyday life. The result is a higher capacity to act on knowledge and make appropriate health decisions with greater self-confidence. Finally, critical health literacy denotes the ability of individuals and societies to critically analyze information and use it to exert greater control over their economic and social circumstances. This leads to community empowerment, resilience in the face of adversity, and improvement of the social and economic determinants of health (Nutbeam, 2000; Zarcadoolas et al., 2003).

Health literacy is influenced by personal characteristics and social circumstances, which may contribute to health disparities particularly when the gap between needs and services provided is large (Bauer, 2019; Kutner et al., 2006; Sørensen, 2012). Its determinants include socioeconomic status, occupation, culture, and even political affiliation (Paasche-Orlow & Wolf, 2007). Media use is another determining factor considering the growth of the internet and the wealth of available information (Manganello, 2008). Because frequent users are young people, age 8 to 18 years, who spend a substantial amount of time on different types of media, they are most likely to benefit from health information available on these sources and the media interventions aimed at spreading health awareness (Manganello, 2008). However, digitalization can create health inequities because a digital gap may result from the lack of access and knowledge in media use among the most disadvantaged populations (Bauer, 2019). Other antecedents to health literacy include physical abilities, cognitive competence, and meta-cognitive skills such as reading, comprehension, and numeracy (Manganello, 2008; Speros, 2000).

The value of health literacy lies in its ability to predict health outcomes and costs, in its effect on social equality, and in the fact that it is a potentially modifiable factor that can be acted upon to promote a healthier and a more just society (Institute of Medicine, 2004). Moreover, low levels of health literacy have been associated with increased visits to the emergency department and a rise in hospital admissions and readmissions (Baker et al., 2002; Berkman et al., 2011; Herndon et al., 2011; Mitchell et al., 2012), higher prevalence of health risk factors (Aung et al., 2012; Yamashita & Kart, 2011), miscommunication with health providers and misinterpretation of health messages (Berkman et al.,

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2011; Schillinger et al., 2004), lower compliance with treatment regimen and higher incidence of adverse drug events (Lindquist et al., 2012), decreased physical functioning (Wolf et al., 2005), lack of patient engagement and participation in health prevention activities such as screening and vaccination (Adams et al., 2013; von Wagner et al., 2007), improper chronic disease self-care and poor health outcomes (Schillinger et al., 2002), and higher mortality rates (Sudore et al., 2006). For these reasons, the World Health Organization (WHO) has considered health literacy a critical determinant of health (WHO, 2017).

Given the scarcity of research on health literacy in the Eastern Mediterranean Region, particularly in Lebanon (Wikkeling-Scott et al., 2019), this study proposed to assess health literacy in Lebanese men and women in outpatient clinics in Beirut. Our main objectives were to provide data on the levels and correlates of health literacy in Beirut, contribute to the knowledge base on disparities in health literacy, and translate these findings into recommendations for policy and practice.

In Lebanon, the health care system consists of a private and a public sector with the latter including military health care. The private sector is a major component of the health care system and constitutes around 82% of the country's total capacity of beds with 12,648 beds (El-Khoury et al., 2012). The Security Forces Coverage is the most generous public service with more than 350,000 beneficiaries (Lebanese Army, 2020). Primarily funded by the Ministry of Defense, it covers all medical fees for members of the Lebanese army and internal security forces, 75% of their direct family's medical fees, and an additional 50% of their parents' medical fees (Kronfol, 2006). For the employed Lebanese, the National Social Security Fund covers 90% of hospitalization costs and 80% of medical consultations and pharmaceuticals in return for a percentage of the employee's income. Another branch of the Lebanese government's public service comprises the Cooperative of Civil Servants, which insures employees of the public sector and covers up to 90% of hospital stays and 75% of consultation fees and pharmaceuticals. Lebanese citizens who do not benefit from any of these schemes are covered by the Ministry of Public Health, or are enrolled in private insurance, or pay out-of-pocket. In Beirut, there is a single military hospital, 19 private hospitals, and two public hospitals (El-Khoury et al., 2012). The populations who use the services of these hospitals are not mutually exclusive. Depending on their ability to pay, individuals visiting the outpatient clinics of a military or a public hospital may choose to seek a second opinion or conduct further diagnostic tests in a private hospital.

The last official national census was in 1932, which was obstructed ever since due to politics, given that the country's political system is based on religious partitions within the government. This lack of official and updated data makes an analysis of the Lebanese socio-economic situation difficult (WHO, 2018). Nevertheless, the health status of the population has seen considerable progress. In the last 20 years, life expectancy at birth surged by 14 years, reaching an apogee of 81 years in 2012 (WHO, 2016). After the 1980s, chronic and degenerative disorders surpassed communicable diseases as leading causes of morbidity and mortality (WHO, 2016). The burden of disease, in 2012, attributable to noncommunicable diseases, communicable diseases and injuries was 84.9%, 6.1%, and 9.1%, respectively (WHO, 2016), with cancer causing an unparalleled burden with an incidence rate of 242.8 new cases per 100,000 population in 2018, the highest in the Middle East and North Africa (MENA) Region (WHO, 2018). Obesity has also become a major challenge with 67.9% of the adult population overweight and 32% obese (WHO, 2018).

METHODS
Study Design and Setting

This cross-sectional study assessed health literacy in a representative sample of Lebanese men and women in outpatient clinics in Beirut. Data collection was performed between August 2019 and December 2019 in the following hospitals: the Beirut Military Hospital (the only military hospital in Beirut), the Rafik Hariri University Hospital (one of two public hospitals in Beirut), and the LAU Medical Center-Rizk Hospital, Mount Lebanon Hospital, and Al Makassed Hospital (representing private hospitals in Beirut). Ethical approval was obtained from Lebanese American University's Institutional Review Board and from the hospitals' ethics committees.

Study Participants

Our sample consisted of 587 study participants as per **Table 1**. Eligible participants were Lebanese, male or female, age 18 years and older, who understand Arabic. The criteria for exclusion were non-Lebanese patients, younger than age 18 years, non-Arabic speakers/readers, lacking or not desiring cooperation, or feeling too ill to speak.

Data Collection

The research team visited the outpatient clinics of the different hospitals and interviewed the third patient that entered the clinics. If the patient fit the inclusion criteria, the researcher explained the purpose of the study, that participa-

TABLE 1

Distribution of Study Participants Across Hospitals in Beirut (*N* = 587)

Hospital Type	Hospital Name	Male *n* (%)	Female *n* (%)	Total *N* (%)
Public	Rafik Harriri University Hospital	81 (13.8)	100 (17)	181 (30.8)
Private	Al Makassed Hospital	29 (4.9)	38 (6.5)	67 (11.4)
	LAUMC-Rizk Hospital	22 (3.7)	43 (7.3)	65 (11.1)
	Mount Lebanon Hospital	28 (4.8)	38 (6.5)	66 (11.2)
Military	Military Hospital	107 (18.2)	101 (17.2)	208 (35.4)

Note. LAUMC = Lebanese American University Medical Center.

tion was voluntary, and that the participant had the right to refuse or withdraw at any moment without implication on their care. Additionally, the researcher obtained a written informed consent from the participant. The Arabic questionnaire was completed through face-to-face interview noting that the questionnaire was completely anonymous. The interview was conducted, by the researcher, in a private corner of the waiting area before the patient was called to the doctor's office. Explanations to study participants were standardized to avoid interviewer bias.

Our sample was calculated as per Cochran's formula, n = Z² p (1-p)/e², (Cochran, 1977) to be 576 participants, given a confidence interval (CI) of 95%, a population proportion of 0.40, and a margin of error of 0.04. In total, 720 people were approached. Of this group, 105 refused to participate. This corresponds to a response rate of 85.4%. The reasons mentioned for non-participation were being non-Lebanese and lacking time. Of the 615 questionnaires collected, 587 were retained for final analysis, whereas 28 questionnaires were discarded due to missing sociodemographic information.

The Questionnaire

The questionnaire consisted of the Arabic version of the Functional Health literacy Scale (FHLS), the short Arabic version of the European Health Literacy Survey (HLS-EU-Q16), and questions related to sex, age, place of birth, marital status, educational level, income, ability to pay for medication and treatment, self-perceived health status, the presence of chronic illness, and visit to a doctor in the last 3 months.

The FHLS was adopted from the work of Ishikawa et al. (2008). It consists of five items that measure FHL by studying the visual ability related to the design and accessibility of health-related texts, the understanding of words and concepts, the ability to persevere in reading, and the need for help in reading and understanding information (Ishikawa et al., 2008). These items were translated to Swedish, Arabic,

and other languages and were used among refugees in Sweden (Wångdahl et al., 2014). The Arabic version showed validity in the Swedish context, in which the Arabic-speaking persons were migrants. Assessments are made on a 5-point Likert scale (*never*, *seldom*, *sometimes*, *often*, and *always*), which are subsequently re-categorized into three new levels (lack of, problematic, and sufficient FHL) as per method described previously (Wångdahl et al., 2014). *Never* and *seldom* enter the sufficient category and are given a value of 1; *sometimes* is fitted in the problematic category and is given a value of 100; and *often* and *always* go into the lack of category and are given a value of 1,000. The values are then summed up and the scores are interpreted as follows: above 1,000 for "inadequate FHL," between 100 and 1,000 for "problematic FHL," and below 100 for "sufficient FHL." When dichotomized categories are required, mainly for the binary logistic regression, "inadequate FHL" is given the value of 1; and "sufficient FHL" and "problematic FHL" from the division above are categorized as "not inadequate FHL" and are given the value of 0.

Developed by the European Health Literacy Consortium (Sørensen et al., 2013), the short version of the HLS-EU-Q16 is derived from the HLS-EU-Q47. It contains 16 items that measure the individual's ability to obtain, understand, evaluate, and apply health-relevant information (i.e., information-processing competencies) in relation to three sub-domains: health care, disease prevention, and health promotion. This is referred to as comprehensive health literacy (CHL) (Sørensen et al., 2012). The perceived difficulty of each item is rated on a 4-point Likert scale. As per method described previously (Wångdahl & Mårtensson, 2015), the responses are dichotomized into *easy* (given a value of 1) and *difficult* (given a value of 0). The health literacy score is obtained from the sum of these values and is interpreted accord-

ing to the following scale: 0-8 as "likely inadequate CHL," 9-12 as "likely problematic CHL," and 13-16 as "likely sufficient CHL." There were no missing values in our dataset. When dichotomized categories are required for the binary logistic regression, "inadequate CHL" is given the value of 1, and "sufficient CHL" and "problematic CHL" are re-categorized as "not inadequate CHL" and given the value of 0.

Statistical Analysis

Analysis was carried out using the Statistical Package for the Social Sciences version 25 for Windows (Chicago, IL). Sample characteristics were reported as percentages. Pearson's chi-square tests of independence were performed to assess the association of sociodemographic factors (gender, age, place of birth, self-assessed social status, education, income) and health-related factors (visit to a health care facility in the past 3 months, any existing chronic disease) with FHL and CHL levels (inadequate, problematic, sufficient). Fisher's exact test was adopted when more than 20% of the expected values in cells were less than 5. Spearman's correlation was used to estimate the association of CHL and FHL levels with ordinal data (ability to pay for treatment, self-perceived health). After turning FHL and CHL into dichotomized outcome variables (inadequate and not inadequate), binary logistic regression was performed to assess the extent to which independent covariates predicted inadequate FHL or CHL. The following variables were included in model 1: sex, age, education, income, ability to pay for medication or treatment, self-perceived health status, doctor's visit in the last 3 months, birth location, self-assessed social status, and existing chronic disease. In model 2, FHL was included to test whether it was as a predictor of CHL. The results were expressed as crude odds ratios and adjusted odds ratios with a 95% CI. A *p* value of less than 0.05 was considered statistically significant.

RESULTS

Sample Characteristics

The sample consisted of 587 participants with a mean age of 37 ± 13 years (minimum = 18 and maximum = 87 years). There was a slightly higher proportion of women (54.5%) than men (45.5%). **Table 2** provides the general characteristics of the study population. Almost 3 of 4 (71.7%) were married; one-half (49.7%) had studied at university; 3 of 4 (71.6%) were middle class; 1 of 3 (33.4%) had a long-term illness; close to 2 of 5 found it hard to pay for treatment and medications (42%) and described their health as average to below average (37.6%); more than two-thirds (68%) had visited a doctor in the past three months.

Reliability and Validity of the Scales

The instruments had been validated among Arabic-speaking migrants in Sweden. In our context, results concerning reliability and validity were equally encouraging. High Cronbach's alpha (α = 0.84) showed high reliability of the items in the HLS-EU-Q16. The scale was subjected to a principal component analysis. The scree plot and Kaiser Eigenvalue extraction criteria suggested the presence of three factors. The first three Eigenvalues were, respectively, 4.76, 1.71, and 1.19. We then performed an oblique principal axis factoring which supported the theoretical three-factor structure (Wångdahl & Mårtensson, 2015). A confirmatory factor analysis was then applied to test construct validity. The results were satisfactory as both root mean square error of approximation (RMSEA) = 0.079 and standardized root mean square residual (SRMR) = 0.068 were less than 0.1, and the Tucker Lewis Index (TLI) = 0.806 and Comparative Fit Index (CFI) = 0.837 were both greater than 0.8.

Similar steps were followed to test the reliability and validity of the FHL scale. High Cronbach's alpha (α = 0.88) showed high reliability of the items. Removing any of the items decreased overall reliability and item-total correlations were high, varying from 0.65 to 0.85. This result confirmed the homogeneity of the items. We then subjected the FHL scale to a principal component analysis. The scree plot and Kaiser eigenvalue extraction criteria suggested the presence of one factor (eigenvalue 3.37) explaining 67.42% of the overall variance. The principal axis factoring supported the one-factor structure for FHL (Ishikawa et al., 2008). A confirmatory factor analysis showed the following fit indices: RMSEA = 0.108, SRMR = 0.027, TLI = 0.955, CFI = 0.978.

Health Literacy

The relations of FHL and CHL levels with sociodemographic and health-related variables were examined through Pearson's chi-square test of independence and Fisher's exact test **(Table 3)**. FHL was not independent from age, social status, education, and income. People who were more likely to have sufficient FHL were single, age 18 to 39 years, with university education, and of higher socioeconomic status. Moreover, CHL was not independent from age, place of birth, education, income, and long-term illness. There was a higher likelihood of having inadequate or problematic CHL in people age 60 years and older, with elementary education, suffering from a long-term illness, born in the Bekaa, North Lebanon or Akkar, and of a lower socioeconomic status.

TABLE 2

General Characteristics of the Study Population (*N* = 587)

Characteristic	Male *n* (%)	Female *n* (%)	Total *N* (%)
Gender	267 (45.5)	320 (54.5)	587 (100)
Social status			
Single	65 (11.1)	75 (12.8)	140 (23.9)
Married	194 (33)	227 (38.7)	421 (71.7)
Divorced	8 (1.4)	7 (1.2)	15 (2.6)
Widowed	0 (0)	11 (1.9)	11 (1.9)
Place of birth			
Mount Lebanon	52 (8.9)	65 (11.1)	117 (19.9)
Bekaa	27 (4.6)	36 (6.1)	63 (10.7)
Baalbek/Hermel	27 (4.6)	32 (5.5)	59 (10.1)
North Lebanon	21 (3.6)	30 (5.1)	51 (8.7)
Akkar	23 (3.9)	12 (2)	35 (6)
Saida/South Lebanon	56 (9.5)	73 (12.4)	129 (22)
Beirut	61 (10.4)	72 (12.3)	133 (22.7)
Education			
Elementary school	16 (2.6)	27 (4.6)	43 (7.3)
Middle school	65 (10.7)	41 (7)	106 (18.1)
Secondary school	62 (10.3)	84 (14.3)	146 (24.9)
University	124 (20.1)	168 (28.6)	292 (49.7)
Income			
Low	69 (11.8)	78 (13.3)	147 (25)
Medium	186 (31.7)	234 (39.9)	420 (71.6)
High	12 (2)	8 (1.4)	20 (3.4)
Ability to pay for treatment and medication			
Very hard	43 (7.3)	36 (6.1)	79 (13.5)
Hard	77 (13.1)	90 (15.3)	167 (28.4)
Medium	101 (17.2)	146 (24.9)	247 (42.1)
Easy	31 (5.3)	38 (6.5)	69 (11.8)
Very easy	15 (2.6)	10 (1.7)	25 (4.3)
Self-perceived health status			
Very bad	5 (0.9)	4 (0.7)	9 (1.5)
Bad	16 (2.7)	14 (2.4)	30 (5.1)
Average	76 (12.9)	106 (18.1)	182 (31)
Good	130 (22.1)	148 (25.2)	278 (47.4)
Very good	40 (6.8)	48 (8.2)	88 (15)
Visit to health care in the last 3 months			
Yes	148 (25.2)	251 (42.8)	399 (68)
No	119 (20.3)	69 (11.8)	188 (32)
Long-term illness			
Yes	98 (16.7)	98 (16.7)	196 (33.4)
No	169 (28.8)	222 (37.8)	391 (66.6)

TABLE 3

Distribution of FHL and CHL Levels by Sociodemographic Factors and Health-Related Variables (*N* = 587)

Characteristic	Inadequate FHL	Problematic FHL	Sufficient FHL	*P* value	Inadequate CHL	Problematic CHL	Sufficient CHL	*P* value
	n (%)				*n* (%)			
Gender								
Male	104 (17.7)	69 (11.8)	94 (16)	.772	26 (4.4)	86 (14.7)	155 (26.4)	.715
Female	122 (20.8)	91 (15.5)	107 (18.2)		34 (5.8)	111 (18.9)	175 (29.8)	
Age (years)								
18-39	137 (23.3)	103 (17.5)	150 (25.6)		43 (7.3)	129 (22)	218 (37.1)	
40-59	67 (11.4)	50 (8.5)	46 (7.8)	.003ᵃ	13 (2.2)	49 (8.3)	101 (17.2)	.024ᵃ
≥60	22 (3.7)	7 (1.2)	5 (0.9)		4 (0.7)	19 (3.2)	11 (1.9)	
Place of birth								
Mount Lebanon	44 (7.5)	34 (5.8)	39 (6.6)		10 (1.7)	39 (6.6)	68 (11.6)	
Bekaa	27 (4.6)	20 (3.4)	16 (2.7)		4 (0.7)	25 (4.3)	34 (5.8)	
Baalbek/Hermel	22 (3.7)	20 (3.4)	17 (2.9)		6 (1)	23 (3.9)	30 (5.1)	
North Lebanon	26 (4.4)	11 (1.9)	14 (2.4)	.343	13 (2.2)	26 (4.4)	12 (2)	.000ᵃ
Akkar	16 (2.7)	5 (0.9)	14 (2.4)		4 (0.7)	15 (2.6)	16 (2.7)	
Saida/South Lebanon	43 (7.3)	33 (5.6)	53 (9)		14 (2.4)	36 (6.1)	79 (13.5)	
Beirut	48 (8.2)	37 (6.3)	48 (8.2)		9 (1.5)	33 (5.6)	91 (15.5)	
Social status								
Single	43 (7.3)	36 (6.1)	61 (10.4)		15 (2.6)	47 (8)	78 (13.3)	
Married	168 (28.6)	119 (20.3)	134 (22.8)	.003ᵇ	41 (7)	143 (24.4)	237 (40.4)	.835
Divorced	5 (0.9)	5 (0.9)	5 (0.9)		3 (0.5)	3 (0.5)	9 (1.5)	
Widowed	10 (1.7)	0 (0)	1 (0.2)		1 (0.2)	4 (0.7)	6 (1)	
Education								
Elementary school	34 (5.8)	5 (0.9)	4 (0.7)		13 (2.2)	24 (4.1)	6 (1.0)	
Middle school	50 (8.5)	29 (4.9)	27 (4.6)	.000ᵃ	14 (2.4)	49 (8.3)	43 (7.3)	.000ᵃ
Secondary school	56 (9.5)	44 (7.5)	46 (7.8)		12 (2)	47 (8)	87 (14.8)	
University	86 (14.7)	82 (14)	124 (21.1)		21 (3.6)	77 (13.1)	194 (33)	
Income								
Low	85 (14.5)	35 (6)	27 (4.6)		34 (5.8)	64 (10.9)	49 (8.3)	
Medium	135 (23)	116 (19.8)	169 (28.8)	.000ᵃ	26 (4.4)	130 (22.1)	264 (45)	.000ᵃ
High	6 (1)	9 (1.5)	5 (0.9)		0 (0)	3 (0.5)	17 (2.9)	
Visit to health care in the last 3 months								
Yes	157 (26.7)	117 (19.9)	125 (21.3)	.072	40 (6.8)	139 (23.7)	220 (37.5)	.634
No	69 (11.8)	43 (7.3)	76 (12.9)		20 (3.4)	58 (9.9)	110 (18.7)	
Long-term illness								
Yes	86 (14.7)	52 (8.9)	58 (9.9)	.127	21 (3.6)	80 (13.6)	95 (16.2)	.020ᵃ
No	140 (23.9)	108 (18.4)	143 (24.4)		39 (6.6)	117 (19.9)	235 (40)	

Note. In bold, the significant differences at *p* < .05. CHL = comprehensive health literacy; FHL = functional health literacy.
ᵃChi-square test of independence; ᵇFisher's exact test.

TABLE 4

Spearman Correlation Analysis Among Potential Explanatory Factors

Characteristic	Min.	Max.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Sex[a]	1	2	1									
Age[b]	1	3	0.031	1								
Education[c]	1	4	−0.073	−0.201**	1							
Income[d]	1	3	0.001	0.076	0.394**	1						
Ability to pay for treatment[e]	1	5	−0.040	0.010	0.328**	0.433**	1					
Self-perceived health[f]	1	5	0.010	−0.405**	0.292**	0.146**	0.248**	1				
Health visits in last 3 months[g]	0	1	−0.245**	0.066	−0.052	0.039	−0.083*	−0.247**	1			
Long-term illness[h]	0	1	0.064	0.414**	−0.187**	0.002	−0.103**	−0.490**	0.277**	1		
FHL[i]	1	3	0.005	−0.138**	0.243**	0.221**	0.177**	0.185**	−0.063	−0.083*	1	
CHL[i]	1	3	0.033	−0.001	0.272**	0.306**	0.158**	0.211**	−0.025	−0.099*	0.296**	1

Note. CHL = comprehensive health literacy; FHL = functional health literacy; Min. = minimum; Max. = maximum.
[a]1 = men, 2 = women.
[b]1 = age 18-39 years, 3 = ≥60 years.
[c]1 = elementary, 4 = university.
[d]1 = low, 3 = high.
[e]1 = very hard, 5 = very easy.
[f]1 = very bad, 5 = very good.
[g]1 = yes, 2 = no.
[h]1 = yes, 2 = no.
[i]1 = sufficient FHL/CHL, 3 = inadequate FHL/CHL.
*Correlation is significant at the 0.05 level (two-tailed).
**Correlation is significant at the 0.01 level (two-tailed).

The Spearman correlation analysis, in **Table 4**, showed significant associations between FHL, CHL, and potential explanatory variables. FHL was negatively very weakly correlated with age, r(585) = −0.138, $p < .01$ and with the presence of long-term illness, r(585) = −0.083, $p < .05$. It was, however, positively very weakly correlated with ability to pay for treatment and self-perceived health, r(585) = 0.117, $p < .01$ and r(585) = 0.185, $p < .01$, respectively. FHL was positively weakly correlated with education and income, r(585) = 0.243, $p < .01$ and r(585) = 0.221, $p < .01$, respectively.

CHL was weakly positively correlated with education, r(585) = 0.272, $p < .01$, with income, r(585) = 0.306, $p < .01$, with FHL, r(585) = 0.296, $p < .01$, and with self-perceived health, r(585) = 0.211, $p < .01$. CHL was very weakly positively correlated with ability to pay for treatment, r(585) = 0.158, $p < .01$. However, it was very weakly negatively correlated with long-term illness, r(585) = −0.099, $p < .05$.

We measured two dimensions of health status, namely self-perceived health and long-term illness. Self-perceived health was weakly positively correlated with education, r(585) = 0.292, $p < .01$, ability to pay, r(585) = 0.248, $p < .01$, and income, r(585) = 0.146, $p < .01$. However, long-term illness was weakly negatively correlated with education, r(585) = 0.187, $p < .01$ and with ability to pay r(585) = 0.103, $p < .01$.

When all 10 potential explanatory predictors went into the binary logistic regression with FHL as a dependent variable, age, ability to pay and self-perceived health seized to have an effect. However, education, income, and social status proved to be of predictive value at a significance level of 0.05. After controlling for other variables, the odds of having inadequate FHL in widows was 10.64 times the odds of having inadequate FHL in never-married singles. Similarly, the odds of having inadequate FHL with university, secondary, and middle education were 0.26, 0.30, and 0.35 times, respectively, the odds of having inadequate FHL in people with elementary education. Finally, the odds of having inadequate FHL in medium income groups was 0.55 times the odds of having inadequate FHL in groups with low income. The other variables had no significant effect. The odds ratios (OR) are presented in **Table 5**.

TABLE 5

Odds Ratio of Having Inadequate FHL

Variables	OR^a [95% CI]		OR^b [95% CI]	
Sex				
Female	1		1	
Male	1.04	[0.74, 1.45]	1.06	[0.72, 1.57]
Age (years)				
18-39	1		1	
40-59	1.29	[0.88, 1.87]	1.07	[0.66, 1.73]
≥60	3.39	[1.65, 7.26]*	2.20	[0.87, 5.58]
Education				
Elementary	1		1	
Middle school	0.24	[0.10, 0.52]*	0.35	[0.14, 0.85]*
Secondary	0.16	[0.07, 0.36]*	0.30	[0.12, 0.71]*
Higher education	0.11	[0.05, 0.23]*	0.26	[0.10, 0.62]*
Income				
Low	1		1	
Medium	0.35	[0.23, 0.51]*	0.55	[0.34, 0.90]*
High	0.31	[0.11, 0.83]*	0.52	[0.15, 1.64]
Ability to pay for treatment				
Very hard	1		1	
Hard	0.75	[0.44, 1.28]	1.18	[0.64, 2.20]
Medium	0.34	[0.20, 0.58]*	0.71	[0.38, 1.35]
Easy	0.37	[0.18, 0.71]*	0.72	[0.32, 1.63]
Very easy	0.66	[0.26, 1.62]	1.27	[0.44, 3.57]
Self-perceived health				
Very bad	1		1	
Bad	0.37	[0.05, 1.86]	0.41	[0.05, 2.38]
Average	0.27	[0.04, 1.14]	0.47	[0.06, 2.40]
Good	0.13	[0.02, 0.54]*	0.27	[0.04, 1.42]
Very good	0.13	[0.02, 0.59]*	0.31	[0.04, 1.74]
Visit to doctor in last 3 months				
No	1		1	
Yes	1.12	[0.78, 1.61]	0.97	[0.63, 1.50]
Place of birth				
Mount Lebanon	1		1	
Bekaa	1.24	[0.66, 2.32]	1.04	[0.51, 2.09]
Baalbeck/Hermel	0.99	[0.51, 1.88]	0.83	[0.40, 1.69]
North Lebanon	1.73	[0.89, 3.37]	1.25	[0.57, 2.74]
Akkar	1.40	(0.65, 3.00)	1.47	[0.64, 3.38]
Saida/South Lebanon	0.83	[0.49, 1.40]	0.82	[0.46, 1.46]
Beirut	0.94	[0.56, 1.57]	1.02	[0.58, 1.81]

TABLE 5 (CONTINUED)

Odds Ratio of Having Inadequate FHL

Variables	OR[a] [95% CI]		OR[b] [95% CI]	
Social status				
Single	1		1	
Married	1.50	[1.00, 2.27]*	1.05	[0.66, 1.70]
Divorced	1.13	[0.33, 3.38]	0.63	[0.17, 2.13]
Widowed	22.56	[4.13, 420.51]*	10.64	[1.71, 207.99]*
Long-term illness				
No	1		1	
Yes	1.40	[0.99, 1.99]	0.83	[0.51, 1.34]

Note. CI = confidence interval; CHL = comprehensive health literacy; FHL = functional health literacy; OR = odds ratio.
[a]Crude OR for each explanatory variable.
[b]Adjusted OR for all included explanatory factors, namely sex, age, education, income, ability to pay for treatment, self-perceived health, visit to doctor in the last 3 months, place of birth, self-assessed social status, and long-term illness.
*Significant at $p < .05$.

Table 6 shows the OR of having inadequate CHL when potential explanatory factors were considered. The binary logistic regression showed that income was predictive of inadequate CHL when other covariates were controlled. Model 2 tested the predictive value of FHS in addition to the other variables that were included in Model 1. In this case, lower income and inadequate FHL were predictive of inadequate CHL. Specifically, the odds of having inadequate CHL in people with medium income were 0.29 times the odds of having inadequate CHL in the group with low income. Moreover, the odds of having inadequate CHL in the event of inadequate FHL was 4.58 times the odds of having inadequate CHL when FHL was adequate. Education and ability to pay seized to be significant predictors when other sociodemographic and health-related variables were considered.

DISCUSSION

The bulk of work on health literacy in the Eastern Mediterranean Region was carried out in Iran (Wikkeling-Scott et al., 2019) where the societal distribution of health literacy closely matches what we identified in Lebanon, namely an increased likelihood of inadequate health literacy linked to older age, lower educational level, lower income level, and being from rural areas. We found a significant relation between place of birth and CHL, with a higher likelihood of having inadequate or problematic CHL in people born in the Bekaa, North Lebanon and Akkar. These governorates enclose some of the country's most deprived and least urbanized areas. Birthplace may be carrying the effect of education and income especially that, in our study population, CHL was positively correlated with education, income, and ability to pay for treatment.

In distinction to prior reports from the MENA region (Almaleh et al., 2017; Bener & Ghuloum, 2011; Rahman, 2014), we found that sex was not a significant predictor of health literacy. This was more in line with findings from Europe and the United States (HLS-EU Consortium, 2012; Rikard et al., 2016). In Lebanon, enrollment in tertiary education is greater in women than in men with a ratio of 1/16; however, the literacy rate is overall higher in men (96% versus 92%), which could be due to higher enrollment of men in primary education (Avis, 2017). Nevertheless, the low involvement of women in decision-making positions and the major gap in economic participation rank Lebanon's gender gap index third to last in the MENA region, with Syria and Yemen performing worse. Women and girls also suffer from limited and substandard services within the health sector, particularly in poor and rural areas (Avis, 2017).

In our research, widowhood was predictive of inadequate FHL in women. A similar observation was made in previous studies (Joveini et al., 2019; Trivedi, 2009) that showed a significant relationship between marital status and health literacy. In particular, single people had higher health literacy than the married people who, in turn, had higher health literacy than widows/widowers or divorced/separated people. Inadequate health literacy may have stemmed from psychological issues that arise with stressful events and sudden life transitions (Trivedi, 2009). Moreover, women were more susceptible to become widows because they lived longer than men (Lee, 2001). Although economic factors may be relevant, fur-

TABLE 6

Odds Ratio of Having Inadequate CHL

Variables	OR[a] [95% CI]		Model 1 OR[b] [95% CI]		Model 2 OR[c] [95% CI]	
Sex						
Female	1		1		1	
Male	0.91	[0.53, 1.55]	0.80	[0.42, 1.50]	0.82	[0.42, 1.57]
Age (years)						
18-39	1		1		1	
40-59	0.70	[0.35, 1.30]	0.60	[0.25, 1.38]	0.58	[0.23, 1.40]
≥60	1.08	[0.31, 2.89]	0.73	[0.15, 3.01]	0.60	[0.11, 2.61]
Education						
Elementary	1		1		1	
Middle School	0.35	[0.15, 0.83]*	0.62	[0.22, 1.71]	0.83	[0.29, 2.42]
Secondary	0.21	[0.08, 0.50]*	0.40	[0.13, 1.16]	0.55	[0.18, 1.67]
Higher education	0.18	[0.08, 0.40]*	0.49	[0.16, 1.54]	0.75	[0.23, 2.47]
Income						
Low	1		1		1	
Medium	0.22	[0.13, 0.38]*	0.27	[0.13, 0.55]*	0.29	[0.14, 0.61]*
High	0.00	[0.00, INF]	0.00	[0.00, INF]	0.00	[0.00, INF]
Ability to pay for treatment						
Very hard	1		1		1	
Hard	0.39	[0.18, 0.82]*	0.65	[0.28, 1.52]	0.63	[0.26, 1.52]
Medium	0.29	[0.14, 0.59]*	0.79	[0.32, 2.00]	0.85	[0.33, 2.24]
Easy	0.48	[0.18, 1.16]	1.51	[0.48, 4.63]	1.66	[0.50, 5.41]
Very easy	0.15	[0.01, 0.81]*	0.40	[0.02, 2.60]	0.46	[0.02, 3.07]
Self-perceived health status						
Very bad	1		1		1	
Bad	2.43	[0.35, 49.19]	4.56	[0.56, 99.28]	6.42	[0.75, 142.97]
Average	0.99	[0.17, 18.81]	2.31	[0.31, 48.53]	3.27	[0.42, 69.93]
Good	0.86	[0.15, 16.27]	2.04	[0.26, 43.84]	3.48	[0.42, 76.86]
Very good	0.48	[0.07, 9.82]	1.28	[0.13, 30.18]	2.27	[0.22, 55.31]
Visit to doctor in last 3 months						
No	1		1		1	
Yes	0.94	[0.54, 1.68]	0.82	[0.42, 1.64]	0.86	[0.42, 1.76]
Place of birth						
Mount Lebanon	1		1		1	
Bekaa	0.73	[0.19, 2.27]	0.59	[0.14, 2.09]	0.54	[0.13, 1.95]
Baalbeck/Hermel	1.21	[0.39, 3.44]	0.83	[0.25, 2.62]	0.75	[0.22,2.43]
North Lebanon	3.66	[1.49, 9.25]	1.96	[0.68, 5.70]	1.79	[0.59, 5.42]
Akkar	1.38	[0.36, 4.45]	1.16	[0.27, 4.29]	0.88	[0.19, 3.49]
Saida/South Lebanon	1.30	[0.56, 3.14]	1.43	[0.57, 3.71]	1.45	[0.56, 3.88]
Beirut	0.78	[0.30, 2.00]	0.74	[0.26, 2.06]	0.63	[0.22, 1.81]

TABLE 6 (CONTINUED)

Odds Ratio of Having Inadequate CHL

Variables	OR[a] [95% CI]		Model 1 OR[b] [95% CI]		Model 2 OR[c] [95% CI]	
Social status						
Single	1		1		1	
Married	0.90	[0.49, 1.73]	0.74	[0.35, 1.60]	0.69	[0.31, 1.57]
Divorced	2.08	[0.44, 7.50]	1.58	[0.27, 7.49]	1.80	[0.27, 9.56]
Widowed	0.83	[0.04, 4.83]	0.57	[0.02, 4.90]	0.37	[0.02, 3.23]
Long-term illness						
No	1		1		1	
Yes	1.08	[0.61, 1.88]	1.12	[0.50, 2.47]	1.31	[0.56, 3.00]
FHL						
Adequate	1		-	-	1	
Inadequate	5.21	[2.92, 9.76]*	-	-	4.58	[2.39, 9.13]*

Note. CI = confidence interval; CHL = comprehensive health literacy; FHL = functional health literacy; INF = infinity; OR = odds ratio.
[a]Crude OR for each explanatory variable.
[b]Adjusted OR for all included explanatory factors, namely sex, age, education, income, ability to pay for treatment, self-perceived, visit to doctor in the last 3 months, place of birth, self-assessed social status, and long-term illness.
[c]Adjusted OR for all included explanatory factors included in Model 1 + FHL.
*Significant at $p < .05$.

ther research is needed to understand the relation between marital status, health literacy, and health outcomes.

We have observed that lower educated and poorer individuals tended to have lower levels of FHL and CHL. Previous studies from different countries have reported a similar pattern (Berkman et al., 2011; Easton et al., 2010; Herndon et al., 2011; HLS-EU Consortium, 2012). We did not find a significant association between the occurrence of a visit to a physician in the past 3 months (a measure of health service use) and health literacy. This was concurrent with another study, from the United States, in which the effect of health literacy on the use of health services disappeared after controlling for economic factors, age, and health status (Baker et al., 1997). However, we observed significant correlations between visits to the doctor and dimensions of health status such as self-perceived health and long-term illness. There were also correlations between visits to the doctor and measures of financial deprivation namely the ability to pay for treatment, and sex (e.g., female). FHL and CHL were both negatively correlated with long-term illness, and positively correlated with self-perceived health, ability to pay for treatment and income. This was comparable to results from various European countries (HLS-EU Consortium, 2012).

Similar to previous work (Almaleh, 2017; Wångdahl et al., 2014), we found that an individual's inadequate FHL did not automatically imply having inadequate CHL. This was possibly due to the narrower focus of the FHL scale on the capacity of the individual to deal with written health information, whereas the HLS-EU-Q16 considered broader aspects of health literacy that did not necessarily depend on written communication and shed light on interactions between individual competencies and situational demands and complexities. Additionally, the contact of our research participants with the health care system may have facilitated their acquisition of health information, their ability to use this information in making decisions relevant to the management of their health complaints, their understanding of what they hear through the media, and their awareness of the importance of disease prevention and health promotion.

Our findings diverge significantly from another study in Lebanon (Fadda et al., 2018) in which 81% of participants were reported to have adequate health literacy. Their recruitment of a convenience sample from a single division in a private health facility with inclusion of both Lebanese and non-Lebanese explains this difference. In our study, 65.8% had inadequate or problematic FHL and 43.8% had inadequate or problematic CHL. These results may be generalized to the Lebanese population because our sampling method has generated a representative sample of Lebanese patients from private, public, and military health facilities with inclusion of all outpatient clinics. Moreover, the tools

used in our study covered complementary health literacy constructs (FHL and CHL).

Although interaction with the health care system constitutes an important opportunity to improve individuals' health literacy, such a responsibility should not rest solely on the shoulders of health providers, educators, and health facilities (Institute of Medicine, 2004). Health literacy is affected by social factors such as income, education and employment, compositional factors such as gender and ethnicity, and contextual factors such as age, culture, and personal interests (Bauer, 2019). This conceptualization of health literacy expands, beyond individual knowledge and ability, to include the interrelationship between individual characteristics and socioeconomic and sociocultural contexts. Against this background, Lebanon can develop a national health literacy action plan that would offer a comprehensive national framework for building a health-literate country. Such an action plan may be guided by basic principles (Schaeffer, 2018) namely (1) diminishing social inequality, which in turn would reduce health inequality because socioeconomically disadvantaged populations usually have the lowest level of health literacy; and (2) empowering people with the conviction that decisions and actions, taken individually or collectively, can improve one's economic status, health, and lifestyle.

STUDY LIMITATIONS

The dichotomization approach, which was adopted in similar research on health literacy, constituted a limitation in our study. By merging the three categories (inadequate, problematic, sufficient) into two (inadequate, not inadequate) prior to performing the binary logistic regression, we may have lost valuable information. However, we chose to adopt this approach to allow for comparison with existing studies. Moreover, our study participants may have had worse health in comparison to the general population because they were recruited from hospital outpatient clinics. We also failed to collect enough information to determine the characteristics of those who refused to take part in the survey and examine if they were different from those who accepted. Finally, the cross-sectional design prevented us from establishing causal relationships.

CONCLUSION

Our study has identified the vulnerable groups among outpatients in Beirut, with risks of having inadequate health literacy and unfavorable health outcomes. This makes it possible for health professionals and researchers to develop targeted interventions that would improve the interaction of these groups with the health system including health information and health services. It is essential to raise awareness among health professionals to the magnitude of the problem of insufficient health literacy in the capital city Beirut. Further investigation would reveal if such a problem exists in other urban and rural communities, and among refugees, in the country. Furthermore, health professions' curricula should introduce best practices in health communication, namely the use of plain language, and the Teach-Back method for verification of understanding. Health workers should be trained to identify the situations in which they may be inadvertently placing high demands on the average patient. However, the focus should extend beyond individual factors and people's interaction with the health system to include the broader socioeconomic and cultural factors that influence health literacy and health outcomes, particularly in vulnerable populations. Thus, a national action plan would provide a framework for a comprehensive approach to building the competencies and the environment for improved health literacy and health equity in Lebanon.

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