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Validation of the Spanish version of the Health Literacy Survey (HLS$_{19}$-Q12) in secondary care specialty consultations☆

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ABSTRACT

Objectives: This study sought to validate the HLS$_{19}$-Q12 in Spain and in the Spanish language, as well as describe the sociodemographic profile and the general health literacy of the study population.
Study design: Descriptive cross-sectional.
Methods: Factor analysis and Cronbach's alpha were used to validate the Spanish version of the HLS$_{19}$-Q12. Health literacy scores and associated categories were calculated using the scale factsheet, and the patient population sociodemographic profile was determined using frequency analysis.
Results: The HLS$_{19}$-Q12 used in Spain in the Spanish language was found to be both valid and reliable (Cronbach's alpha = 0.87). The sociodemographic profile was primarily male and aged, and the majority of patients were of Spanish origin and had diabetes. General patient health literacy was limited, with 60% of participants having general health literacy categorized as inadequate or problematic, and 40 % sufficient or excellent.
Conclusions: This study validated the HLS$_{19}$-Q12 in Spain, created a sociodemographic profile of the sample population, and calculated their health literacy scores. This contribution provides another valuable validated tool and associated data to the increasingly important field of health literacy.

Introduction

Patients attend appointments with clinicians with expectations of a physical treatment, undergoing a procedure, receiving a prescription, or learning of a diagnosis.[1–3] However, at the same time, patients receive valuable information about their condition or health status. This important information not only informs the patient of their current condition, but instructs them on how to manage it, suspend worsening of symptoms, and even prevent the occurrence of new medical conditions. Furthermore, family members and/or caregivers who accompany patients during their appointments may hear the same information and use it as a tool to manage and improve their own health.[4,5] These clinical points of contact are invaluable opportunities to increase the health literacy (HL) of service users (patients, family members, and/or caregivers).

Health literacy is a multidimensional concept that encompasses willful actions that affect individuals, communities, and entire populations on numerous levels. While the definition has evolved over time, this article uses the definition developed by Sorenson et al. for the Consortium Health Literacy Project European:

> 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 judgements and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course.[6,7]

HL is a subject of concern because studies show that low HL leads to poor outcomes on both the individual and population level.[8] On an individual level, people with low HL are less likely to take medications as prescribed, adhere to treatment regimens for chronic conditions, take steps to prevent health problems, act correctly and promptly when

facing acute conditions, and seek medical help when needed.[9] Low HL is linked to increased hospitalization, readmissions, and increased use of emergency services.[8,10] Consequences of low HL include increases in morbidity and mortality, and decreased quality of life and wellbeing.[11]

On a population level, healthy societies are more productive societies. HL affects the economy as a whole because, as mentioned above, individuals with low HL are more likely to be ill and remain ill. As a consequence, individuals face economic hardships related to school and work absences, and additional loss of wages from caregivers who are forced to leave the workforce. The economy suffers from lost productivity, private and public benefit payouts, and increased healthcare spending.[6,9,12–14] Communities with higher HL have less disparity in health outcomes, increased equity and are more prosperous.[8]

Various scales have been used to measure HL, however, not all scales measure the same types or dimensions of HL, nor do they target the same populations. The Health and Literacy Scale (HALS), the Rapid Estimate of Adult Literacy in Medicine (REALM), the Health Literacy Questionnaire (HLQ), and the European Health Literacy Survey Questionnaire (HLS-EU-Q) are some of the oldest and newest examples.[15–18] While each scale may have benefits or challenges, it is necessary and useful to have a common language, methodology, or scale by which HL can be measured across both specialized and more general, larger populations. In this way, evidence-based lessons can be shared, and data can be used to make meaningful comparisons and improvements in HL on both individual and population levels.

This study examined a more recent HL survey called the HLS_{19}-Q12, which was developed from a longer survey, the HLS_{19}-Q47 (47 questions).[19] With only 12 questions, the scale is more attractive and feasible in settings where both patients and healthcare providers have limited time. The shorter length also increases the likelihood of a participant's willingness to complete the questionnaire.[20,21]

The HLS_{19}-Q12 was validated internationally in 17 countries and in 17 languages using multiple types of data collection with acceptable psychometric and validity properties.[22,23] However, during its initial validation study, Spain was not one of the countries; and at that time there was not a Spanish version of the instrument.[22] Therefore, this study aimed to validate the HLS_{19}-Q12 in Spain and in the Spanish language, as well as describe the sociodemographic profile and the general health literacy of the sample population.

Methods

This validation and cross-sectional study was part of a larger project that examined patient HL scores before and after nursing interventions that were aimed at increasing patient HL. The entire project ran for a period of 12 months, between April 2023–2024; however, the data for validation of the HLS_{19}-Q12 and initial sociodemographic questionnaire were collected during the first eight months.

Selection and description of participants

The patient sample consisted of patients who regularly attended specialty consultations in Zaragoza health sector III of the autonomous community of Aragon. The sector is one of eight sectors in Aragon and covers a population of approximately 300,000 people. In addition to 22 health centers and 119 local clinics, specialty care is provided in three locations.[24] It is from two of these specialty centers that the study population was recruited. For this investigation, the types of specialty consultations included: Diabetes, Ostomy, Cardiology, and Digestive. Inclusion criteria for the study were 1) age 18 or older, 2) willingness to complete the HLS_{19}-Q12 two times (before and after health literacy interventions), and 3) the patient had the necessity to make three visits to the specialty consult within the 12-month timespan of the study.

In order to obtain the sample group, the principal researcher visited each specialty consultation on predetermined days each week. The patients who happened to have appointments on those days are the ones

who were asked to participate in the study. If the patient met inclusion criteria, the nurse introduced the patient to the principal researcher who then proceeded to provide a description of the study protocol, explain the purpose of the study, introduce the HLS_{19}-Q12, address privacy and confidentiality, and discuss informed consent. Over a recruitment period of eight months, 166 total participants met selection criteria and were asked to participate in the study. 100 % agreed to participate. All participants signed informed consents forms.

Sample size was determined based on the primary objective of the study, which was to validate the Spanish version of the HLS_{19}-Q12 in this study population in Spain. As we used confirmatory factor analysis, comparative fit index, and principal component analysis to validate a 12-item survey, calculations determined that 166 patients was sufficient to secure a medium effect size (Cohen's d = 0.5), with a significance level of 0.05, and a power of 80 %.

Data collection and measurements

Data collection was conducted during face-to-face specialty nursing consultations with patients. Reponses were captured on paper in one of the following ways: 1) by the patient alone, 2) face-to-face interview with the principal researcher, 3) patient with the help of a family member or caregiver, 4) patient with help of the principal researcher, or 5) by the specialty nurse. The HLS_{19}-Q12 had been previously validated using the paper-assisted personal interview (PAPI) mode, so the methods used in this study were acceptable.[23]

Survey completion preference depended on factors such as the patients' ability to read, vision, patients' level of patience when it came to answering questions, and elderly patients' tendency to defer to family or caregivers for completion of tasks. The principal researcher was present during all initial visits where surveys were administered, and data collected. Once the participant finished the survey, the researcher briefly reviewed it to verify that it was completed correctly and in its entirety. All data was anonymized.

A questionnaire with 15 sociodemographic questions was included as the first page of the HLS_{19}-Q12 instrument. Questions addressed age, sex, gender, marital status, education, occupation, country of origin, living situation, work, residence (rural or urban), self-classification of health status, net monthly income, use of aids or assistive devices, self-reported illnesses, and number of appointments they previously had at the consult, not including that day's appointment.

The HLS_{19}-Q12

The HLS_{19}-Q12 Health Literacy Survey is a subjective, perception-based instrument, that uses a 4-point Likert scale to record a patient's perceptions concerning 12 health-related tasks. Respondents are asked to rate the difficulty level of health-related items by selecting "very difficult," "difficult," "easy," "very easy," or "I don't know."[22] (see Supplemental Table 1)

In accordance with Type P calculations described by Pelikan et al., 2022, scores were calculated as the sum of the item's numeric values scaled to a range from 0 to 100.[22] A response was considered invalid if the participant answered, "I don't know." If there were more than two invalid responses in a survey, that survey was disqualified from the study. Scores were then categorized based on the following scale: >83.33 = Excellent, >66.67 and ≤83.33 = Sufficient, >50 and ≤66.67 = Problematic, and ≤50 = Inadequate. In total, 16 surveys were disqualified based on invalid responses. Therefore, HL scores were calculated for 150 patients.

Translation to Spanish

At the start of this study, there was no published evidence that the 12-item short form of the survey had been used and validated in Spain, nor translated to Spanish. The principal researcher contacted the

International Coordination Centre (ICC) of M-POHL, which is responsible for authorizing the use of the HLS instrument, to determine if a Spanish language version was available. The Spanish language version used in this study was provided by the ICC and had been translated by the Hamburg Center for Health Economics, University of Hamburg, for use in the 11th wave of the European Covid Survey (ECOS) Corona Research[25] (see Supplementary Table 2). The survey was not adapted for use in this study with the Spanish population.

Statistics

This study used IBM SPSS 27 to analyze the survey data. To validate the HLS19-Q12, factor analysis was performed including Standardized Root Mean Square Residual (SRMSR), Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI). CFI was extracted via CFA analysis using SPSS AMOS. Principle Component Analysis (PCA) test was further conducted to determine construct validity. Frequency analysis was used to create the sociodemographic profile of the patient population.

Results

Validation of the HLS19-Q12 in this Spanish population

The reliability of the instrument was tested using Cronbach's alpha. This test helped to measure the internal consistency of the data. Cronbach's alpha was 0.87, suggesting high or good internal consistency of the survey items (Table 1).

The Kaiser-Meyer-Olkin (KMO) measure was used to measure sampling adequacy for each variable. Results showed an adequate KMO value of 0.863, supporting that the data was suited for factor analysis.

Bartlett's Test of Sphericity Approx. ($X_2 = 341.526$, df = 66, p < 0.001) showed statistically significant results confirming correlations did not occur by chance and that factor analysis could be performed. PCA was performed on all 12 items. The threshold for factor loading values was 0.3, which meant any factor loading below 0.3 was not associated with the extracted component.[26] Per results in Table 2, all items were accepted going forward.

Table 1
HLS19-Q12 Psychometric properties including results from the Spanish population.

Country	Cronbach's alpha	Single-Factor Confirmatory Factor Analysis		
		SRMSR	RMSEA	CFI
Austria	0.67	0.07	0.03	0.97
Belgium	0.82	0.08	0.05	0.98
Bulgaria	0.78	0.07	0.04	0.99
Czech Republic	0.78	0.05	0.03	0.99
Denmark	0.75	0.06	0.03	0.98
France	0.81	0.05	0.02	1.00
Germany	0.73	0.07	0.04	0.97
Hungary	0.76	0.07	0.03	0.98
Ireland	0.72	0.06	0.03	0.97
Israel	0.80	0.06	0.03	0.99
Italy	0.85	0.05	0.04	0.99
Norway	0.73	0.07	0.04	0.97
Portugal	0.87	0.05	0.02	1.00
Russian Federation	0.86	0.05	0.04	0.99
Slovakia	0.81	0.06	0.04	0.99
Slovenia	0.82	0.04	0.02	1.00
Spain	**0.87**	**0.07**	**0.05**	**0.96**
Switzerland	0.72	0.07	0.03	0.98

Data from Table 2: The HLS19 Consortium of the WHO Action Network M-POHL (2022): The HLS19-Q12 Instrument to measure General Health Literacy. Factsheet.[23] Data for Spain is from this study.

Sociodemographic profile

Frequency analysis was performed to create a sociodemographic profile of the 166 respondents. Most of the patients were 61–70 years old (28.3 %), followed by those who were 51–60 years old (18.1 %) and 71–80 years old (18.1 %). A small proportion of the sample size were below age 30 (10.8 %). Most respondents visited the 'Diabetes' specialty clinic, equaling 47.6 % of the sample size, whereas 9.0 % visited 'Cardiology.' Sixty-eight percent of patients were able to complete the survey on their own. The remainders required the assistance of the researcher, family member, caregiver, or specialty nurse. More than half of respondents were male (62.7 %) and 37.3 % were female. All participants identified as cisgender. As shown in Table 3, the majority of patients were married or living with a domestic partner (60.8 %), and the majority (38.0 %) had achieved a primary education level. Ninety-five percent of participants were of Spanish origin.

Health literacy in this patient population

Referring to the 12 items on the HLS19-Q12, respondents found it easier to 'act on advice from their doctor or pharmacist' (3.31 ± 0.60), and to 'judge if information on unhealthy habits, such as smoking, low physical activity or drinking too much alcohol, are reliable' (3.18 ± 0.70). Participants scored lower when asked how difficult it was 'to decide how you can protect yourself from illness using information from the mass media' (2.41 ± 0.83), 'to find information on how to manage mental health problems' (2.47 ± 0.85), and 'to understand advice concerning your health from family or friends' (2.83 ± 0.64) (Table 4).

Based on all 12 items, the median HL score was 67 and the mean was 66. As described in the HLS19-Q12 factsheet, participants' scores were categorized into categories of HL.[23] We observed that 60 % of participants had HL scores categorized as inadequate or problematic, while 40 % had HL scores categorized as sufficient or excellent (See Fig. 1).

Discussion

The study served to validate the HLS19-Q12 in the Spanish population, in the Spanish language. As to the extent of our knowledge, the survey had not been validated in Spain or in the Spanish language at the time of the investigation. However, it had been validated and used in various studies in other European countries.[19,23,27] When compared to the validation statistics of 17 other European countries, its use in Spain with the sample population showed comparable psychometric properties (Table 1).[23] Alpha coefficients reported for its use in the 17 countries varied from 0.67 to 0.87.[28] Cronbach's alpha for this study was 0.87.

This study further generated a sociodemographic profile of the population of patients in Zaragoza health sector III who attend specialty consultations. This is valuable information because research shows that sociodemographic variables are associated with HL in both positive and

Table 2
PCA for the 12 items on the HLS19-Q12.

Component Matrix[a]	
Item 1	0.679
Item 2	0.690
Item 3	0.644
Item 4	0.744
Item 5	0.561
Item 6	0.722
Item 7	0.586
Item 8	0.534
Item 9	0.692
Item 10	0.566
Item 11	0.570
Item 12	0.783

Extraction Method: Principal Component Analysis.
[a] 1 component extracted.

Table 3
Sample population sociodemographic profile.

		Woman		Man	
		N	%	N	%
Age	≤ 30	10	16.1	8	7.7
	31–40	4	6.5	6	5.8
	41–50	6	9.7	10	9.6
	51–60	12	19.4	18	17.3
	61–70	13	21.0	34	32.7
	71–80	9	14.5	21	20.2
	81+	8	12.9	7	6.7
Specialty clinic	Cardiology	5	8.1	10	9.6
	Digestive	6	9.7	15	14.4
	Diabetes	34	54.8	45	43.3
	Ostomy	17	27.4	34	32.7
Completed by	Patient alone	41	66.1	72	69.2
	Face-to-face interview	6	9.7	12	11.5
	Patient with the help of a familiar member or caregiver	14	22.6	16	15.4
	Patient with help of the principal researcher	1	1.6	1	1.0
	By the advanced practice nurse	0	0.0	3	2.9
Marital status	Married or domestic partner	34	54.8	67	64.4
	Widowed	14	22.6	8	7.7
	Divorced	4	6.5	9	8.7
	Separated	1	1.6	1	1.0
	Never married	9	14.5	19	18.3
Education level	Primary education	25	40.3	38	36.5
	ESO (Secondary)	8	12.9	9	8.7
	High school	3	4.8	9	8.7
	Vocational training	9	14.5	26	25.0
	Student	12	19.4	17	16.3
	Master's degree	5	8.1	4	3.8
	Doctorate	0	0.0	1	1.0
Origin	Spain	57	91.9	101	97.1
	Other	5	8.1	3	2.9
Living situation	Nobody	12	19.4	15	14.4
	With my partner	19	30.6	48	46.2
	Partner & family	15	24.2	24	23.1
	Children	8	12.9	6	5.8
	Parents	7	11.3	7	6.7
	Other family members	1	1.6	4	3.8
	Friends	0	0.0	0	0.0
	I don't have a permanent residency	0	0.0	0	0.0
Work	Unemployed	9	14.5	6	5.8
	Work full-time	14	22.6	26	25.0
	Work part-time	7	11.3	2	1.9
	Retiree with contributory pension	16	25.8	55	52.9
	Retiree with a non-contributory pension	6	9.7	5	4.8
	Currently studying	4	6.5	4	3.8
	Disability or sick leave	6	9.7	6	5.8
Residence	Rural	25	40.3	28	26.9
	Urban	37	59.7	76	73.1
I would classify my health as	Very good	1	1.6	7	6.7
	Good	25	40.3	49	47.1
	Regular	32	51.6	34	32.7
	Bad	4	6.5	13	12.5
	Very bad	0	0.0	1	1.0 %
Net monthly income	<600 €	6	9.7	7	6.7
	601–800 €	7	11.3	4	3.8
	801–1000 €	4	6.5	10	9.6
	1001–1.200 €	8	12.9	9	8.7
	€1201 – €1500	5	8.1	15	14.4

Table 3 (*continued*)

		Woman		Man	
		N	%	N	%
	€1501 – €2000	5	8.1	15	14.4
	> €2001	10	16.1	19	18.3
	Spouse's pension	2	3.2	0	0.0
	I'd rather not answer	13	21.0	18	17.3
	I don't know	2	3.2	7	6.7
How many appointments have you had in this outpatient clinic not including today?	1–2	21	33.9	39	37.5
	3–4	14	22.6	22	21.2
	5–6	9	14.5	7	6.7
	>6 visits	18	29.0	36	34.6

Table 4
Global descriptive results of the HLS$_{19}$-Q12 items.

| Item	On a scale from very easy to very difficult, how easy would you say it is …	Q25	Median	Q75	Mean	Std. Deviation
1	to find out where to get professional help when you are ill?	3.00	3.00	4.00	3.12	0.697
2	to understand information about what to do in a medical emergency?	3.00	3.00	3.00	3.09	0.601
3	to judge the advantages and disadvantages of different treatment options?	2.25	3.00	3.00	2.86	0.603
4	to act on advice from your doctor or pharmacist?	3.00	3.00	4.00	3.31	0.602
5	to find information on how to manage mental health problems?	2.00	3.00	3.00	2.47	0.854
6	to understand information about recommended health screenings or examinations?	3.00	3.00	4.00	3.17	0.587
7	to judge if information on unhealthy habits, such as smoking, low physical activity or drinking too much alcohol, are reliable?	3.00	3.00	4.00	3.18	0.695
8	to decide how you can protect yourself from illness using information from the mass media?	2.00	2.00	3.00	2.41	0.825
9	to find information on healthy lifestyles such as physical exercise, healthy food or nutrition?	3.00	3.00	4.00	3.18	0.621
10	to understand advice concerning your health from family or friends?	2.00	3.00	3.00	2.83	0.642
11	to judge how your housing conditions may affect your health and wellbeing?	3.00	3.00	3.00	3.03	0.604
12	to make decisions to improve your health and wellbeing?	3.00	3.00	3.00	2.99	0.711
Total		2.00	2.00	3.00	2.38	0.783
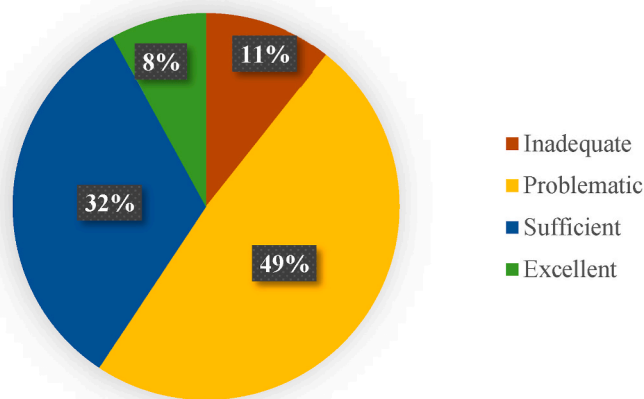
Fig. 1. Percentage of patients with inadequate, problematic, sufficient, or excellent health literacy.

negative ways.[9,11,29–32] The more a health system or hospital knows and understands the sociodemographic profile of the population it serves, the better poised it is to create processes and policies that address its patients' specific HL needs.[6,30]

Using the newly validated HLS_{19}-Q12, we calculated HL scores for this patient sample. Over half of the patients (60 %) had limited (problematic or inadequate) HL scores, which is in agreement with a large European study that reported 58 % of the Spanish population had low HL.[33] The validation report describing methodology and results of the HLS_{19}-Q12 across 17 countries documented a median HL score of 64 with a mean of 65. Similarly, this study population had a median HL score of 67 and a mean of 66.[22]

Our findings are in keeping with a report that indicated one-third to nearly half of Europeans had low HL.[34] The results warrant reflection concerning the state of HL in this current study population. As research shows, this large percentage of patients is more likely not to use preventive care services, to have difficulty adhering to treatment and medication regimens, more frequently use emergency services, and have overall poorer health outcomes.[6,14,30,35]

Looking at the specific responses to the 12-item survey, respondents found it most difficult to judge and trust health information from outside sources such as the media and friends or family members. These findings are congruent with the uncertainty and distrust in "fake news," social media, and artificial intelligence.[36–38] Respondents also found it difficult to find information on how to manage mental health problems. This is a meaningful finding, as *the State of Health in the EU (Spain) Country Profile 2023* reported that the burden of mental health issues in Spain is high, and that one in six people experienced mental health issues before the COVID-19 pandemic.[39]

Our study provides information for Zaragoza health sector III of the autonomous community of Aragon regarding the HL of patients attending specialty consultations. These results should be considered when creating or altering processes for healthcare delivery to ensure that patients receive, understand, and act upon health information in effective ways. Improving HL can positively affect health outcomes for individual patients and the larger community, while decreasing human and financial resource burdens on the health system.[8,14]

Limitations and future research

This study had certain limitations, such as sample size, non-randomization, and the specificity of care delivery site being specialty consultations. Nevertheless, a strength of this research was the unique opportunity to evaluate HL of a population that represents the most frequent users of specialty care settings in Spain. This includes the aged, and individuals suffering from chronic conditions.[40]

While most HL studies have been conducted in the United States and Europe, it would be an equitable and valuable endeavor to use the HLS_{19}-Q12 in Latin American countries to determine how HL compares to HL in Europe. Latin America embraces a rich mix of cultures, indigenous beliefs and languages.[41] These populations might present with additional sociodemographic variables that were less considered when studying European populations, such as the use of alternative medicine or spiritual healers.[42] Therefore, it is necessary to determine if the HLS_{19}-Q12 is valid among such diverse patient profiles. In the same stream of thought, the Spanish language used in Latin American countries can differ from than that used in Spain.[43] It would be useful to revisit the appropriateness of the current Spanish translation of the HLS_{19}-Q12 if used in Latin America.

Spain has a decentralized healthcare system, with each autonomous community being responsible for its own services. This study evaluated a population in the community of Aragon; hence, the HLS_{19}-Q12 should be given to patients in other autonomous communities to discover if HL scores vary significantly. This could serve as a useful benchmarking tool for health services across Spain's 17 communities.

Conclusions

This study contributes to the advancement of health literacy measurement and study in various ways. It serves to validate the use of the HLS_{19}-Q12 in Spain and in the Spanish language. A sociodemographic profile was created that can be used to inform policy decisions regarding HL for this specific population. The calculated HL scores provide valuable data showing the need to address low HL in this patient population. The findings add to a growing body of knowledge around HL, aimed at increasing the effectiveness of healthcare provision and improving health and wellbeing for all populations served.

Author statements

Data availability

Data collected for this study is available by formal request to the primary author.

CRediT authorship contribution statement

A. McCaskill: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing. **A. Gasch-Gallen:** Conceptualization, Methodology, Writing – review & editing, Supervision. **J. Montero-Marco:** Conceptualization, Methodology, Writing – review & editing, Supervision.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2024.09.022.

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