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Original article

Health literacy and quality of life: a cross-sectional study

Literacia para a saúde e qualidade de vida: estudo transversal

Literacia para la salud y calidad de vida: estudio transversal

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Abstract

Objective: to identify the level of health literacy (HL) for understanding health and quality of life in a population linked to a university extension project aimed at adherence to physical activity. **Method**: cross-sectional, quantitative study. HL was measured virtually using the Brazilian version of the European Health Literacy Survey Questionnaire short-short form (HLS-EU-Q6). Three Generalized Linear Models were run. **Results**: 913 participants, 95.4% female and 59.3% over 50 years old. Education and age were predictors of the "Evaluation and application of the information in the health care" domain (Wald=13.85;p=0.017; Wald=8.42;p=0.004, respectively). Age was a predictor of disease prevention (Wald=5.20;p=0.023). It is suggested that graduation increases the LS for evaluating and implementing information when compared to education up to 5th grade (Beta=-0.918;p=0.005); 6th to 8th/9th grade (Beta=-0.609;p=0.050); high school (Beta=-0.498;p=0.005). **Conclusion**: Education and age were factors associated with HL.

Descriptors: Health Literacy; Social Determinants of Health; Physical Education and Training; Health Promotion; Health Education

Resumo

Objetivo: identificar o nível de literacia para a saúde (LS) para a compreensão de saúde e qualidade de vida em uma população vinculada a um projeto de extensão universitária que visa à adesão à atividade física. **Método:** pesquisa transversal, quantitativa. A LS foi mensurada virtualmente pela versão brasileira do *European Health Literacy Survey Questionnaire short-short form (*HLS-EU-Q6). Foram executados três *Generalized Linear Model*. **Resultados:** 913 participantes, sendo 95,4% do sexo feminino e 59,3% acima de 50 anos. Escolaridade e idade se apresentaram como preditoras no domínio "Avaliação e aplicação de informações no campo do cuidado à saúde" (Wald=13,85;p=0,017; Wald=8,42;p=0,004, respectivamente). A idade foi preditora para prevenção de doenças (Wald=5,20;p=0,023). Sugere-se que graduação aumenta o LS para avaliar e implementar informações quando comparado à escolaridade até 5º ano (Beta=-0,918;p=0,005); de 6º a 8º/9º ano (Beta=-0,609;p=0,050); ensino médio (Beta=-0,498;p=0,005). **Conclusão:** a escolaridade e a idade foram fatores que se associaram à LS.

Descritores: Letramento em Saúde; Determinantes Sociais da Saúde; Educação Física e Treinamento; Promoção da Saúde; Educação em Saúde

Resumen

Objetivo: identificar el nivel de literacia en salud (LS) para la comprensión de la salud y la calidad de vida en una población vinculada a un proyecto de extensión universitaria dirigido a la adherencia a la actividad física. **Método:** investigación cuantitativa transversal. La LS fue medida virtualmente utilizando la versión brasileña del Cuestionario Europeo de Alfabetización en Salud (HLS-EU-Q6). Se realizaron tres modelos lineales generalizados. **Resultados:** 913 participantes, 95,4% mujeres y 59,3% mayores de 50 años. La escolaridad y la edad fueron predictores en el dominio «Evaluación y aplicación de la información en el ámbito de la atención sanitaria» (Wald=13,85;p=0,017; Wald=8,42;p=0,004, respectivamente). La edad fue un factor predictivo de la prevención de enfermedades (Wald=5,20;p=0,023). Se sugiere que la graduación aumenta la LS para evaluar y aplicar la información en comparación con la escolarización hasta 5º curso (Beta=-0,918;p=0,005); de 6º a 8º/9º curso (Beta=-0,609;p=0,050); bachillerato (Beta=-0,498;p=0,005). **Conclusión:** La escolaridad y la edad fueron factores asociados a la LS.
Descriptores: Alfabetización en Salud; Determinantes Sociales de la Salud; Educación y Entrenamiento Físico; Promoción de la Salud; Educación en Salud

Introduction

Health literacy refers to a person's ability to search for, access, understand, evaluate, and translate health information into action.[1] Competencies linked to HL can affect health status by implementing care for health promotion, disease prevention, and treatment at an individual and collective level.[2]

In the field of health, HL can be understood from different angles. The first relates to understanding written information, such as when interpreting a medicine leaflet or reading information about healthy practices. Written information can be presented in printed or digital form. Currently, digital literacy is considered an essential determinant of health.[3]

The second refers to numerical literacy, also called numeracy,[4] which makes it possible to understand, use, and analyze, for example, medication doses and schedules, nutrient counting, or interpreting test results and processed food labels. Therefore, numeracy skills related to HL refer to numerical, quantitative, graphical, statistical, and probabilistic health information that contribute to health decision-making.[5]

Beyond the individual perspective, the community or collective HL explores communication through groups, written or graphic materials, and conversation circles. Civic or environmental HL refers to knowing the rights and duties related to

health and promoting community engagement so that there is ownership and implementation of actions by the groups involved.[6-7]

Combining the abovementioned angles shows that HL can contribute to broadening citizens' awareness of individual, collective, and public health.[1] In this way, HL can be understood as a shared tool that generates an interface between health, education, communication, and public policies and is, therefore, a transdisciplinary tool.[8]

Studies carried out in different countries suggest that low HL is associated with adverse health outcomes, even among populations with a high level of education.[9-10] In the Brazilian population, there is still no evidence to show the degree of HL or its underlying factors. However, these may represent self-care or shared care challenges between the person and professionals and should be the target of interventions.

Over time, the relationship between vulnerability and the incidence of illness or disease has been demonstrated, with social and environmental conditions being determinants of health. This is why, more recently, HL has been discussed as one of the emerging social determinants of health.[11-12]

HL must, therefore, be assessed based on the needs of the individual and the individual, as well as collective and political social determinants. For this reason, it needs to be discussed and assessed beyond the individual's ability to carry out a daily or one-off task. It should be based on developing skills that bring to light criticality and decision-making related to health with health promotion.[13]

Health promotion actions integrated with the expansion of HL can guide individuals towards emancipation and autonomy in their choices based on their ability to understand information in depth. In this way, HL focuses on health rather than disease. This concept helps to break away from the biomedical model centered on the drug treatment of illnesses and diseases. It moves towards a model centered on the person and their subjectivity, including the family, community, and public policies.[13]

HL is an essential tool for new outcomes related to public health.[13] However, to be understood and contribute to promoting self-care and well-being in society, it must be measured and evaluated alongside the other social determinants of health.

Thus, based on a conceptual model,[8] this study aimed to identify the level of HL needed to understand health and quality of life in a population linked to a university extension project aimed at encouraging physical activity.

Method

This cross-sectional survey is conducted in a virtual environment with a non-probabilistic sample for convenience.

The settings for this research were 26 squares and parks in the municipality of Rio de Janeiro, where physical educators coordinate group physical and cultural activities in partnership with the Federal University of the State of Rio de Janeiro through university extension actions. In each scenario, two types of physical activity are worked on, one focused on children and the other on adults, including soccer, gymnastics, functional training, wrestling, capoeira, and stretching. The extension project involved 2,600 participants (ranging in age from 6 to 87) over its six-month duration (November/2022 to April/2023).

We chose to include the general population of the project on the assumption that all the members already act to promote health, such as physical activity and having access to reliable information from the health professionals who run the project.

The inclusion criteria for the participants were linked to the sports extension project, being of both sexes, being over 18, and having the autonomy to decide about their participation in the study, which materialized by signing the Free and Informed Consent Form (FICF or ICF). Exclusion criteria were participants on vacation or on leave at the time of data collection.

The collection period was from February to April 2023. All participants who met the inclusion criteria were invited to participate in the survey. For this reason, the sample size was not calculated.

The invitation to participate in the survey was made online using communication apps. The contacts of potential participants were obtained from the management of the extension project, which supported the development of the research. Once they had accepted, a *link* containing the ICF was sent to register their consent. The participants then filled in the data collection instrument using the Internet.

An instrument was created to characterize the participants for data collection, using the Brazilian version of the *European Health Literacy Survey Questionnaire short-short form* (HLS-EU-Q6) to assess health literacy.[14]

The HLS-EU-Q6 instrument is made up of six questions, each of which is answered using a Likert-type scale, as described below: On a scale from “very easy” to “very difficult,” how easily can you: 1. evaluate when you need a second opinion from another doctor; 2. use the information your doctor gives you to make decisions about your illness; 3. find information about how to deal with mental health problems, such as stress or depression; 4. evaluate whether the information about health risks available in the media is reliable? (e.g., TV, internet, or other media); 5. Find information about activities that are good for your mental well-being? (e.g., meditation, exercise, walking, Pilates, among others); 6. Understand the information available in the media about how to become healthier? (e.g., internet, newspapers, magazines).

Thus, questions 1 and 2 make up the domain of evaluating and applying health-relevant information in the field of health care; questions 3 and 4 are the domain related to finding/accessing and evaluating information in the field of disease prevention; and questions 5 and 6 the domain of finding/accessing and understanding health-relevant information in the field of health promotion.[14]

In addition to evaluating HL, the primary endpoint of the study, the following variables were assessed: age, gender, education, who they live with, weight, height, and BMI (weight/heigh^{t2}).

The data was analyzed by compiling a database from the answers obtained on the registration form using Excel for *Windows software*. SPSS *software* version 21.0 was used for statistical analysis. Descriptive analyses were carried out (mean, standard deviation, minimum, maximum, and percentages) of the variables: age, number of people they live with and education, and each of the three domains of the HL Scale.

Subsequently, three *Generalized Linear Models* (GLM) were run using the Gamma distribution and identity link function to assess the impact of age, number of people lived with, and education on the three domains of the HLS-EU-Q6 instrument. These models showed a better fit to the data based on the Akaike Information Criterion (AIC) than the GLM model, which is fitted with a linear distribution and identity link function.

This research complied with the "General Guidelines for Conducting Research Protocols in a Virtual Environment" of the National Research Ethics Committee of the National Health Council (CNS, in Portuguese). All stages of the study followed the procedures of CNS Resolution No. 466 of 2012 and its complements, respecting the autonomy and anonymity of the research participants. The project was submitted to the Research Ethics Committee and approved under opinion number 5.865.661 on January 20, 2023.

Results

A total of 913 people linked to the university extension project took part in the study. Of the total, 871 (95.4%) were female. The average age was 52.3 (±10.7), ranging from 18 to 87 years (median = 54 years). Age revealed that 245 (26.8%) participants were between 50 and 59, and 297 (32.5%) were 60 or over. Most participants live with their family, with up to 4 members (78.9%).

Regarding education, the participants reported that they had completed elementary school (15.9%), started, but interrupted, secondary school (6.8%), finished secondary school (41.4%), completed undergraduate higher education (24.2%), or completed postgraduate studies (11.4%).

The average self-reported weight of the participants was 73.6 (±11.4; 42-140) kg, and the average BMI was 28.2 (±4.0) kg/m2, ranging from 16.6 to 63.7 kg/m2. According to the BMI calculated from self-reported weight and height, five participants were underweight; 242 (26.5%) were eutrophic; 340 (37.2%) were overweight; and 292 (32%) had some degree of obesity.

The results of the HL assessment are shown in Table 1.

Table 1 - Descriptive analysis of HL based on the HLS-EU-Q6 instrument

Variable	n (%)					Total
	1	2	3	4	5	(n)
Evaluate when you need a second opinion from another doctor.	321 (36.3)	180 (20.3)	220 (24.9)	56 (6.3)	106 (12.0)	883
Use the information your doctor gives you to make decisions about your illness.	451 (51.2)	170 (19.3)	146 (16.6)	54 (6.1)	59 (6.7)	880
Find information on how to deal with mental health problems.	337 (38.1)	156 (17.6)	193 (21.8)	80 (9.0)	117 (13.2)	883
Assess whether the information on health risks available in the media is reliable.	312 (35.0)	175 (16.6)	239 (26.8)	85 (9.5)	79 (8.8)	890
Find information about activities that are good for your mental well-being.	504 (56.3)	169 (18.8)	126 (14.0)	50 (5.5)	46 (5.1)	895
Understand the information available in the media on how to become healthier.	488 (54.5)	183 (20.4)	139 (15.5)	46 (5.1)	39 (4.3)	895

Caption: 1=very easy; 2=easy; 3=neither easy nor difficult; 4=difficult; 5=very difficult

Table 2 shows the results of the three GLMs using Wald statistics, and Table 3 shows the Betas of the statistically significant predictor variables. The independent variables' education (strong association: Wald = 13.8) and age (moderate to strong association: Wald = 8.4) were statistically significant predictor variables in the domain "Evaluation and application of information relevant to health in the field of health care." Age was a statistically significant predictor variable in the domain "Finding /accessing and evaluating information in the field of disease prevention" (moderate association: Wald=5.2) (Table 2).

Although not significant, there is a moderate association between the education variable and the domain "Individual's ability to find/access and understand health-relevant information in the field of health promotion" (Wald=8.8). However, there is insufficient robust evidence to state that this impact is statistically significant, possibly because it is a categorical variable with six categories.

Table 2 - Generalized Linear Model results for each domain of the HLS-EU-Q6 instrument (n=913)

Model	Independent variable	Degrees of freedom	Wald statistics	p
1 (Evaluation and application of health-relevant information in the field of health care)	**Education**	**5**	**13.85**	**0.017**
	Age	**1**	**8.42**	**0.004**
	Number of people you live with	1	0.59	0.440
2 (Finding/accessing and evaluating information in the field of disease prevention)	Education	5	5.87	0.319
	Age	**1**	**5.20**	**0.023**
	Number of people you live with	1	0.01	0.935
3 (Individual's ability to find/access and understand health-relevant information in the field of health promotion)	Education	5	8.86	0.115
	Age	1	0.20	0.654
	Number of people you live with	1	1.26	0.260

The "Evaluation and application of health-relevant information in healthcare" comparison between people between 1st and 5th-grade education and those who completed an undergraduate course showed a Beta of -0.918 (Table 3). The negative value indicates that, on average, people who have "completed an undergraduate course" have scores that are 0.918 units lower than people with

"between 1st and 5th year of education". Higher scores indicate that the task is more complex, and lower scores indicate the task is more manageable. The Beta of -0.918 suggests that, on average, people who have "completed an undergraduate course" find it easier to evaluate and apply health-relevant information in the healthcare field than people with "between 1st and 5th grade" education.

The same phenomenon appears in the comparisons of people who "Have done an undergraduate course" and people "Between 6th and 8th or 9th grade" (b = -0.609) and "Finished high school" (b = -0.498) (Table 3). That said, people who have "completed an undergraduate course" find it easier to evaluate and apply health-relevant information in healthcare than people with fewer years of education.

The Beta of 0.742 presented in the comparison between people who did postgraduate studies and people who studied between 1st and 5th grade (Table 3) suggests that the difficulty scores are 0.742 units higher for the "Between 1st and 5th grade" group compared to the "Did postgraduate studies" group. Thus, individuals who are "Between 1st and 5th year" find evaluating and applying health-relevant information more complex than those who have done postgraduate studies.

Age was a predictor variable for the domains "Evaluation and application of health-relevant information in the field of health care" and "Finding/accessing and evaluating information in the field of disease prevention" (Table 3). The Beta of -0.006 indicates that for every one-year increase in age, the score for "Evaluation and application of health-relevant information in healthcare" decreases on average by 0.006 units. Beta -0.015 indicates that for every one-year increase in age, the score for "Finding/accessing and evaluating information in the field of disease prevention" decreases by an average of 0.015 units.

Table 3 – Betas of statistically significant predictor variables (n=913)

Model	Predictor variable	Pairwise comparisons	Beta	Wald Chi-squared	Sig.
Model 1 (Evaluation and application of health-relevant information in the field of health care)	Education	I did postgraduate studies / I started high school but didn't finish it	0.322	0.787	0.375
		Postgraduate / Between 1st and 5th year	**0.742**	**4.331**	**0.037**
		Postgraduate / Between 6th and 8th or 9th year	0.433	1.550	0.213
		I did postgraduate studies / I finished high school	0.322	1.884	0.170
		I went to graduate school / I took an undergraduate course	-0.176	0.533	0.465
		I started high school but didn't finish / I took an undergraduate course	-0.498	2.287	0.130
		I started high school but didn't finish / I finished high school	0.001	< 0.001	0.998
		I started high school but didn't finish / Between 6th and 8th or 9th grade	0.111	0.074	0.786
		I started high school, but didn't finish / Between 1st and 5th grade	0.421	1.001	0.317
		Between 1st and 5th grade / Between 6th and 8th or 9th grade	-0.310	0.577	0.448
		Between 1st and 5th grade / Finished high school	-0.420	1.723	0.198
		Between 1st and 5th year / I took an undergraduate course	**-0.918**	**8.003**	**0.005**
		Between 6th and 8th or 9th grade / Finished high school	-0.110	0.133	0.715
		Between 6th and 8th or 9th grade / I took an undergraduate course	**-0.609**	**3.839**	**0.050**
		I finished high school / Took an undergraduate course	**-0.498**	**7.759**	**0.005**
		Age	**-0.006**	**8.424**	**0.004**
2 (Finding/accessing and evaluating information in the field of disease prevention)		Age	**-0.015**	**5.204**	**0.023**

Sig = Statistical significance
The first variable mentioned in pairwise comparisons is the reference variable

Discussion

This study included 913 participants, primarily women over 50, from an extension project whose main objective was promoting sports.

Several systematic reviews have shown the benefits of physical activity for aging, such as reducing falls and improving balance,[15] reducing the burden of age-related chronic diseases[16], and reducing the risk of dementia and Alzheimer's disease[17].

An umbrella review[18] identified a positive association between physical activity and general and cardiovascular mortality reduction. It also identified a decrease in the risk of developing breast and prostate cancer, fractures and falls, and other conditions of the musculoskeletal and joint systems, and a reduction in cognitive decline, dementia, and depression. In addition, better quality of life and active and independent aging have been shown.

As identified, most studies discuss active aging with a focus on disease prevention and outcomes related to morbidity and mortality. However, people and groups need to be able to make daily choices about diet, physical activity, adherence to treatment, means of transportation, and other factors considered determinants of individual health. Inclusion of income, educational level, and HL as modifiable factors is imperative.[19]

However, when discussing health promotion, the determinants of active aging do not depend solely on the individual. We need environments that promote life, strengthen—or enable—choices in contexts of vulnerability, and reduce social inequalities and, consequently, health.

Education is defined as one of the determinants of health and health-related behaviors. The lower the level of education, the lower the chance of adhering to healthy behavior, which is one of the factors that underpin health inequalities.[20-21]

However, improving the general educational level of a population is not directly associated with improved HL or adherence to healthy behaviors.[22-23] Since the beginning of the 21st century, HL has been discussed as a strategy to improve the health of populations, mainly because it works with health promotion and education pragmatically.[24]

It is, therefore, essential to know the population's level of HL. To identify the primary needs and gaps and propose individual, collective, and population interventions based on evidence and theories that enable effective changes in behavior and, consequently, better health outcomes and quality of life. Above all, they allow health decisions based on collective choices.

Thus, the literacy level, primarily scientific literacy, can change the ignorance of communities and populations.[25] Scientific literacy is directly associated with factors related to finding/accessing and evaluating information. In health, this literacy can be focused on subjective and individual needs and on collective mobilizations to promote equity, with a focus on collective processes of social determination.

Concerning the HL assessed in this study, the instrument used allows us to identify aspects related to three domains: evaluating and applying health-relevant information in the field of health care (questions 1 and 2); finding or accessing and evaluating information in the field of disease prevention (questions 3 and 4); the individual's ability to see or access and understand health-relevant details in the field of health promotion (questions 5 and 6).[14]

The results show that, although the scores were mostly 1 and 2 for all the questions, some study participants had difficulties related to the three fields assessed. The lowest HL score for questions 3 and 4 stands out, suggesting gaps in finding, accessing, and evaluating information in the field of disease prevention, especially with mental health, and identifying information widely disseminated as true or false.

Although the media and the internet increasingly facilitate access to health information, evidence shows the importance of HL in dealing with individual, community, and population health situations.[26-29]

Even with broad access to health information, scientific literacy concerns how the scientific community produces evidence, how the media shares this information, and how this information is received and applied by the general population.[30]

The participants in this study have lower HL in the concept of scientific literacy applied to health. HL can be promoted as a means of achieving public health since it increases individual and collective responsibility for health.

In the Brazilian context, it is essential to know the level of HL to highlight the need to promote spaces for dialog, effective communication, and shared decision-making on health. In this context, the focus of HL needs to explore both health promotion and the modification of factors in the social determination of health, as well as the user-professional relationship. This will finally lead to equitable public policies and a scientifically literate society.

Promoting skills related to SL can improve the population's health and quality of life and contribute to exercising citizenship. In health, it can boost social participation through institutionalized spaces—health councils and conferences—and non-institutionalized spaces, such as popular participation in the routine of services and the actions of health teams. Increasing HL can combat misinformation, promote the possibility of making autonomous choices, and increase interest in social participation in guaranteeing rights.

The study's limitations refer to data collection in a virtual environment and with a self-administered measuring instrument, which can lead to difficulties in understanding the questions or the digital tools, which can cause response bias. Furthermore, to protect the participants' privacy, their residence was not identified, so it was impossible to analyze the association between the region of the municipality and HL. There is a limitation related to cross-sectional methodological design, which prevents the establishment of cause-effect evaluations.

Despite the limitations, this study contributes to identifying the level of HL in a population participating in a sports extension project linked to a Federal University in different areas and regions of Rio de Janeiro.

Conclusion

In this sample, education and age were factors associated with HL. The aim of this study to identify the level of HL among the participants was achieved. However, future studies are needed to produce evidence to corroborate these results, promote interventions to increase HL among physical activity practitioners, and assess its impact on engagement and defense of health as a right.

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